

St. John's University

St. John's Scholar

Theses and Dissertations

2021

**TEACHER PERCEPTIONS & PRACTICE OF TECHNOLOGY
INTEGRATION BEFORE AND AFTER PICRAT MATRIX
PROFESSIONAL DEVELOPMENT INTERVENTION**

Donald H. Heberer Jr.

Follow this and additional works at: https://scholar.stjohns.edu/theses_dissertations



Part of the Educational Technology Commons

TEACHER PERCEPTIONS & PRACTICE OF TECHNOLOGY INTEGRATION
BEFORE AND AFTER PICRAT MATRIX PROFESSIONAL DEVELOPMENT
INTERVENTION

A dissertation submitted in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

to the faculty of the

DEPARTMENT OF ADMINISTRATIVE AND INSTRUCTIONAL LEADERSHIP

of

THE SCHOOL OF EDUCATION

at

ST. JOHN'S UNIVERSITY

New York

by

Donald H. Heberer Jr.

Submitted Date November 10, 2020

Approved Date January 29, 2021

Donald H. Heberer Jr.

Dr. Anthony Annunziato

© Copyright by Donald H. Heberer Jr. 2021
All Rights Reserved

ABSTRACT

TEACHER PERCEPTIONS & PRACTICE OF TECHNOLOGY INTEGRATION BEFORE AND AFTER PICRAT MATRIX PROFESSIONAL DEVELOPMENT INTERVENTION

Donald H. Heberer Jr.

Professional development provides support and training to teachers using new technologies. Several educational technology models, guidelines, and frameworks have provided educators a guide to effective technology integration. Building upon previous models like the SAMR model (Puentedura, 2013), the TPCK model (Misrah & Koehler, 2005) and the RAT model (Hughes, 2006), a new model called the PICRAT matrix (Kimmons, 2018) has emerged. PICRAT accounts for both the student's interaction with educational technology and the teachers use of technology in instructional practice. The purpose of this study was to examine teacher perceptions and instructional practice on educational technology before and after the introduction of the PICRAT matrix through a professional development intervention session. The participants were secondary educators from various school districts from the Long Island region of New York. Data for teacher perceptions was collected via a pre-survey and post-survey. Participants also attended a professional development session on the PICRAT matrix. Teacher practice was examined by collecting samples of lesson activities as documentation before and after the professional development session. The lesson activities were evaluated using the PICRAT matrix as an instrument by the researcher before and after the professional development session. Interviews were conducted with participants that shifted the most

amount of spaces on the PICRAT matrix. The findings determined that participants immediately had a shift in their perceptions and instructional practice after the professional development session. They were able to implement higher levels of technology integration after just one professional development session. Stakeholders should consider the benefits of focused professional development on educational technology integration models, in particular PICRAT as an important part of their professional development offerings to their educators. Future researchers could expand the scope, sample size and length of the study to further test the findings.

DEDICATION

This dissertation is dedicated to Donald H. Heberer Sr., my father. He never finished his Bachelor's degree and always regretted it. Although he was only in my life for 16 years before he passed away, he always stressed the value and importance of education and hard work for me and my sister.

ACKNOWLEDGEMENTS

Going through this journey, has been a long and bumpy road. However, the support I received along the way has made all of the difference. I could not have done it without Team Don. Thank you to Dr. Anthony Annunziato for being my mentor (twice) and guiding me through this process. Thank you to Dr. Richard Bernato, who always helped me think about change in a different way and prove that no matter what the topic, “there’s a dissertation in that”. For Dr. Elizabeth Gil for getting me through the proposal phase and guiding me through my numerous drafts and edits. To Dr. James Campbell who helped me understand quantitative analysis and is serving on my committee.

To my participants in this study, I want to thank you for being patient and willing to participate during a global pandemic, when giving up any extra time was more challenging than ever. I appreciated your honesty and willing participation. To my classmates in the program, thank you for the motivation to finish. To Dr. Micheala Finlay, thank you for keep me sane during every step along the way, I’m lucky to have you as a friend and colleague.

For my friends and family, first, my mother, who always believed that I could and would accomplish anything (when I am ready to do so). To my sister, brother-in-law and nieces, Uncle D is going have more time on weekends to see you now, thank you for understanding. To my friends, who have been patient, that I’ve missed gaming night and other social gatherings to work on this project – thank you for being understanding and supportive. Last and most importantly, to my lovely wife, Jenn, who for the last three and half years, has given up almost every Saturday and many Sundays so I could work on this doctorate. The sacrifices you have made for me, so I could pursue my dream are limitless.

Buying a house, planning a wedding, and surviving a global pandemic during these last few years has been challenging on top of this doctorate. I can never express how much your support and love has helped me get through this. I love you!

TABLE OF CONTENTS

DEDICATION	ii
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	xii
LIST OF FIGURES	xiv
CHAPTER 1 - INTRODUCTION.....	1
Problem Statement.....	2
Purpose of the Study	5
Theoretical Framework.....	5
Conceptual Framework.....	6
Significance/Importance of the Study	8
Connection to Social Justice and Vincentian Mission in Education	9
Research Questions.....	9
(1) What are secondary teacher perceptions and prior knowledge of educational technology integration models?	10
(2) What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) model?	10
(3) To what extent does participants' experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?	10
Methods.....	10
Participants.....	10
Instruments.....	11
Intervention	11
Definition of Key Terminology	11
Summary of Chapter	14

CHAPTER 2 - REVIEW OF RELATED LITERATURE.....	16
Introduction.....	16
Review of Related Literature.....	16
History of Educational Technology.....	16
Standards, Guidelines & Frameworks for Educational Technology.....	20
Educational Technology Integration Models.....	26
TPACK Model.....	27
RAT and SAMR Models.....	28
The PICRAT Matrix.....	29
Counterpoints and Opposition to Educational Technology.....	32
Perceptions, Misconceptions, Beliefs, & Barriers of Technology Integration.....	33
Professional Development.....	34
Reflective Practice in Professional Learning.....	35
Gaps in the Literature.....	37
Summary of Chapter.....	38
CHAPTER 3 - METHODOLOGY.....	39
Introduction.....	39
Research Questions:.....	39
Rationale for Research Approach.....	40
Addressing the Research Questions.....	40
Research Design and Data Analysis.....	41
The Sample and Population.....	45
Instruments.....	46
Assigning Numerical Point Values to the PICRAT Matrix.....	47
Intervention.....	47
Procedures for Collecting Data.....	48
Data Collection and Data Analysis Approach.....	50

Researcher Role and Research Ethics.....	50
Trustworthiness of the Design	51
Summary of Chapter	53
CHAPTER 4 - FINDINGS	54
Introduction.....	54
Results/Findings	54
Overall Demographics	55
Overall District School Data by New York State Definition.....	57
Economically Disadvantaged.....	57
The School Districts	58
Sunset Grove School District.....	59
Sunset Grove Student Demographic Data	59
Participant Demographics at Sunset Grove	60
Ever Pines School District	60
Ever Pines Student Demographic Data.....	61
Participant Demographics at Ever Pines School District.....	61
West Elm School District.....	62
West Elms Student Demographic Data.....	63
Participant Demographics at West Elm School District.....	63
Island Acres School District	64
Island Acres Student Demographic Data.....	65
Teacher Demographics at Island Acres School District	65
Comparisons of School Districts by Demographics	66
Research Question #1: What are secondary teacher perceptions and prior knowledge of educational technology integration models?.....	67
Participant #01 – Sunset Grove – Pre-Test.....	67
Participant #02 – Sunset Grove – Pre-Test.....	68
Participant #03 – EverPines – Pre-Test	69
Participant #04 – EverPines – Pre-Test	69
Participant #05 – EverPines – Pre-Test	70
Participant #06 – West Elm – Pre-Test.....	72
Participant #07 – West Elm – Pre-Test.....	72
Participant #08 – West Elm – Pre-Test.....	73
Participant #09 – Island Acres – Pre-Test.....	74
Participant #10 – Island Acres – Pre-Test.....	75
Participant #11 – Island Acres – Pre-Test.....	76
Participant #12 – Island Acres – Pre-Test.....	77

Research Question #2: What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) model?	78
Results from the Pre-Professional Development Activities Are Evaluated by Researcher.....	80
The Professional Development Intervention Sessions	81
Outline and Overview of the Professional Development Session	82
Research Question #3: To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?	84
Part I - Teacher Perceptions After the Professional Development Session	84
Participant #01 Sunset Grove – After Intervention.....	84
Participant #02 Sunset Grove – After Intervention.....	85
Participant #03 – Ever Pines – After Intervention	86
Participant #04 – Ever Pines – After Intervention	87
Participant #05 – Ever Pines – After Intervention	88
Participant #06 – West Elm – After Intervention	89
Participant #07 – West Elm – After Intervention	90
Participant #08 – West Elm – After Intervention	90
Participant #09 – Island Acres – After Intervention	92
Participant #10 – Island Acres – After Intervention	93
Participant #11 – Island Acres – After Intervention	94
Participant #12 – Island Acres – After Intervention	95
Teacher Perceptions and Evaluation on the PICRAT Matrix.....	96
Participant #01 – Sunset Grove – Teacher Perceptions on the PICRAT Matrix	96
Participant #02 – Sunset Grove – Teacher Perceptions on the PICRAT Matrix.....	96
Participant #03 – Ever Pines – Teacher Perceptions on the PICRAT Matrix	97
Participant #04 – Ever Pines – Teacher Perceptions on the PICRAT Matrix	98
Participant #05 – Ever Pines – Teacher Perceptions on the PICRAT Matrix	98
Participant #06 – West Elm – Teacher Perceptions on the PICRAT Matrix.....	99
Participant #07 – West Elm – Teacher Perceptions on the PICRAT Matrix.....	99
Participant #08 – West Elm – Teacher Perceptions on the PICRAT Matrix.....	99
Participant #09 – Island Acres – Teacher Perceptions on the PICRAT Matrix.....	100
Participant #10 – Island Acres – Teacher Perceptions on the PICRAT Matrix.....	100
Participant #11 – Island Acres – Teacher Perceptions on the PICRAT Matrix.....	101
Participant #12 – Island Acres – Teacher Perceptions on the PICRAT Matrix.....	102
Overall Results of The Six Criteria to the PICRAT Matrix.....	102
Comparison of Pre & Post Professional Development Responses	108
Rubric for Converting Responses into Numbers Based on Participants Responses...	111
Statements Pre & Post Professional Development with Movement on a Scale	112
Changes in Teacher Perceptions and Statements Before and After the Professional Development Session.....	113
Part II - Teacher Instructional Practice after the Professional Development Session	114
Results from the Post-Professional Development Activities are Evaluated by Researcher.....	116

Comparison of Educational Technology Integration	116
Comparison between the Pre-Score Average and Post Score Average	117
The Number of Instances of Each PICRAT Box Before and After the Professional Development Session.....	117
Comparison Between the Post-Score Average (Researcher) and Post Score Average Self-Reported	118
Triangulation of Quantitative and Qualitative Data.....	121
Member Checking and Transcript Review	121
Interviews.....	121
Summary of Chapter	123
CHAPTER 5 - DISCUSSION	125
Organization of Chapter	125
Introduction.....	125
Implications of Findings.....	126
Research Question #1: What are secondary teacher perceptions and prior knowledge of educational technology integration models?.....	126
Research Question #2: What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?	127
Research Question #3: To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?.....	128
Impact of the Professional Development on Teacher Perceptions	128
Impact of the Professional Development on Teacher Instructional Practice	130
Relationship to Prior Research.....	130
Summary of the Discussion	133
Limitations of the Study	135
Additional COVID-19 Pandemic Limitations	137
Recommendations for Future Practice	137
School Districts and Policy Makers.....	139
Educators.....	139
Higher Education	139
Educational Technology Vendors.....	140
Recommendations for Future Research	140
Conclusions.....	141

EPILOGUE - COVID-19 PANDEMIC	143
Introduction.....	143
COVID-19 Questions and Optional Data	143
Optional Question 1: To what extent has the COVID-19 Outbreak and the move to remote learning impacted your perceptions of educational technology?.....	143
Optional Question 2: To what extent has the COVID-19 Outbreak and the move to remote learning impacted your use of educational technology?.....	145
COVID-19 Discussion and Conclusions.....	147
APPENDICES	148
APPENDIX A International Society for Technology in Education Essential Conditions.....	148
APPENDIX B Battelle for Kids Framework.....	150
APPENDIX C Request for Participants and Expectations.....	151
APPENDIX D Informed Consent for Respondents.....	152
APPENDIX E Request for Volunteers – Survey.....	154
APPENDIX F Sample Emails for Accepting / Rejecting Participants.....	159
APPENDIX G Initial – Survey	160
APPENDIX H Post PD Survey and Lessons	168
APPENDIX I Professional Development Session Slides	177
APPENDIX J Researcher Pre-Professional Development Evaluation with PICRAT Matrix Compared to Researcher Post Professional Development Evaluation, with Self-Reported Participant Evaluation.....	192
APPENDIX K Professional Development Session Transcript Session 01 - June 29, 4:00 PM	Error! Bookmark not defined.
APPENDIX L Professional Development Session Transcript Session 02 - June 29, 8:00 PM	219
APPENDIX M Professional Development Session Transcript Session 03 – July 1, 6:00 PM	232
APPENDIX N Professional Development Session Transcript Session 04 – July 2, 5:00 PM	248

APPENDIX O Professional Development Session Transcript Session 05 – July 6, 10:00 AM.....	259
APPENDIX P Professional Development Session Transcript Session 06 – July 10, 10:00 AM.....	270
APPENDIX Q Semi-structured Interview Questions for Participants.....	284
APPENDIX R Interview with coding for Participant #11 of Island Acres	286
APPENDIX S Interview with Coding for Participant #02 of Sunset Grove	312
REFERENCES.....	328

LIST OF TABLES

Table 1. Nine Lessons for 21st Century Learning (Saavedra 2012).....	23
Table 2. Participant Levels of Education and Experience.	56
Table 3. Frequency of Professional Development received in participants school districts.....	57
Table 4. Results “What is your primary way to learn about new educational technologies” question.....	57
Table 5. Ethnicity, Group Percentages and Graduation Rates for Sunset Grove School District (NYSED Data, 2020).	59
Table 6. Ethnicity, Group Percentages and Graduation Rates for Ever Pines School District (NYSED Data, 2020).....	61
Table 7. Ethnicity, Group Percentages and Graduation Rates for West Elm School District (NYSED Data, 2020).....	63
Table 8. Ethnicity, Group Percentages and Graduation Rates for Island Acres (NYSED Data, 2020).....	65
Table 9. Researcher Evaluated Lesson Activities and Score Given.	80
Table 10. Session Dates, Times, Duration, and Participant Details.	81
Table 11. Thick Description of all slides in the professional development session.	83
Table 12. Six Criteria for Evaluating Instructional Technology Integration Models (Kimmons & Hall 2016b).....	103
Table 13. Sunset Grove Teacher Perceptions of the PICRAT Model.	104
Table 14. Ever Pines Teacher Perceptions of the PICRAT Model.....	105
Table 15. West Elm Teacher Perceptions of the PICRAT Model.	106
Table 16. Island Acres Teacher Perceptions of the PICRAT Model.....	107
Table 17. Averages of Teacher Responses using Six Criteria for Evaluating Technology Integration Models.....	108
Table 18. The comparison of responses before and after the professional development session (1 – Not Important 5 – Very Important).....	109
Table 19. Values assigned to the responses based on the participants statements.	111
Table 20. Comparison of Participant Responses to Statements Before and After Professional Development Session.....	112
Table 21. Researcher Evaluated Lesson Activities and Score Given After Professional Development Intervention.	116
Table 22. Researcher Evaluated Lesson Activities and Score Compare before and after Professional Development Session.....	117
Table 23. Number of Instances of each level of PICRAT, before and after intervention with the difference.....	118
Table 24. Self-Reported Evaluation of Lesson Activities and Score Given After Professional Development Intervention.	119
Table 25. Comparison between the Post-Score Average (Researcher) and Post Score Average (Self-Reported).	120
Table 26. The difference between the researcher’s score and the self-reported score.....	120
Table 27. Coded Themes after Interviews with the Two Participants.....	123
Table 28. Coded Free Responses for Optional Question #1.....	143

Table 29. Emerging Themes based on Coded Free Responses for Optional Question #1.	145
Table 30. Coded Free Responses for Optional Question #2.	145
Table 31. Emerging Themes based on Coded Free Responses for Optional Question #2.	146

LIST OF FIGURES

Figure 1. Research Design Incorporating Lewin’s and Guskey Models.	7
Figure 2. The PICRAT Model (Kimmons, 2018).	13
Figure 3. The TPACK Model (Kimmons, 2018).	28
Figure 4. The RAT and SAMR Models (Kimmons, 2018).	29
Figure 5. The PICRAT Matrix (Kimmons, 2018).	30
Figure 6. Shifts in the PICRAT Matrix (Kimmons, 2018).	32
Figure 7. Researcher assigning point values to the PICRAT matrix.	47
Figure 8. PICRAT Flowchart for deterring RAT (Hughes 2006, Kimmons, 2018).	79
Figure 9. Chart of Participants Responses – “What’s Most Important?” – Before Professional Development Intervention Session.	109
Figure 10. Chart of Participants Responses – “What’s Most Important?” – After Professional Development Intervention Session.	110
Figure 11. Guskey’s Model of Professional Development Change (Guskey, 2002).	132
Figure 12. Updated Framework based on this study.	132

CHAPTER 1 - INTRODUCTION

Technology in education is not a modern concept. New technologies have been implemented into educational institutions for well over a century. In the last few decades, there has been an effort to measure the level of technology integration in the classroom. Multiple models have tried to measure how the technology changes the lesson and the experience in the classroom. However, one of the main areas that many of these models often neglect is the student relationship with the technology or student engagement when measuring the use of integrating educational technology (Kimmons et al., 2020).

The purpose of this study was to evaluate the ways that teachers integrate technology in the classroom. In particular, the focus was on the level of teacher technology integration and student relationship with the technology. One model, the Passive, Interactive, Creative, Replaces, Amplifies, Transforms, or PICRAT matrix uses a nine-box matrix and puts the Teacher Level of Technology use on the X-axis and the Student Relationship to the Technology on the Y-axis. By surveying educators regarding their integration of educational technology and best practices, this study helps provide a context for what criteria educators use for integration of technology. (Kimmons, 2018).

The PICRAT matrix is a relatively new educational technology integration model. By using this new model to examine technology integration and student engagement, a determination can be made, to what extent the PICRAT matrix impacts teacher perceptions and implementation practice in the classroom. By measuring teacher perceptions and practice before and after the PICRAT matrix is introduced through

professional development, we can calculate the extent that the PICRAT intervention has on the participants.

Problem Statement

Education has had a dynamic relationship with change (Cummings, 2015; Fullan, 2006; Popkewitz, 2018). Educational institutions pride themselves on their ability to prepare their students for the world ahead, yet they are slow to embrace change and often are resistant and systematically resilient to embracing changing (Cummings, 2015; Fullan, 2006). Because of factors like globalization, mobile technology and the internet, change is happening more rapidly now than ever (Friedman, 2016). There is a disconnect between factors in the workforce and society and what is actually happening in schools in the United States. According to the National Education Association, businesses are looking for students that are more collaborative, communicate well, can be creative, and critically think. These four skills are collectively referred to as the “4C’s of 21st Century Learning” (NEA, 2017). However, from 2001-2015, schools on average have shifted toward more standardized testing which in many ways is counter-culture to what skills businesses are seeking from prospective candidates (Popkewitz, 2018). There is a disconnection between factors of globalization, technology, and education. Human adaptability is happening too slow to keep up with and support the speed of change (Friedman, 2016).

In order to meet the needs of the new workforce and societal paradigm, many schools in the United States have been investing time and resources into educational technology, the most popular being a 1:1 device program. These programs allow every student to have their own device to do assignments and participate in class. Because of the increasing demands of 21st century skills and the need for student engagement, how

educational technology is used in the classroom, is more important than what educational technology is used (Kimmons, 2018).

Today, educational technology integration is often measured with models that focus only on the technology and/or the teacher. According to Fredricks (2004), learning in the classroom, is more effective when it is focused on the student, in particular student learning and engagement. The PICRAT matrix includes student interaction with technology or student engagement as a major component of the technology integration model. According to Blumenfeld (1992), “the quality of student engagement may diminish if what is being improved is not perceived as meaningful or valued by the student” (p. 273).

Since our society has invested heavily in technology on a personal and business level, it is natural that education try to emulate what is happening in the private sector. However, education has been slow to embrace reform and especially slow to embrace technology. Schools have been investing in 1:1 device programs. In these schools, every student has a device provided to them by the school. In some schools, students are permitted to take them home. In other schools, having tablets, iPads, and Chromebooks in the hands of every secondary student and some elementary school students is becoming commonplace (Romrell et al., 2014).

According to Ertmer et al. (2012), the manner in which the teacher teaches the students should be completely different with educational technology - “a new pedagogy, a new way of doing school” (Ertmer et al., 2012). According to Hughes (2006), teachers need to have a base level of skills to build upon when considering integration of technology. Hughes defines it into three categories: replacement, amplification, and

transformation, more commonly referred to as the RAT Model (Hew & Brush, 2007; Hughes, 2005). This is similar to the SAMR model, which is based on Hughes research and defines technology integration into four categories: substitution, augmentation, modification, and redefinition (Puentedura 2006, 2013; Romrell et al., 2014). Regardless of the adopted model, there is a clear shift in the way technology is used in the classroom. In the replacement/substitution level, the technology just replaces the traditional way without little benefit. In the amplification/augmentation and modification levels, the technology brings added value to the lesson. This added value could be in the form of efficiency, increased engagement, or better student understanding, etc. Lastly, the transformation/redefinition level leverages the technology in such a way the lesson would not be possible without it being used in the lesson, and the outcomes are unique and substantial (Hew & Brush, 2007; Hughes, 2005; Ottenbreit-Leftwich et al., 2010; Romrell et al., 2014).

For some students, using any type of technology is engaging in itself; however, how the technology is used and engages students plays a critical role in the classroom. According to a study by Schindler et al. (2017), “One overarching theme is that most of the technologies we reviewed had a positive influence on multiple indicators of student engagement, which may lead to a larger return on investment in terms of learning outcomes” (p. 16). Technology use and student engagement are linked, yet many of the educational technology models ignore student engagement or student interaction with the technology altogether.

One of the popular and widely used models is the Substitution, Augmentation, Modification and Redefinition (SAMR) Model. The SAMR Model measures four levels

of technology integration, Substitution, Augmentation, Modification, and Redefinition. The SAMR Model provides a streamlined approach to integration of technology in the classroom. It is simple to follow and is a good entry point for teachers to begin to measure their levels of technology integration. However, SAMR and many of the other models fail to measure student engagement as a category for integration (Hamilton et al., 2016; Kimmons, 2017).

Purpose of the Study

The purpose of this study was to determine educator perceptions and instructional practice of educational technology integration when categorizing it with the PICRAT matrix. This study examined several educators in several suburban secondary schools and their perceptions and use of educational technology integration.

The purpose of the study was to analyze educator perceptions and instructional practice and their connection to integration of educational technology when the PICRAT matrix was applied. The goal was to measure to what extent that educational technology is used in the classroom, and the level of technology integration measured by surveys of teacher perceptions and provided documentation evaluated using the nine-box matrix of the PICRAT matrix (Kimmons, 2017; Romrell et al., 2014). This study examined to what extent, if any, teacher's perceptions shift after professional development intervention, based on their survey responses, interviews, and sample lesson activities provided by the participants through documentation.

Theoretical Framework

When looking at change and how educational change takes place, it is difficult to come up with a solution that works for all scenarios. Lewin (1947)'s Change Theory

focused on a three-step model for change, (1) Unfreeze, (2) Change, (3) Refreeze, or changing as three steps abbreviated as “CATS (Changing As Three Steps)”.

This model is highly regarded in educational research. However, there are some critics who argue otherwise. Cummings (2015) asserted that when we look at organizational change, if we take a different approach, we may spark innovation. Perhaps when we look toward educational technology and its overall role in pedagogical shifts, we might need to look at other models for inspiration than just Lewin’s CATS model. A more recent perspective is through Thomas Popkewitz’s view of change and in turn the way that education should be structured (Popkewitz, 2018).

The Eisenhower Professional Development study (Garet et, al, 1999) examined teachers over a three-year period, found that teachers did not change their teaching practice year to year. The study stated, that “the overall findings imply that the positive effects of professional development on teaching practice would be increased if districts and schools provided a more coherent, systemic program of high-quality professional development for their teachers” (Garet et. al, 1999, p. 6). Based on these findings, professional development that is highly structured and that outlines an easy to follow, but structured model might have positive changes on teacher perceptions and practice.

Conceptual Framework

Using Lewin (1947) as a guide with the “Change As Three Steps,” the conceptual framework depicted in Figure 1 illustrates what aspects of this study occur in the “Unfreeze” phase, “Change” phase and the “Refreeze” phase. The specific aspects of this will be explained further in chapter three of this study. However, simply put, this study examined participants’ perceptions and instructional practice of educational technology, before and after an intervention of professional development of a particular educational

technology matrix, PICRAT. The researcher examined to what extent the instruction of the PICRAT matrix has on the participants' perceptions of educational technology integration and their instructional practice. Figure 1 shows that the teacher perceptions were measured by surveys and the instructional practice were measured by their submission of lesson activities before and after the professional development intervention. These activities were mapped onto the PICRAT model. The professional development intervention session served as the potential catalyst for change. Near the end of the study, participants that exhibited the most movement on the PICRAT matrix were interviewed.

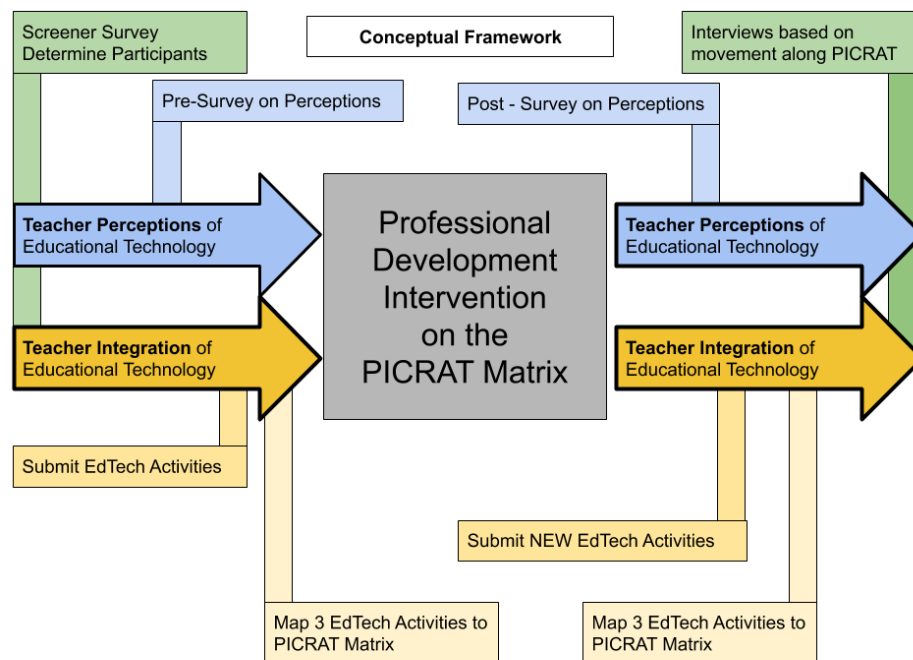


Figure 1. Research Design Incorporating Lewin's and Guskey Models.

Guskey (2002) defined his own Model of Teacher Change. It consisted of three outcomes of professional development. The first outcome was a change in teacher practice, the next change was in student learning outcomes, and the final change was in teachers' beliefs and attitudes. According to Guskey, the most important was the order.

Teachers were willing to change their practice before they considered the students or their own beliefs. However, once the teachers implemented the change in practice, they might be inspired to change the student learning outcomes. Once teachers see positive results in student learning outcomes, they might change their beliefs and attitudes. Combining this process with Lewin's ideas about Unfreezing, Change, and Re-freezing, one might consider the professional development the "heat" to begin the melting process as the catalyst for change as depicted in Figure 1. (Guskey, 2002; Lewin, 1947).

Significance/Importance of the Study

Educational Technology integration models all have various ways of measuring educational technology integration. However, few of them measure student's relationship to the technology when evaluating educational technology integration. Since student involvement is an important factor in learning and a great motivator, it should also be considered as a rationale for educational technology use. The PICRAT matrix not only measures the teacher's use of educational technology, but also the students' interaction with the educational technology. According to Blumenfeld (1992), students are more motivated to learn more when they are involved in a lesson. By mapping teachers' perceptions of educational technology, and their actual implementation before and after professional development intervention on the PICRAT matrix, teacher's perceptions may shift. Additionally, teacher's integration practices may shift based on the introduction of this new model. Perceptions may be shifted based on the explanation and integration of the new model in the teacher's own practice. Since the PICRAT matrix was only first released in 2018, there is little research on this model (Kimmons, 2018). The aim of this study was to determine if there was a change in teacher perception and teacher practice after the introduction of the PICRAT matrix for potential implementation and

professional development for educators. The PICRAT matrix is designed to be a planning model, but it might be used as an effective reflective tool. If teachers reflect on their own educational technology integration, they can use the PICRAT matrix to see where they are in the matrix and try to adapt their lesson to reach a higher level.

Connection to Social Justice and Vincentian Mission in Education

For the purpose of this study, it was important to select school districts from different areas with different demographics such as: race, socio-economic status, and availability to educational technology. However, the digital divide, has shifted from a disparity between the “haves” and the “have nots” to “those that know how to use it” and “those that do not” (Huffman, 2018). Perhaps the same could apply to educators; there could be an abundance of technology access, but without proper training or use, it is less effective in terms of practice in the classroom.

Although not a primary focus of this study, data was analyzed to determine if there was a difference in perceptions of teachers in school districts based on racial demographics, teacher’s experience, and the educational technology available to them. If there was a connection or no connection, this was included in the scope of the project.

Research Questions

Overall, this study investigated teacher’s perceptions and prior knowledge of educational technology integration models. Additionally, teacher’s use and practice of educational technology was collected. The impact of a specific professional development session on the PICRAT matrix was investigated to see if the professional development session had any effect on the teachers’ perceptions and instructional practice. The research questions that guided this study are listed below:

- (1) What are secondary teacher perceptions and prior knowledge of educational technology integration models?
- (2) What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) model?
- (3) To what extent does participants' experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?

Methods

Participants completed several surveys to measure their perceptions toward educational technology integration models before and after a professional development intervention session. Participants also provided lesson activity samples as documentation of educational technology integration. Next participants attended a professional development intervention session focused on a particular educational technology model: PICRAT. Afterward, participants were asked to answer similar questions in the survey. Participants also provided documentation of their educational technology integration. The researcher analyzed these responses and documentation for patterns or changes in perception or practice. Participants that had substantial change were interviewed for additional data.

Participants

The sample consisted of twelve teachers from a suburban area of New York State from four different school districts. Participants had different experience in years of

teaching, degrees, and subjects. They also had different levels of experience with educational technology integration.

Instruments

The PICRAT matrix will be used as an instrument for evaluating the documentation provided by the participants. Additionally, the researcher assigned a numeric value to each of the nine boxes of the PICRAT matrix in order to further quantify the documentation of lesson activities provided. The PICRAT matrix is depicted in Figure 2.

Intervention

The professional development session served as an intervention for the participants. Data was collected before the intervention through survey and documentation. After the professional development intervention, new survey data was collected and documented. The data collected after the professional development intervention was compared to the data collected prior to the professional development intervention. The researcher analyzed the data and looked for changes to determine to what extent, if at all, the professional development intervention session impacted teachers' perceptions and instructional practice.

Definition of Key Terminology

Educational technology integration: In this study it is defined as how teachers use technology to drive their lessons within the classroom setting, by leveraging it to increase student engagement, understanding or to create learning experiences not possible without it (Hew & Brush, 2007).

Instructional Practice: For the purpose of this study, instructional practice refers to how teachers implement a lesson in the classroom. Teacher's application of how they teach in the classroom, how they design lessons and how they execute them.

PICRAT Matrix (Shown in Figure 2.) (as described by Kimmons 2018):

Passive: Students are observers, bystanders in their learning.

Interactive: Students engage in material in an interactive way - they are active learners

Creative: Students are creating materials themselves; they are creative learners rather than interactive or passive ones.

Replacement: Changes the appearance of our practices or dressings of our practices but not the practice itself. It doesn't affect teaching or learning practices and behaviors. It can increase access but it doesn't improve learning.

Amplifying: Technology improves the efficiency of tasks or introduces new functions to original tasks.

Transforming: It introduces new activities and learning that are impossible without technology. Take away the technology – take away the learning too.

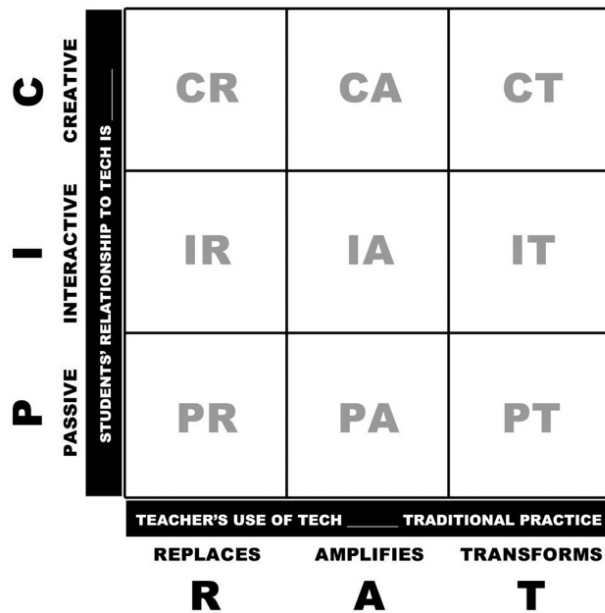


Figure 2. The PICRAT Model (Kimmons, 2016).

SAMR model: The model in which technology integration is broken down into four distinct levels: substitution, augmentation, modification, and redefinition. Substitution and Augmentation are considered to be part of the enhancement category, while Modification and Redefinition are considered to be in the transformation category (Puentedura, 2006, 2013; Romrell et al., 2014).

Student Engagement: Taylor (2011), stated that, “student engagement has primarily and historically focused upon increasing achievement, positive behaviors, and a sense of belonging in students so they might remain in school” (p. 4). However, for the purpose of this study, we defined student engagement as interest in the activity. Students that are engaged would have active participation in the lesson show excitement. In this study, we were not be able to measure student engagement directly. We focused instead on student interaction with technology.

Student Interaction with Technology: Different than student engagement, but related, student interaction with technology describes the type of interaction the student has with the technology. Students can be engaged with a passive use of technology. However, students might be more likely engaged with an interactive or creative use of technology. These terms are further defined in the PICRAT Matrix.

Teacher Perceptions: This refers to teacher's attitudes, beliefs, and conceptions. It is important to note that individual perceptions might contradict fact evidence or data and instead be based on feelings, experiences, and potential biases.

Summary of Chapter

In this chapter, the researcher explained the problem statement, that schools often attempt to support educational technology without the proper professional development and modeling to support their teachers. Many models lack student interaction or engagement with the technology. The purpose of this study will be to examine teachers' perceptions and instructional practice in implementation of educational technology, using the PICRAT matrix as a guide. The theoretical framework is rooted in change as process in education. The significance of this particular study, is that the PICRAT matrix is relatively new and has not been widely used as a tool to measure the nature of technology integration for secondary teachers. The research questions in this study will examine teacher perceptions and practice, before and after the introduction of the PICRAT matrix during a professional development intervention. Lastly, this chapter includes a list of key terminology.

The next chapter contains a review of the relevant literature. First, it explores the history of educational technology. Additionally, the chapter explains the movement to standardize classroom integration and the use of several models and frameworks to define

and categorize the level and effectiveness of the educational technology in the classroom. Lastly, the chapter focuses on the PICRAT Matrix and why it should be used to measure teacher's relationship with the technology and the student's interaction with the technology.

CHAPTER 2 - REVIEW OF RELATED LITERATURE

Introduction

This study's purpose was to identify secondary teachers' perceptions of educational technology and the integration of educational technology. The following review of the literature first examined the history of technology in education. Second, the review focused on various frameworks, standards, and guidelines for the integration of educational technology. Next, the literature explores several of the integration models. Passive, Interactive, Creative, Replaces, Amplifies, Transforms, or PICRAT being a newer model of technology integration, because it focuses on the level of student interaction as well as the level of technology integration. Finally, the review of the literature explores barriers, challenges, and misconceptions of educational technology.

Review of Related Literature

In reviewing the related literature for the purpose of this study, the researcher examined several key areas. First, it was important to research how educational technology developed over time. Second, the focus shifted to how organizations began to develop ways to measure and assess the integration of educational technology with standards and guidelines. Next, how standard, guidelines, and frameworks for educational technology paved the way for Educational Technology integration models. Additionally, the researcher explored some perceptions, misconceptions, and barriers for educational technology integration. Lastly, how these the need for high quality professional development because of the beliefs, misconceptions, and barriers to integrating educational technology into a classroom setting.

History of Educational Technology

Educational Technology is an essential part of modern-day education. However, it was not always that way. Over a hundred years ago, school museums were established in St. Louis (1905), Reading (1908), and Cleveland (1909) to provide resources for teachers to use in schools (Saettler, 1990). In the late 1920s and early 1930s radio and silent films began to make their way into the classroom. In fact, “Eastman Teaching Films” provided silent films for schools for geography, general science, and health (Saettler, 1990).

World War II changed the way educational technology was viewed by many Americans. According to Saettler (1990), “The war effort brought the first significant convergence of the visual instruction tributary with the mainstream of educational technology” (p. 194). Additionally, the importance of science, math, and other subjects related to war efforts became more prevalent to educators (Mehlinger & Powers, 2002; Saettler, 1990). In 1957, the Soviet Union’s launch of Sputnik, the first space satellite, shocked the United States, into spending millions of dollars on math, science, and technology (Reiser, 2001).

The next shift for educational technology was the development of public educational television channels that could be broadcast and supported in large part by the Ford Foundation (Marr, 2011). However, much like radio and silent films before, educational television programming had difficulty garnering success with the public because many people did not know the hours that they broadcasted content or even that these stations existed (Kent & McNergney, 1999; Mehlinger & Powers, 2002; Saettler, 1990).

In the 1970s, mainframe computer technology coupled with computer assisted instruction (CAI) began to gain popularity (Saettler, 1990). CAI functioned by students

using terminal access allowing them to connect to the mainframe to receive the computer paced content. Early computer-assisted instruction, focused on rigid curriculum and content, but it did have learner feedback and student record keeping, and did have adaptive content branching (Saettler, 1990).

The 1980s were the tipping point for microcomputers and educational technology in schools. The microcomputer was small, powerful, and much more affordable than mainframe computers. Apple Computer led the way in getting computers into schools. By early 1983, seventy-five percent of all secondary schools had a computer laboratory, with forty percent of all elementary schools (Marr, 2011; Mehlinger & Powers, 2002). Despite the promise and excitement of affordable computers for education, the ratio of computers to students was 125:1 in the 1980s. The lack of consistent access to these devices in schools hindered their success, but some products like the Apple IIe were very successful (Mehlinger & Powers, 2002; Saettler, 1990). The personal computer and the shift from a manufacturing workforce to an information-based workforce, only reinforced the importance of educational technology in schools (Kent & McNergney, 1999).

By the 1990s, personal computers had become more common in homes and schools. The emerging use of the internet for research, instruction, and distance learning became prevalent as schools sought connections to the growing technology (Reiser, 2001). Educational Technology is now a staple in modern education. Computers, tablets, and other devices became a regular part of students' education (Ottenbreit-Leftwich et al., 2010).

According to Kent and McNergney (1999), educational technology can be divided into two groups. Low technology includes “overhead projectors, maps and charts,

textbooks and a chalkboard. This form of technology is simple, flexible, durable, and quickly adapted to any teacher-defined modification of daily instruction” (Marr, 2001, pg. 39). High technology covers, video, audio, and multimedia. This technology is less flexible and difficult for teachers to adapt to their needs. Traditional high technology is video and audio. New high technology refers to the technology developed during or after the 1980s with the advent of microcomputer.

Educational Technology can transform the way teachers teach and students learn. Technology is expandable, adaptable, and ever increasingly affordable. Educational Technology fosters collaboration, increases in student achievement, student interest, and simplifies explanation of complex concepts (Friedman, 2016; Marr, 2011; Zucker 2008). The Apple Classrooms of Tomorrow (ACOT) started a research project to measure the impact of educational technology on teachers in 1986. This study became the basis of educational technology research in the modern microcomputer era (Dunleavy et al., 2007; Hew & Brush, 2007).

Having educational technology readily available is only the first step in the process. Knowing how to effectively integrate it into the classroom for students is more difficult. Today, several organizations provide teachers with guidelines, frameworks, and standards for integrating educational technology. The new digital divide is not about the separation of access to technology, instead, it is the division of training or knowledge of how to use the technology effectively (Huffman, 2018).

In the United States, the purpose of education has evolved over time. John Dewey (1934) stated, “the purpose of education has always been to everyone in essence, the same – to give the young, the things they need in order to develop in an orderly,

sequential way into members of society” (p. 12). Martin Luther King, Jr. (1948), stated that education’s purpose is to teach people to think critically and intensively, but more importantly character education. Margaret Ammons (1964), stated “The purpose of education has changed from that of producing a literate society to producing a learning society” (p. 1). More recently, views have focused on providing people with skills that will enable them to better themselves, their families, and the community. One of the purposes of modern education is to prepare children for adult roles in the workforce. In order for children to be successful in the present and the future, the role of education is to help children develop relevant skills and mastery in the English Language Arts, Math, Science, and other subjects. More recently businesses have sought to push skills that are crucial for the 21st century.

Standards, Guidelines & Frameworks for Educational Technology

Organizations and researchers have developed models, guidelines, and frameworks to help educators integrate technology in the classroom. Some of these models focus on the technology, others focus on the skills. One model for these skills is called the “fours C’s” of 21st Century Skills: critical thinking, collaboration, communication, and creativity (National Research Council, 2012; NEA, 2017). The purpose of these skills is to help pinpoint what is important in 21st century education. Educational Technology models often incorporate these skills into their models. For example, PICRAT has Creative, one of the 4C’s, as one of the levels on the matrix. Wagner (2008) also identifies various skills, put forth by business leaders regarding the skills necessary for success in the 21st century: (1) Critical thinking and Problem solving, (2) Collaboration across networks and leading by influence, (3) Agility and Adaptability, (4) Initiative and entrepreneurship, (5) Effective oral and written communication, (6)

Accessing and Analyzing information, (7) Curiosity and Imagination (p. 66-67). Wagner (2008) stated that these skills should be taught and assessed daily and infused into the curriculum to enhance the content being taught.

Several organizations have developed frameworks for educational technology, 21st century skills, and implementation of educational technology. P21's Frameworks for 21st Century Learning identified five main areas. The first area was Key Subjects and 21st Century Themes. The subtopics include: Global Awareness, Financial, Economic, Business and Entrepreneurial Literacy, Civic Literacy, Health Literacy, and Environmental Literacy. The second area was Learning and Innovation Skills. The subtopics include: Creativity and Innovation, Critical Thinking and Problem Solving, Communication, and Collaboration. The third topic was Information, Media, and Technology Skills. The subgroups are: Information Literacy, Media Literacy, and ICT (Information, Communications, and Technology) Literacy. The fourth topic was Life and Career Skills. The subgroup was Flexibility and Adaptability, Initiative and Self-Direction, Social and Cross-Cultural Skills, Productivity and Accountability, and Leadership and Responsibility. The last topic was 21st Century Support Systems. The subgroups were 21st Century Standards, Assessments of 21st Century Skills, 21st Century Curriculum and Instruction, 21st Century Professional Development, and 21st Century Learning Environments depicted in Figure 5. (Battelle for Kids, 2019). The second category, Learning and Innovation Skills, aligns almost exactly with the four C's of 21st century learning. Additionally, the other skills and areas of focus support the goals of educational technology use that will be discussed in detail later in this literature review

(Battelle for Kids, 2019; National Research Council, 2012; Wagner & Dintersmith, 2016).

Another organization that has developed standards/skills for technology integration is the International Society for Technology in Education (ISTE). According to their organization website, the ISTE Standards are:

The ISTE Standards are a framework for students, educators, administrators, coaches and computer science educators to rethink education and create innovative learning environments. The standards are helping educators and education leaders worldwide re-engineer schools and classrooms for digital age learning, no matter where they are on the journey to effective EdTech integration. (International Society for Technology in Education, 2019, para. 2)

ISTE (2019) has several sets of standards for different stakeholders in educational technology: Students, Educators, Education Leaders, (Technology) Coaches, and Computer Science Educators. Additionally, ISTE provides a list of fourteen (14) essential conditions that they have deemed “necessary to effectively leverage technology for learning” (ISTE, 2019, page: Essential Conditions). Below are the Essential Conditions [see Appendix A] and description as outlined by ISTE in their Essential Conditions framework (International Society for Technology in Education, 2019): (1) Shared Vision, (2) Empowered Leaders, (3) Implementation Planning, (4) Consistent and Adequate Funding, (5) Equitable Access, (6) Skilled Personnel, (7) Ongoing Professional Learning, (8) Technical Support, (9) Curriculum Framework, (10) Student-Centered Learning, (11) Assessment and Evaluation, (12) Engaged Communities, (13) Support Policies, (14) Supportive External Context (International Society for Technology in Education, 2019, page: Essential Conditions). Saavedra and Opfer (2012) stated that there are nine lessons for 21st-century learning that teachers should follow: (1) Make it relevant, (2), Teach

through the disciplines, (3) Develop thinking skills, (4) Encourage learning transfer, (5) Teach students how to learn, (6) Address misunderstandings directly, (7) Treat teamwork like an outcome, (8) Exploit technology to support learning, (9) Foster creativity (p. 10-11). Table 1 lists these nine lessons that focus on different aspects of the educational system:

Table 1.

Nine Lessons for 21st Century Learning (Saavedra 2012).

Nine Lessons	Connection to other models or frameworks
(1) Make it relevant	Students should have real world experiences that make learning meaningful to them.
(2) Teach through the disciplines	By teaching through the disciplines, rather than the disciplines themselves, students can make deeper connections to why their learning matters.
(3) Develop thinking skills	Critical thinking is one of the 4C's of 21 st century learning, students that can critically think can synthesize information to problem solve.
(4) Encourage learning transfer	Transferability of skills is important, as the world continues to change, students that can transfer skills are flexible and adaptable.
(5) Teach students how to learn	Students that understand their own metacognition, have the ability to know what methods work best for learning.
(6) Address misunderstandings directly	Communication is one of the 4C's of 21 st century learning, students that communicate well, will likely have advantage over those that do not.
(7) Treat teamwork like an outcome	Collaboration is one of the 4C's of 21 st century learning. Working well with others is essential in a service-based workforce.
(8) Exploit technology to support learning	Technology is the support that holds up all of the other lessons of 21 st Century Learning.
(9) Foster creativity	Creativity is one of the 4C's of 21 st century learning, Creativity let's students explore their own desires and helps make connections to their learning.

These nine lessons fit nicely in the frameworks of 21st century learning. There is overlap between these, the ISTE Framework, and P21's framework (Saavedra, 2012).

Outlining skills and standards is not the only perspective to have on educational technology. Mehlinger and Powers (2002) stated that Educational Technology serves one or more of four potential roles:

- 1) provide access to resources to enhance student research capacity.
- 2) engage students in real-world activities creating authentic experiences to make student inquiry more realistic.
- 3) provide the opportunity for students to demonstrate new learning in appealing forms such as digital video, audio, and slideshows.
- 4) provide student access to resources within and beyond the limited resources of their school walls through, among others, virtual fieldtrips, and distance learning (Mehlinger & Powers, 2002; as cited by Marr, 2011, p. 40).

Sandholtz et al. (1993) stated that teachers' integration of educational technology tools and best practices occurring in several phases:

The first phase, entry, educators struggle to make sense of low technology materials and newer high technology concepts. In this phase, educators might be inexperienced with educational technology. They might struggle along with issues of frustration, classroom management and discipline as well as a sense of anxiety or being overwhelmed. The second phase, adoption, is the overall difficulty of the teacher attempting to integrate the new technology tools and best practices into their lessons. While confidence, engagement and motivation of student increases, the technology is used in a way to only supplement existing curriculum practices (p. 6-7).

The third phase, adaption, puts productivity as the main purpose of the use of educational technology. Students are able to work and complete tasks and assignments more rapidly, allowing the educator to ask higher level questions and scenarios. At this level student engagement is considerably higher than the previous levels. The fourth phase is called appropriation. By now each teacher's personal understanding and skill

level of the technology determines how effectively and effortlessly they are able to use the technology to accomplish authentic learning. Since the educator has mastered the educational technology, it opens up new opportunities for team teaching, interdisciplinary project-based instruction, and individually paced instruction (personalized learning). It is interesting to note that bringing in experts from the local community greatly increased the speed of the appropriation phase. The culminating phase of teacher behavior is invention. “This phase involves the creation of new learning environments that are radically different from the traditional classroom environment” (Marr, 2011, p. 28).

Cuban (2001) has another perspective on the goals of educational technology. He asserts that there are three goals for software and hardware: 1) make schools more efficient than they currently are, 2) Transform teaching and learning into an engaging and active process connected to real life, 3) prepare the current generation of young people for the future workplace (Cuban 2001, loc.100-120). Cuban (2001), Dwyer et al. (1990), Mehlinger and Powers (2002), ISTE (2019), NEA (2017), Wagner and Dintersmith (2016) all share similar perspectives on the purpose of educational technology in the classroom.

All of the above-mentioned frameworks and guidelines provide educators with a roadmap for skills-based learning in education. Many of these skills have been incorporated into the educational technology integration models that have been developed. As technology changes rapidly, so does our way to integrate it into the classroom. In the late 1990s, PowerPoint might have been a dynamic educational tool, if not used effectively, it can be the same as a chalk board, or an overhead projector with transparencies for today’s students. Educational Technology Integration models help give

teachers a sense of where they are on a scale, continuum, or matrix, allowing them to see clearly what areas they might need to improve their pedagogy or use of educational technology in the classroom.

Educational Technology Integration Models

Technology has transformed our world over the last decade in ways we could not have imagined (Friedman, 2016). Educators today are encouraged by administrators, students, community members, and even their own colleagues to use educational technology in their classrooms (Zucker, 2008). However, Richard Culatta, CEO at International Society for Technology in Education, stated that there is a new digital divide in education – one group of teachers that uses technology to reimagine teaching and learning and another group that aims to digitize traditional classroom practices (TEDxBeaconStreet, 2013). Every school district has their own unique perspective about technology. Educators might feel different than the administrators, board of education, the community, and the students. All of these groups might have a different view, but some are confided with the views of their Board of Education, community, principal, or superintendent. Personal beliefs, perceptions, and values will vary between different people. Kimmons (2018) defined that there are four areas that educators' value in technology integration.

The first value is Proof. Proof uses evidence to showcase a tangible result of the technology integration. For example, a teacher will want the evidence to be in the form of student work, while a principal might want to prove that the educational technology can be used in multiple classrooms. Second, Facility is the how easy it is for the new technology to be “learned, implemented, or managed at the teacher- or student-level” (p. 17). Teachers are more willing to use technologies that are easier and take less time to

learn. Third, Compliance refers to security, ethical and legal requirements for students and teachers. Lastly, Institutionalization refers to “infrastructural compatibility, cost, lifespan, and management scale of new technologies” in the context of managing for the organization. Even technologies with educational value are abandoned because they are unmanageable. (Kimmons, 2018, pp. 16-19)

Many educators understand the need and importance of having proof of success through student learning and the facility of integrating technology because they experience instruction on a daily basis. However, educators sometimes do not consider the compliance and institutionalization issues, as oftentimes they are only concerned with the learning outcomes or how it affects them personally (Kimmons, 2018). Pressure on teachers to use educational technology sometimes overshadows the pedagogy or the student interaction. Teachers look for guidance on should they do it and how they should do it, more than why they should do it (Zucker, 2008).

There are several educational technology models and frameworks aimed at defining technology integration. The most prominent models are the TPACK Model (Mishra & Koehler, 2006), the RAT Model (Hughes et al., 2006), and the SAMR Model (Puentedura, 2010). These models have been widely accepted in educational technology for over a decade. Collectively, these models provide a process, flow chart, and visual representative roadmap for technology integration for educators.

TPACK Model

The TPACK/TPCK Model (Mishra & Koehler, 2006) is described as a technology integration model that showcases the connection between Technological Knowledge, Pedagogical Knowledge, and Content Knowledge as seen in Figure 3. The model is

depicted in Figure 4. The TPACK model’s main focus is that “Technological Pedagogical Content Knowledge” is the overlap and merging of three distinct areas in educational instruction: Pedagogical Knowledge, Content Knowledge, and Technological Knowledge to create something new. Educators must understand that using technology is not enough to transform learning (Mishra & Koehler, 2006). Teachers need to understand the roles to the extent at which technology, pedagogy, and content knowledge all have an impact on the learning experience for the student.

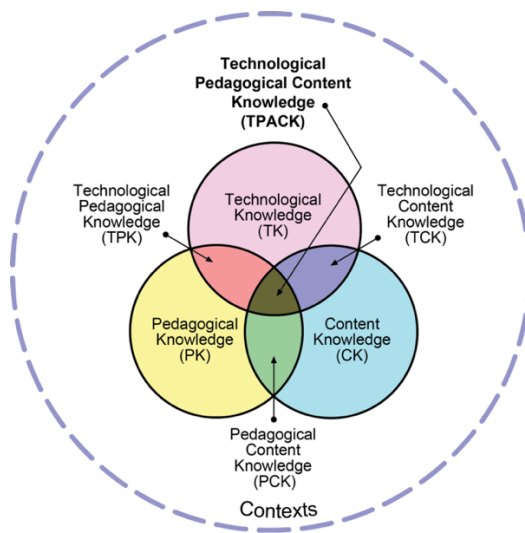


Figure 3. The TPACK Model (Kimmons, 2018).

RAT and SAMR Models

According to Hughes et al. (2006), teachers need to have a base level of skills to build upon when considering integration of technology. Hughes et al. divided these skills into three categories: replacement, amplification, and transformation (Hew & Brush, 2007; Hughes, 2005). This is considered the RAT Model. Kimmons (YEAR) defined the RAT model as a “technology integration model that views that technology is either used to replace a traditional approach to teaching (without any discernible difference on student outcomes), to amplify the learning that was occurring, or to transform learning in

ways that were not possible without the technology” (Hughes et al., 2006, as cited in Kimmons, 2018, para. 26). The overlap of the RAT and SAMR models is shown in Figure 4.

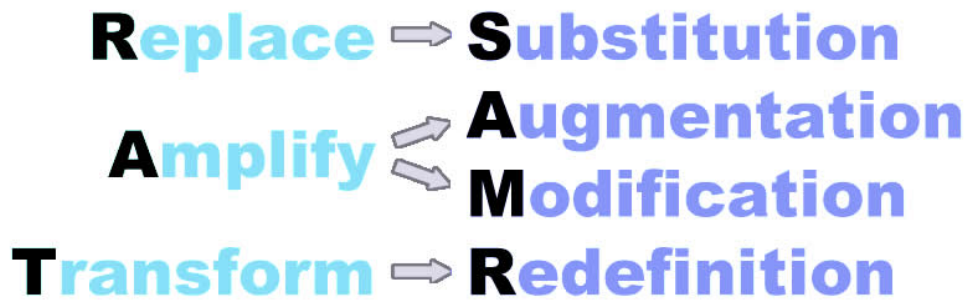


Figure 4. The RAT and SAMR Models (Kimmons, 2018).

Building upon the RAT Model is Puentedura’s SAMR Model (2006). In this model, technology integration is broken down into four distinct levels: substitution, augmentation, modification, and redefinition. Substitution and Augmentation are considered to be part of the enhancement category, while Modification and Redefinition are considered to be in the transformation category (Puentedura, 2006, 2013; Romrell et al., 2014).

The PICRAT Matrix

Although these three models do well to provide teachers with a basic understanding of the technology integration process, another more comprehensive model has emerged. Kimmons (2018) PICRAT matrix goes a step further than the RAT and the SAMR Models by incorporating student’s relationship to the technology.

PICRAT assumes that there are two foundational questions that a teacher must ask about any technology use in their classrooms. These include:

1. What is the students' relationship to the technology? (PIC: Passive, Interactive, Creative).

2. How is the teacher's use of technology influencing traditional practice? (RAT: Replace, Amplify, Transform) cf. (Hughes et al., 2006; Kimmons, 2018, para).

P PASSIVE STUDENTS' RELATIONSHIP TO TECH IS	CR	CA	CT
	IR	IA	IT
	PR	PA	PT
	TEACHER'S USE OF TECH		TRADITIONAL PRACTICE
	R	A	T
	REPLACES	AMPLIFIES	TRANSFORMS

Figure 5. The PICRAT Matrix (Kimmons, 2018).

The PICRAT matrix takes the three levels of the RAT model replace, amplify, and transforms, and adds a second axis for student's relationship to the technology for PIC: passive, interactive and creative. Kimmons (2016) described in his YouTube video, PICRAT for Effective Technology Integration in Teaching:

- Passive: Students are observers, bystanders in their learning.
- Interactive: Students engage in material in an interactive way - they are active learners.
- Creative: Students are creating materials themselves; they are creative learners rather than interactive or passive ones.

- Replacement: Changes the appearance of our practices or dressings of our practices but not the practice itself. It doesn't affect teaching or learning practices and behaviors. It can increase access but it doesn't improve learning.
- Amplifying: Technology improves the efficiency of tasks or introduces new functions to original tasks.
- Transforming: It introduces new activities and learning that are impossible without technology. Take away the technology – take away the learning too.

The PICRAT model is shown in Figure 6.

The PICRAT matrix takes the simplified RAT model and implements student engagement into the process. Student engagement is an important factor that many of the other models are missing. However, the PICRAT matrix has not been proven like many other models because it is so new. Kimmons (2018) suggested that teachers should strive to move to the upper-right most corner of the matrix by evolving their teaching and activities with students. The forward momentum is depicted in Figure 6.

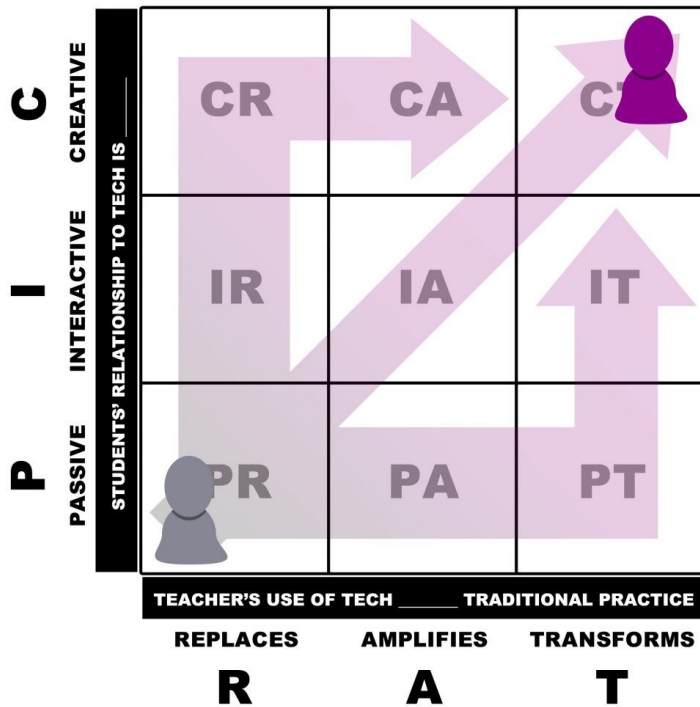


Figure 6. Shifts in the PICRAT Matrix (Kimmons, 2018).

Counterpoints and Opposition to Educational Technology

Although there is plenty of research to suggest that technology benefits students and is necessary for the 21st century, there is some research to suggest otherwise. Bauerlein (2011) suggested that “The sense of inevitability — technology’s here to stay, so we might as well go with it — prompts researchers to accept the practices technology fosters, to tolerate and respect the habits young people develop as a serious and catholic literacy” (p. 140). Bauerlein also asserts that screen reading is no longer done in addition to the reading or research students do on their own, it has become the primary form of text consumption (Bauerlein, 2008). Cuban (2011) stated that we have been convinced that technology can be a helpful tool for students and prepare them for the future, but it has not turned out that way because of the lack of teacher training, teacher willingness to

adapt, and lack of additional funding (Cuban, 2011). “Computers have been oversold, and underused, at least for now” (Cuban, 2011, loc. 1625).

Perceptions, Misconceptions, Beliefs, & Barriers of Technology Integration

Implementation of Educational Technology has several barriers: According to multiple studies, teacher’s challenges were in two categories: (a) classroom management, and (b) hardware issues (Dunleavy et al., 2007). Classroom management was uncovered as an issue in some of the studies that were reviewed by Dunleavy et al. (2007). School policies and procedures in many cases had to be revisited to ensure students were not only protected, but were disciplined in cases of misuse (Owen et al., 2006). Several of the studies cited that the laptops often were distracting to the students, when the students were not engaged in a specific task they might wander and go off-task (Dunleavy et al., 2007). One study by Mueller and Oppenheimer (2014) found that math and science teachers were less likely to use technology over social studies and English teachers. There was no evidence to suggest why, but perhaps it had to do with the difficulty of solving math problems with a keyboard over pen and paper. In The study, Mueller and Oppenheimer showed that those that took handwritten notes were likely to remember more than those that typed notes. “Participants using laptops were more inclined to take verbatim notes than participants who wrote longhand, ...if the notes are taken indiscriminately or by mindlessly transcribing content” students are less likely to recall what they have written (p. 8). For this experiment, they used $<.001$ as a strict measure for rejecting the null hypothesis. It was found that students recall was better when students studied or didn’t study with handwritten notes, when compared to students that took notes on laptop and either studied or did not study their notes (Mueller & Oppenheimer, 2014).

Technical challenges in the management of the devices for the students are a major issue. In addition, some students complained that the laptops sometimes had glitches, bugs or broke and it was frustrating for the students and the parents (Lowther et al., 2006). In the Apple Classrooms of Tomorrow (ACOT) study the school's technical team was not well equipped in managing and repairing the Apple devices due to their previous experience with only PC based systems (Dunleavy et al., 2007; Hew & Brush, 2007). Students in some cases were able to help the teachers during the lessons but when it came to technical issues like Internet connectivity and software updates, it was up to the school's technical team to troubleshoot these issues (Garthwait & Weller, 2005).

Students in several studies complained that bringing laptops to and from school each day was difficult because they were heavy (Lowther et al., 2006). Other teachers stated some students would forget to charge their laptops before coming to school (Dunleavy et al., 2007). As stated before, other challenges were based on the teachers' perceptions about technology, lack of pedagogical skills, lack of effective professional development and ongoing support.

Professional Development

Since World War II created a shortage of teachers, professional development became an important tool to train unqualified teachers in education. Post-War professional development began to shift toward teacher learning and process of change (Lieberman & Miller, 1992). Throughout the 1960s and 1970s, the shift of professional development focused on organizational change with the Rand corporation spearheading professional development sponsored by the U.S. Office of Education (House, 1979; as cited in Marr, 2011). Modern day professional development has been seeded in the push for education reform as a reaction to the "Nation at Risk" commission report (Cuban &

Cuban, 2007). The report was critical of the United States education system. As a result, a greater focus was placed on professional development in schools. As the United States moved toward the 21st century, programs like Goals 2000 and the No Child Left Behind Act sought to improve student learning and teacher learning through education reform (Marr, 2011).

According to Guskey (2002), there are three staff development outcomes: changes in teacher beliefs and attitudes, changes in classroom practices, and changes in the learning outcomes of students. He stressed that the order of these outcomes was most important. In his model of teacher change, professional development leads to change in teachers' classroom practices, which leads to change in student learning outcomes, which can finally change teachers' beliefs and attitudes. Guskey (2002) asserted that there are three guiding principles for significant and sustained educational improvements from professional development. The principles were: (1) recognize that change is a gradual and difficult process for teachers, (2) ensure that teachers receive regular feedback on student learning progress, and (3) provide continuous support, follow-up and pressure (Guskey, 2002, p. 386-388). Teacher reflection of their own profession and learning is an important part of the process (Rodgers, 2002).

Reflective Practice in Professional Learning

Reflective practice is a skill that most professionals develop over time and showcase through knowledge and skill. Educators call this pedagogy (Schön, 1983). “Whereas reflection-in-action is immediate, and often split second (Schön, 1983), reflection-on-action takes time, and involves looking at evidence, thinking about theories and alternatives. Reid (2004) adds reflection-for-action, the forwarding planning, based on preceding reflection. The form can and should be collaborative” (Benade, 2015,

p.44).” These types of reflection all focus on the learning of the teacher and the importance of acknowledging change as a process. Professionals engaged in reflective practice question existing practices and challenge old methods (Larrivee, 2000).

Rodgers (2002) explained the reflective process had four phases: (a) being present, (b) describing the moment, (c) analyzing the description, and (d) diagnosing. First, “being present requires the teacher to observe classroom activities, listen to student dialogue, and pay attention to problem solving strategies” (Turner, 2019, p 40). In the second phase, the teacher is tasked with describing the moment. This is achieved by stating facts only and not interpreting, just chronicling what happened. Next the analyzing phase focuses on the importance of getting a detailed description, and analysis of student responses. Diagnosing is the last part of the reflective process, where the teacher can take stock of what the strengths and weaknesses are in the classroom and prescribe a plan and enact a solution (Holmes, 2004; Rodgers, 2002). “Reflective practice can be a beneficial form of professional development...by gaining a better understanding of their own individual teaching styles through reflective practice, teachers can improve their effectiveness in the classroom” (Ferraro, 2000, p. 1).

Guskey (2014) also developed a model to help evaluate professional development. Guskey stated, “Those who plan professional learning experiences often do exactly the same thing. They plan for processes, not for results. Planning in this way is like choosing the route for a journey before deciding on the destination” (p. 11). It is important to work backward when designing professional development. Knowing what you want the participants to achieve is paramount to determining the effectiveness of the professional development session (Guskey, 2014).

Through Guskey’s “Planning Backward” approach, the order becomes most important. First, focusing on student learning outcomes helps determine what we want the students to learn. Guskey suggested using multiple sources of evidence whenever possible. In terms of professional development, the teachers might be in the student role because they are the ones learning. Second, should determine what new practices or procedures should be implemented. When planning, determine the best way to achieve the desired outcomes. Third, what ways could organizational support be offered to help stoke the embers of the change. Implement ways you encourage teachers and have indicators that help show progress and success along the way. Fourth, the focus shifts to educator knowledge and skills that are needed to implement the new practices successfully. These might be pedagogical or procedural. Lastly, the learning activities are developed to “best enable participants to acquire the needed knowledge and skills” (Guskey, 2014, p. 14). By following this model, it can enhance and make professional development experiences more effective and help ensure success.

Gaps in the Literature

Since the PICRAT matrix (Kimmons, 2016, 2018) is fairly new compared to the RAT (Hughes & Sharber, 2016), SAMR (Puendenta, 2006) and TPACK (2006) models, there are few studies or research on teacher perceptions, use, or implementation of the PICRAT matrix. Although there is plenty of research on the other models, PICRAT remains largely undocumented in studies. Although the research and institutional organizations would seem to align to the methodology of the PICRAT matrix, it would seem that they have not moved from the more popular SAMR and TPACK models. Teacher perceptions of the model have yet to be explored. The exploration of teacher perceptions, practice, and usage of the PICRAT matrix in this study, would prove

beneficial to educators seeking to find a more flexible and relevant framework to measure the level and integration of educational technology.

Summary of Chapter

In this chapter, the review of the literature examined the history of educational technology. The move toward computers forced a boom in technology that led to the development of various educational technology organizations that developed standards, frameworks, and guidelines for technology integration. Professional development has been given to teachers on several educational technology models. However, the PICRAT matrix is a new model that weighs student interaction with technology on the same importance as teachers' use of the technology. Additionally, the chapter examined professional development, models, and the concept of reflective practice. Lastly, the literature review explored counterpoints to educational technology and their critics.

The next chapter focuses on the methodology of the study. Review of the research questions, and their context in the study. Sample selection and participant expectations are addressed. The research design, data collection and data analysis are discussed in detail. Also discussed is the use of the PICRAT Matrix as an instrument to measure instructional practice in the classroom. The professional development session intervention procedure and scope are also covered. Additionally, any bias, ethical concerns, and limitations of the study are explored.

CHAPTER 3 - METHODOLOGY

Introduction

The purpose of this study was to examine teacher perceptions of current educational technology integration models and instructional practice, and to determine if the Passive, Interactive, Creative, Redefinition, Amplification, Transformation (PICRAT) model has any impact on these perceptions or instructional practice. This chapter first: (a) explains the research questions, (b) describes the field setting for the study, (c) explores the participant population and sample, (d) explains the instrumentation of the PICRAT matrix and the professional development session intervention, (e) explores how the research design will serve as an in depth look at how the study is organized, (f) discusses the data collect methods for the study, (g) explains the focus on trustworthiness, and (h) explores the limitations, confidentiality, and the role of the researcher.

Research Questions:

1. What are secondary teacher perceptions and prior knowledge of educational technology integration models?
2. What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?
3. To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?

Rationale for Research Approach

This study was a mixed method intervention study. Participants completed a pre-survey and post survey which provided quantitative data, through Likert scale and multiple-choice questions. There were also questions on the surveys that allowed the participants to provide qualitative feedback. Additionally, participants that met pre-established criteria were interviewed as another opportunity for qualitative feedback. Lastly, participants provided documentation in the form of sample lesson activities, which served as evidence to corroborate their survey and interview answers. This was an appropriate approach because, this allowed the researcher to determine the level of educational technology integration without the ability to observe it in action. In person-observations were not feasible due to global pandemic restrictions. While teacher perceptions can be measured through surveys and teacher instructional practice must be seen through evidence, in lieu of in-person observations, the teacher-provided samples of educational technology integration served as a baseline for pre-intervention and post-intervention practice of educational technology integration.

Addressing the Research Questions

The first research question, “What are teacher perceptions of educational technology integration models?” was addressed in the pre-survey sent out to participants at the beginning of the data collection. The second research question, “What types/levels of educational technology integration are occurring in the classroom?” was addressed through the collection of sample lesson activities that the participants provided. The final research question, “To what extent does the introduction of professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in schools” was addressed by the post-survey completed by the participants

after the professional development session on the PICRAT matrix. Several weeks after the professional development session, participants were interviewed to see if their perceptions on educational technology integration models had changed, in particular their perceptions on the PICRAT matrix. The implementation of the PICRAT matrix was measured by the participants providing examples with activities defined by the PICRAT matrix. Participants provided lesson examples to the researcher prior to the professional development session and after the initial professional development session. The researcher developed a rubric points scale to help measure the shift in the PICRAT matrix.

Research Design and Data Analysis

The research was conducted through a multistep process. A request for participants email was sent out through several educational technology listservs, professional learning circles, and communities related to educational technology. The researcher had access to these groups and asked the leaders of these groups permission to share the request for volunteers. The initial request asked participants basic questions, including which school district they are from and if they are willing to commit to part of the study. By asking these questions, it served as way to screen the participants prior to including them in the study. The survey can be found in Appendix E. Different school districts were selected based on the socio-economic status of the school district. The socio-economic status of the school district was determined by analyzing the data found on the New York State Education Department Data website (NYSED Data, 2020). Information about varying background knowledge was collected in the pre-survey to gauge where the participant's level of understanding of educational technology integration stood and of the various models available. The commitment requirements

were: completing two surveys which each took about 10 minutes, participation in an online virtual professional development session for approximately one-hour, potential participation in an individual online interview for up to one hour, and willingness to share three examples of educational technology classroom activities that they have done with their students both before and after the professional development session for a total of six. Not all candidates were eligible to participate in this study. Not all participants were asked to complete the interview.

Once the researcher had the list of volunteers, he selected them based on school district and commitment. The researcher was able to recruit two to four participants from four different school districts. The number of participant size was 12. Fourteen candidates applied, but two were not selected to participate due to time commitments. Having multiple school districts allowed the researcher to make comparisons between the school districts and comparisons between teachers within the schools. The researcher selected candidates from different subject areas. The study was limited to secondary teachers. The participant field was likely narrowed to educational technology savvy teachers because the researcher sent out requests only through educational technology communities. Participants were encouraged to share the request for volunteers with colleagues. This method could have led to snowball sampling, but ultimately, the researcher made the final selection, which mitigated one of the main issues with this approach (Creswell, 2008). One of the drawbacks of snowball sampling, is that the researcher loses control of the sample. However, since the researcher made the final selection, this was not an issue (Creswell, 2008).

After the sample of participants had been selected, the researcher sent the participants a pre-survey to measure teacher perceptions of educational technology and their knowledge and thoughts about educational technology models. This survey can be found in Appendix G. The survey included a section of open-ended questions for teachers to explain their thoughts and feelings. Lastly, documentation of three educational technology classroom activities from each teacher was collected. The researcher used the PICRAT matrix to categorize each of the activities. The PICRAT matrix served as an instrumentation and evaluation tool in determining where each activity would fall within the nine-box matrix. The researcher also applied a numerical value to the PICRAT to use it similar to a rubric. The estimated time to complete this pre-intervention survey was ten minutes.

Once all of the activities were collected and mapped to their relevant PICRAT matrix box, participants attended an online professional development session on the PICRAT matrix. There was a total of six sections. In this session, the researcher was the professional development instructor. The researcher explained the PICRAT matrix in detail and gave the participants feedback on where all of the activities of the participants fell in relation on the matrix. The researcher also mapped them to a point value, that the researcher did not share with the participants. The participants' activities and lessons were anonymously shared to the group, without names so that the participants would not know who provided which lesson or activity. Additionally, the researcher provided suggestions on how some of the activities might be elevated to a higher level on the PICRAT matrix. The session provided an overview and conceptual understanding of PICRAT and gave the participants examples of its use and mapping lessons and

activities. Each session of the professional development was recorded, and transcribed in Appendices K through P. The slides for the professional development session can be found in Appendix I.

One week after the professional development session, participants were asked to complete the post-survey to measure their perceptions of the PICRAT matrix and provide their own thoughts about it. In the survey, they also had the opportunity to compare the PICRAT matrix to their own experiences with integration of education in the classroom and/or any of the other models they may be familiar with. Several of the questions from the survey were the same as those in the pre-survey. The answers to these questions presented an opportunity to measure any change or shift in teacher perceptions with educational technology and educational technology models. Participants were also asked to evaluate PICRAT using the model for evaluating Technology Integration Models. The survey can be found in Appendix H.

Finally, two to three weeks after the professional development session, participants were asked to provide an additional three sample educational technology classroom activities. The researcher mapped them to the PICRAT matrix and tally the number of instances in each box of the matrix as well as the level of PICRAT described. This data was compared to the activities prior to the PICRAT professional development to determine if, by using the PICRAT categories/model as a guide, teachers' perceptions and practice has been affected. Comparisons and scores of their lessons was determined in Appendix J. Virtual interviews were conducted by the researcher via Zoom to participants that had an average change of 1.0 or more when comparing their lessons before and after the professional development session. Creswell (2008) stated that

interviews provide information that cannot be observed because participants can describe personal information. Additionally, the interviewer can control the types of responses based on directed questioning. However, interviews might have drawbacks, because the information is filtered through the interviewer (Creswell, 2008).

For the purpose of the surveys, the researcher used Microsoft Forms. Based on the form results, the researcher entered the quantitative data in Microsoft Excel to determine what changes in teacher perception and practice occurred before and after the introduction of the PICRAT matrix. Additionally, when analyzing the qualitative questions and the interviews through process coding, the researcher looked for trends and themes in coding the data with the responses to help validate the quantitative data. It is important for the researcher to code the data on the first pass to specific themes and topics, then consolidate to bigger broader themes (Creswell, 2008).

The Sample and Population

The sample was four school districts in a suburban area of New York. Two to four participants were selected from the volunteers for each school district. The schools selected were from different ethnic and socioeconomic status as determined by NYSED data. Each school district had different educational technology resources available for their teachers and students. Differences in educational technology resources included, but not be limited to: hardware, software, web-based subscriptions, computer technicians, educational technology coaches or specialists. The researcher does not work in any of these school districts. Each school had different types of professional development offered to teachers in their district prior to this study. Additionally, many teachers sought their own professional development outside of their school district through in-service courses, graduate courses, and/or workshops.

Through the introduction of the PICRAT matrix to all participants during the professional development session, all of the participants received the same training slides. The researcher conducted the training on six separate occasions, so there was some variation in the number of participants in each session. After the training, the participants completed a post-survey based on the professional development they received. Additionally, three weeks after the professional development session intervention, participants were asked to provide another set of lesson activities; these can be found in Appendix H. The post-survey will be analyzed to gauge to what degree there was a change in teacher perceptions. Based on the magnitude of the shift, participants were interviewed if they qualified with a threshold of 1.0. Interview questions are in Appendix Q. The two interview transcripts are in Appendix R and Appendix S. The documentation of the lesson activities served as another way to verify if there has been a change in overall practice.

Instruments

The PICRAT matrix was used as an instrument for evaluating the documentation provided by the participants. The PICRAT model was developed by Kimmons in 2016. It is an educational technology integration model that builds upon several other educational technology models. The reliability of the instrument can be obtained through its use in previous studies (Kimmons, 2018; Kimmons et al., 2020). However, it is important to be careful not to assume that one particular model is valid or appropriate for every instance (Cherner & Mitchell, 2020). Since the PICRAT model is relatively new, we must look at the models that it is built upon. In particular, the RAT model developed by Hughes et al. (2006) is the teacher's use of technology part of PICRAT matrix. Many other models are built upon, including SAMR. The PIC part of the PICRAT is derived from parts of the

revised Bloom’s Taxonomy, in which the highest levels of learning is “Creative.” The revised Bloom’s Taxonomy had been widely accepted for 50 years as the pedagogical gold standard in education, until it was revised in the early 2000s (Krathwohl, 2002).

The researcher is taking PICRAT one step further and adding a quantitative component to the PICRAT Matrix in order to measure the differences in potential shifts of instructional practice. Since the Creative/Replacement level on the PICRAT matrix is considered the most basic level of technology integration, it was assigned a value of “1.” The next level on the x-axis and y-axis is Interactive Replacement, and Passive Amplifies were assigned a value of “2.” Along with the same pattern, the middle of the matrix was assigned a value of “3” with Creative Replacement, Interactive Amplifies, Passive Transformation. Next, Creative Amplifies, Interactive Transformation, were assigned a value of “4.” Lastly, the highest level, Creative Transformation was assigned a value of “5.”

Assigning Numerical Point Values to the PICRAT Matrix

C	3	4	5
I	2	3	4
P	1	2	3
	R	A	T

Figure 7. Researcher assigning point values to the PICRAT matrix.

Intervention

The professional development session served as an intervention for the participants. Data were collected before the intervention through survey and documentation. After the professional development intervention, new survey data were

collected and documented. The data collected after the professional development intervention was compared to the data collected before. The researcher analyzed the data and looked for changes to determine to what extent, if at all, the professional development intervention session impacted teachers' perceptions and instructional practice. The slides used in the professional development session can be found in Appendix I. The transcripts of the sessions were recorded. Transcripts can be found in Appendices K through P. Each of the six sessions were similar in length, and had the same content. Although, there were some variables like the number of participants, connection issues and the participants questions, all of the participants received the same content for their session. By following these procedures to ensure that each session was as similar as possible, it established fidelity among the sessions. The researcher had considered making the professional development a recorded video to ensure that there were no variances between the sessions, however, the researcher felt it was more important that the participants were engaged in an interactive session rather than a passive one. It would be disingenuous to not put PICRAT into practice when delivering this professional development.

Procedures for Collecting Data

Participants were selected through purposeful convenience sampling. Through several listservs, and regional professional organizations related to educational technology in this suburban area, participants received an email that detailed the purpose of the study in general terms. Participants were given a consent form to participate. It is stated in the Consent Form that any participant can stop at any time during the study (see Appendix C). In order to not contaminate the sample, the specifics of what the researcher was specifically measuring was not disclosed (see Appendix E). The request for

participants email (see Appendix D) included the commitments required for the purpose of the study: completion of two brief surveys (pre-survey and post-survey) (see Appendix G and H), potential participants' attendance in one hour long virtual professional session, and their participation in an online interview if necessary. Additionally, the participants were asked to provide details of the classroom activities in their room related to educational technology. Not all volunteers were eligible for selection to participate based on the criteria for the study. The selection was based on the participants' school district and the amount of time they are able to commit. The researcher wanted to have no more than sixteen participants and no less than twelve. Creswell (2008) stated that, convenience sampling "can provide useful information for answering questions and hypothesis" (p. 144). The researcher attempted to keep the scope of the sample size narrow to allow for more time with each participant for the professional development intervention.

The participants' names were concealed and changed to numbers to protect their identity. The researcher collected each school district name and change it to an unidentifiable pseudonym to alleviate any question as to the school district or the participants involved. When participants completed the surveys and interviews, the researcher coded each with a number for his own purposes only. The professional development session occurred through video conferencing software, Zoom. Participants in the session were required to not use their cameras or their real names in the recorded session. They were required to use their assigned participant numbers. The group professional development sessions and the individual interviews were recorded only for the purpose of transcription and were deleted after the study was completed.

Data Collection and Data Analysis Approach

The role of researcher is to collect, evaluate, and analyze data (Creswell, 2007). In this study, the researcher designed three surveys. First, a screening survey narrowed participants, second a pre-intervention survey, and last, a post-intervention survey. The participants were educators selected from several school districts in a suburban region of New York State. Participants were selected based on their school district, potential participants' available technology and willingness to participate. The goal was to have a solid sampling from several schools from teachers that use educational technology on a regular basis (self-reported an average of three or more times a week) in the classroom.

The researcher used the screener survey results to select these educators. After these educators were selected, they were asked to complete surveys, professional development sessions, and provide lesson activities. Willingness to participate in the interview was a requirement in the selection process, but not all participants were interviewed. The goal of the interviews was to determine why there was a significant change in their lessons, attitudes, and perceptions. The lesson samples were categorized using the PICRAT matrix. The Teacher level of Technology Integration were measured in three levels, Replacement, Amplification, and Transformation. The student levels of student technology use were measured in the following three levels: Passive, Interactive, and Creative. Based on their responses for each lesson, they were put in one of the nine boxes of the PICRAT matrix (Kimmons, 2017). Each PICRAT box was given a numeric value based on the position on the PICRAT matrix scale, developed by the researcher.

Researcher Role and Research Ethics

The researcher is currently a District Administrator for Instructional Technology in a suburban school district in New York State. In order to eliminate any conflict of

interest, participants were selected from school districts where the researcher is not employed. The researcher believed that it was important for participants in the study be selected from schools with a different socio-economic status to ensure that there is representation of schools with varying socio-economic status. Different school districts were selected based on the socio-economic status of the school district, access to educational technology, and frequency of professional development. This was determined by the demographics provided on the NYSED data website (NYSED Data, 2020). Participation might have been affected by the researcher's prominence and reputation in regional organizations. Participants may have been more willing to participate because of the researcher's connection with the overall educational technology educator community.

Trustworthiness of the Design

According to Guba and Lincoln (1994), there are four elements that need to be included in a study for it to be valid and credible. The four aspects are credibility, transferability, dependability, and confirmability. Credibility is the confidence in the findings. Credibility can be established when the researcher is able to use member-checking or triangulation to corroborate data. In order to provide credibility, all participants were able to read their transcriptions of interviews to make sure their responses were accurately represented. Additionally, the sample lesson activities that teachers provided as documentation, lend another data point to help triangulate the data. Transferability is showing that findings are consistent and repeatable, and are applicable in other contexts. It can be achieved by providing evidence that study's findings could be relevant in other settings, populations, and contexts. To achieve this, the researcher used the technique of thick description of the research setting in order to include the rationale of researcher's actions of the research and data collection. Thick description is a detailed

journaling of field experiences, in this study during the professional development session and the interviews the researcher chronicled the rationale and the reaction of the process. Dependability shows that findings are consistent and could be repeated. To meet the criterion of dependability, this study can be replicated with different participant populations from another region. Lastly, confirmability is the confidence that the data comes from the participants and are free from researcher bias. The method of mixed qualitative and quantitative data analysis increased the confirmability to the study. An additional layer of confirmability was achieved through the collection and documentation of the educational technology lesson activities. The researcher also asked participants to evaluate their lessons and activities after they completed the professional development intervention. By taking these steps to meet these four criteria carefully, the intention was to provide trustworthiness to the study.

Greenbank (2003) stated that, “What is important is that [the researcher] adopt a reflexive approach that is clearly articulated in their writing” (p. 798). It is important that the researcher disclose any biases that they have. Addressing the bias limits the potential for any bias to impact the study. As a district administrator for Instructional Technology, the researcher often sees education through the lens of educational technology. Although the researcher values the importance of seeing educational technology as just another tool to provide instruction rather than the main focus of a lesson, the researcher may stress its importance more than other people with any intentions.

In order to provide distance to these biases, the researcher conducted the research outside of the researcher’s school district of employment. This distance helped in a multitude of ways. Teacher participants from the researcher’s district might answer the

questions differently or provide examples that were meant to impress, more than be a true snapshot of what is happening in the classroom. Participants outside of the researcher's school district would be less likely to have that pressure. However, due to the participants knowing that their activities are being included in a study, might encourage or motivate them to include examples that are high-quality than if participation was completely anonymous.

Summary of Chapter

In this chapter, the researcher restated the research questions and provided a rationale for the research methods. The researcher outlined the selection process and how the sample would be chosen. Additionally, the researcher explained the process in which participants would be conducting during the study; presurvey, intervention, post-survey, and interview. The researcher also explained the use of PICRAT as instrumentation, and the scope of the professional development intervention session. Additional consent letters and surveys are provided in the Appendices. The researcher outlined data analysis, validity, and trustworthiness of the study. Lastly, the chapter explored researcher bias and its potential impact on the overall study.

In the next chapter, the researcher will present the results and findings of the surveys, documentation collection, evaluation of the documentation, and the professional development intervention. Each research question will be addressed with the data from the study that specifically focuses on it.

CHAPTER 4 - FINDINGS

Introduction

Educational Technology has been a focus of school districts, teachers, and administrators for decades. The purpose of this study was to see if professional development on the PICRAT model has any impact on teacher perceptions and instructional practice. Participants included secondary educators from four different school districts in a suburban region of New York State. A total of 13 teachers were selected to participate in the study. Twelve participants completed the study. Only one participant did not complete the study. Each school district had a different student populations, needs, and demographics. For the purpose of this study, demographic information was filtered to grades 7-12 only and based on the latest data available, the 2018 – 2019 school year (New York State Education Department, 2020). Of the twelve total teachers that completed the study, two teachers participated from Sunset Grove School District, three teachers from Ever Pines School District, three from West Elm School District, and four teachers from Island Acres School District.

Results/Findings

First, each of the participants completed an initial screener survey, which asked demographics and information about their school district. Second, each participant answered questions on their perceptions of educational technology and educational technology models. They also provided documentation of three lessons or activities they have previous done in the classroom using educational technology. Third, they participated in a professional development session on the educational technology integration and the PICRAT matrix. Fourth, they completed a post-professional development survey to re-measure teacher perceptions and attitudes. Fifth, about a week

later, participants provided documentation of three more lessons or activities using educational technology that they would teach in the classroom. At this step they were also asked where they felt each one score on the PICRAT matrix. Lastly, two participants were selected for a follow-up interview. The following questions guided the study:

1. What are secondary teacher perceptions and prior knowledge of educational technology integration models?
2. What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?
3. To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?

The majority of the questions and responses from the surveys was quantitative. The data was exported into a Microsoft Excel spreadsheet and analyzed. The responses from the documentation collected were evaluated using the PICRAT matrix. A few questions from the surveys asked for qualitative data to help triangulate the quantitative data, by having participants explain their answers. In these instances, the researcher looked for common themes and trends in the data.

Overall Demographics

Table 2, summarizes the demographic data collected for participants. Participants of this study have an average of 14 years teaching experience. The lowest is 6 years, and the highest is 37 years. Overall, the average number of teaching certifications is 2.3. The average number of degrees is 1.9. The average number of other certificates is .9.

Table 2

Participant Levels of Education and Experience.

Participant	School District	Grade Levels	Years Taught	Number of Teaching Certifications	Number of Degrees	Other Certificates
Participant #01	Sunset Grove	7-12	7	3	3	1
Participant #02	Sunset Grove	Secondary	11	2	1	1
Participant #03	Ever Pines	High School 9-12	11	2	2	1
Participant #04	Ever Pines	7th	6	2	2	1
Participant #05	Ever Pines	9-12	34	3	2	1
Participant #06	West Elms	7-12	13	4	2	1
Participant #07	West Elms	9-12	8	3	2	1
Participant #08	West Elms	9,10,11	37	3	3	1
Participant #09	Island Acres	Grade 9-10, Grade 14	13	1	1	0
Participant #10	Island Acres	High School	16	4	3	1
Participant #11	Island Acres	9-12	7	1	3	1
Participant #12	Island Acres	9-12	6	3	2	0

Participants were asked to describe the frequency in which they received professional development. The data is shown below in Table 3.

Table 3.

Frequency of Professional Development received in participants school districts.

Frequency	Responses out of 12
Daily	1
Weekly	1
Monthly	2
Quarterly	5
Yearly	3

Participants were also asked, “What is your primary way to learn about new educational technologies?” The responses are shown in Table 4.

Table 4.

Results “What is your primary way to learn about new educational technologies” question.

Way to Learn	Responses out of 12
In-School / in-service professional development	7
Outside of School / Graduate level professional development	1
Learning on your own	3
Social Media groups / Personal Learning Networks	1

Overall District School Data by New York State Definition

There were several factors by which the school district demographics were measured. Below are the definitions as defined by New York State Data website:

Economically Disadvantaged: Economically disadvantaged students are those who participate in, or whose family participates in, economic assistance programs, such as the free or reduced-price lunch programs, Social Security Insurance (SSI), Food Stamps, Foster Care, Refugee Assistance (cash or medical assistance), Earned Income Tax Credit (EITC), Home Energy Assistance Program (HEAP), Safety Net Assistance (SNA), Bureau of Indian Affairs (BIA), or Family Assistance: Temporary Assistance for

Needy Families (TANF). If one student in a family is identified as low income, all students from that household (economic unit) may be identified as low income.

English Language Learners: English Language Learners (ELLs) are those who, by reason of foreign birth or ancestry, speak or understand a language other than English and speak or understand little or no English, and require support in order to become proficient in English and are identified pursuant to Section 154.3 of Commissioner's Regulations” (NYSED Data, 2020).

Students with Disabilities: Students with disabilities are those who have been identified as such by the Committee on Special Education and are receiving services under the Individuals with Disabilities Education Act (IDEA). Students with disabilities include those having an intellectual disability; hearing impairment, including deafness; speech or language impairment; visual impairment, including blindness; serious emotional disturbance; orthopedic impairment; autism; traumatic brain injury; developmental delay; other health impairment; specific learning disability; deaf-blindness; or multiple disabilities and who, by reason thereof, receive special education and related services under the IDEA according to an Individualized Education Program (IEP), Individualized Family Service Plan (IFSP), or a services plan” (NYSED Data, 2020).

The School Districts

The school districts were all located in a suburban region of New York State, Long Island. This region of New York state is divided into several school districts broken down by town or collections of towns. This is contrast to some states in which the school districts are divided by county into very large school districts. Each school districts culture is specific and indicative of the community it resides within.

Sunset Grove School District

Sunset Grove School District is located in a suburban region of New York state. The town is heavily focused on coastal industries and access to the bay and ocean are a major focus of the community. Overall, Sunset Grove has 2,015 students. The ethnicity of these students is Hispanic/Latinx at 57%, White at 40%, and 3% Other. The school district is comprised of 25% of English Language Learners, 12% of Students with Disabilities, 64% of the families are considered Economically Disadvantaged. The high school graduation rate is 93% which is 10% higher than the state average (NYSED Data). This data is summarized in Table 5 below.

Sunset Grove Student Demographic Data

Table 5.

Ethnicity, Group Percentages and Graduation Rates for Sunset Grove School District (NYSED Data, 2020).

PERCENTAGE OF TOTAL ENROLLMENT	Sunset Grove School District
American Indian or Alaska Native Percentage	0%
Black or African American	1%
Hispanic or Latino	57%
Asian or Native Hawaiian/Other Pacific Islander	1%
White	40%
Multiracial	1%
English Language Learners	25%
Students With Disabilities	12%
Economically Disadvantaged	64%
Migrant	0%
Homeless	1%
Foster Care	0%
Parent In Armed Forces	0%
School Graduation Rate	93%
New York State Graduation Rate	83%

Participant Demographics at Sunset Grove

Two participants were selected from Sunset Grove School District. Participant #01 has 7 years of teaching experience. They are certified in Math 5-12, Educational Technology Specialist and English as a New Language. Participant #01 also has 3 college degrees, and 1 additional professional certificate. Participant #02 has 11 years of teaching experience. They are certified in Social Studies 7-12. Participant #02 also has 1 college degree, and 1 additional professional certificate. This data is presented in Table 5.

Ever Pines School District

Ever Pines School District is located in a suburban region of New York state. The district is comprised of several towns and hamlets. Overall, Ever Pines has 9,166 students. The ethnicity of these students is: Black or African American at 19%, Hispanic/Latinx at 27%, Asian or Native Hawaiian/Other Pacific Islander at 4%, White at 46%, and Multiracial at 4%. The school district is comprised of 6% of English Language Learners, 17% of Students with Disabilities, 54% of the families are considered Economically Disadvantaged. The high school graduation rate is 85% which is 2% higher than the state average (NYSED Data). This data is summarized in Table 6 below.

Ever Pines Student Demographic Data

Table 6.

Ethnicity, Group Percentages and Graduation Rates for Ever Pines School District
(NYSED Data, 2020).

Percentage of Total Enrollment	Ever Pines School District
American Indian or Alaska Native Percentage	0%
Black or African American	19%
Hispanic or Latino	27%
Asian or Native Hawaiian/Other Pacific Islander	4%
White	46%
Multiracial	4%
English Language Learners	6%
Students With Disabilities	17%
Economically Disadvantaged	54%
Migrant	0%
Homeless	2%
Foster Care	0%
Parent In Armed Forces	0%
School Graduation Rate	85%
New York State Graduation Rate	83%

Participant Demographics at Ever Pines School District

Three participants were selected from Ever Pines School District. Participant #03 has 11 years of teaching experience. They are Biology, Chemistry, and General Science 7-8. Participant #03 also has 2 college degrees, and 1 additional professional certificate. Participant #04 has 6 years of teaching experience. They are certified in Social Studies 7-12 and Students with Disabilities 7-12. Participant #04 also has 2 college degrees, and 1 additional professional certificate. Participant #05 has 34 years of teaching experience. They are certified in Spanish, Elementary Education and have a FLEX extension.

Participant #05 also has 2 college degrees, and 1 additional professional certificate. This data is presented in Figure 9.

West Elm School District

West Elm School District is located in a suburban region of New York state. The district is in the center of a crossroads of transportation and commerce. Overall, West Elm has 5,724 students. The ethnicity of these students is Black or African American at 7%, Hispanic/Latinx at 44%, Asian or Native Hawaiian/Other Pacific Islander at 6%, White at 40%, and Multiracial at 3%. The school district is comprised of 17% of English Language Learners, 16% of Students with Disabilities, 56% of the families are considered Economically Disadvantaged. The high school graduation rate is 89% which is 6% higher than the state average (NYSED Data). This data is summarized in Table 7 below.

West Elms Student Demographic Data

Table 7.

Ethnicity, Group Percentages and Graduation Rates for West Elm School District
(NYSED Data, 2020).

Percentage of Total Enrollment	West Elm School District
American Indian or Alaska Native Percentage	0%
Black or African American	7%
Hispanic or Latino	44%
Asian or Native Hawaiian/Other Pacific Islander	6%
White	40%
Multiracial	3%
English Language Learners	17%
Students With Disabilities	16%
Economically Disadvantaged	56%
Migrant	0%
Homeless	1%
Foster Care	0%
Parent In Armed Forces	0%
School Graduation Rate	89%
New York State Graduation Rate	83%

Participant Demographics at West Elm School District Three participants were selected from West Elm School District. Participant #6 has 13 years of teaching experience. They are certified in Spanish and Educational Computing. Participant #6 also has 2 college degrees, and 1 additional professional certificate. Participant #7 has 8 years of teaching experience. They are certified in Social Studies 7-12 and Students with Disabilities 7-12. Participant #7 also has 2 college degrees, and 1 additional professional certificate. Participant #8 has 37 years of teaching experience. They are certified in Italian, Spanish, TESOL, and School Administration. Participant #8 also has 3 college degrees, and 1 additional professional certificate. This data is presented in Figure 9.

Island Acres School District

Based on 2018-2019, data Island Acres School District is located in a suburban region of New York state. The community has a major university and a major sports arena. Overall, Island Acres has 6,884 students. The ethnicity of these students is Black or African American at 37%, Hispanic/Latinx at 60%, Asian or Native Hawaiian/Other Pacific Islander at 1%, White at 2%, and Multiracial at 1%. The school district is comprised of 21% of English Language Learners, 11% of Students with Disabilities, 77% of the families are considered Economically Disadvantaged. The high school graduation rate is 79% which is 4% lower than the state average (NYSED Data). This data is summarized in Table 8.

Island Acres Student Demographic Data

Table 8.

Ethnicity, Group Percentages and Graduation Rates for Island Acres (NYSED Data, 2020).

Percentage of Total Enrollment	Island Acres School District
American Indian or Alaska Native Percentage	0%
Black or African American	37%
Hispanic or Latino	60%
Asian or Native Hawaiian/Other Pacific Islander	1%
White	2%
Multiracial	1%
English Language Learners	21%
Students With Disabilities	11%
Economically Disadvantaged	77%
Migrant	0%
Homeless	0%
Foster Care	0%
Parent In Armed Forces	0%
School Graduation Rate	79%
New York State Graduation Rate	83%

Teacher Demographics at Island Acres School District Three participants were selected from Island Acres School District. Participant #9 has 13 years of teaching experience. They are certified in Grades 5-9 Generalist and Special Education with TESOL pending. Participant #9 also has 1 college degree. Participant #10 has 16 years of teaching experience. They are certified in Speech Pathology. Participant #10 also has 3 college degrees, and 1 additional professional certificate. Participant #11 has 7 years of teaching experience. They are certified in Adolescent Students with Disabilities grades 7-12, Adolescent Social Studies grades 7-12, Literacy grades 5-12, and Literacy birth-grade 5. Participant #11 also has 2 college degrees, and 1 additional professional

certificate. Participant #12 has 6 years of teaching experience. They are certified in Biology 7-12. Participant #12 also has 2 college degrees. This data is presented in Figure 9.

Comparisons of School Districts by Demographics

When the demographics of the school districts is compared to other factors these are the interesting takeaways. Overall Sunset Grove showed the most improvement overall with instructional practice. The participants in Sunset also received the most prior professional development compared to the other school districts. This was measured as a 1.335 on average of the individual shifts, which is 4 shifts in the PICRAT model.

Ever Pines School District was the school district with the second biggest shift in instructional practice after the professional development session. Ever Pines on average was 1.133 shifts on the PICRAT model, which is slightly over 3 shifts. Ever Pines also had the lowest frequency of educational technology use on average, Two-thirds of participants said they use technology only 2 or 3 times a week.

West Elem School District had the smallest amount of change after the Professional Development session. This was measured as a .2 on average of the individual shifts, which is under 1 shift in the PICRAT model. West Elem School District teachers reported that they received professional development more regularly than other teachers in the study.

Island Acres School District had the third the greatest number of shifts compared to the other school districts. Island Acres average shifts were measured as .918, or almost an average of 3 shifts on the PICRAT model. Interestingly Island Acres teachers were not familiar with any of the technology integration models prior to the study. Island Acres

teachers also perceptions and beliefs shifted the most with an average of 5 shifts, compared to the overall participant average of 3.08. Island Acres teachers reported the most inconsistent amount of professional development, meaning that they had the widest range of answers from “daily” to “optional, only over the summer.”

Research Question #1: What are secondary teacher perceptions and prior knowledge of educational technology integration models?

Participant #01 – Sunset Grove – Pre-Test

Participant #01 stated in the survey that they have taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally, Participant #01 was not familiar with any of the listed Educational Technology models. However, they stated that they use two/three days a week in the classroom. Participant #01 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #01 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #01 responded, “Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #01 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #01 responded, “Strongly Agree.” For Participant #01 the primary focus for developing classroom activities and main motivation for technology use is “engagement.” When designing a lesson, Participant #01 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #01 rated the importance of student engagement a 5 out of 5.

Participant #02 – Sunset Grove – Pre-Test

Participant #02 stated in the survey that they have taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally, Participant #02 was familiar with the following Technology Integration Models: RAT, SAMR, TAM, TIM, TIP, and TPACK. Participant #02 was most comfortable with the TAM model. Participant #02 stated that s/he used technology every day / or almost every day in the classroom. Participant #02 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #02 responded, “Strongly Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #02 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #02 responded, “Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #02 responded, “Agree.” For Participant #02 the primary focus for developing classroom activities and main motivation for technology use is to “develop lesson that can help facilitate higher order thinking.” When designing a lesson, Participant #02 felt that it was most important that students learn character. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #02 rated the importance of student engagement a 5 out of 5.

Participant #03 – EverPines – Pre-Test

Participant #03 stated in the survey that they have taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally, Participant #03 was familiar with the following Technology Integration Models: LoTi/H.E.AT and SAMR. Participant #03 was most comfortable with the SAMR model. Participant #03 stated that s/he used technology 2 or 3 times a week in the classroom. Participant #03 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,,” Participant #03 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first, “Strongly Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #03 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #03 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #03 responded, “Agree.” For Participant #03 the primary focus for developing classroom activities and main motivation for technology use is to “foster engagement and to meet the diverse learning needs all of the students.” When designing a lesson, Participant #03 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #03 rated the importance of student engagement a 5 out of 5.

Participant #04 – EverPines – Pre-Test

Participant #4 stated in the survey that they have taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally,

Participant #04 was familiar with the following Technology Integration Models: SAMR. Participant #04 was most comfortable with the SAMR model. Participant #04 stated that s/he used technology 2 or 3 times a week in the classroom. Participant #04 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #04 responded, “Neutral.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Neutral.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #04 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #04 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #04 responded, “Strongly Agree.” This was a shift from the pre-survey from Strongly Agree to Agree. For Participant #04 the primary focus for developing classroom activities and main motivation is to “The main motivation for education technology use in my classroom would be for engagement. I like to be able to differentiate the lessons to accommodate all learners. This keeps my students most interested.” When designing a lesson, Participant #04 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #04 rated the importance of student engagement a 5 out of 5.

Participant #05 – EverPines – Pre-Test

Participant #05 stated in the survey that they have taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally, Participant #05 was familiar with the following Technology Integration Models: SAMR.

Participant #05 was most comfortable with the SAMR model. Participant #05 stated that s/he used technology every day / almost every day in the classroom. After which they were asked follow up questions in a survey. Participant #05 stated in the survey that they have taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally, Participant #05 was familiar with the following Technology Integration Models: SAMR. Participant #05 was most comfortable with the SAMR model. They stated that they use technology every day / almost every day in the classroom. Participant #05 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #05 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Strongly Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #05 responded, “Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #05 responded, “Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #05 responded, “Disagree.” For Participant #05 the primary focus for developing classroom activities and main motivation for technology use is “organization- if I create Google slideshow presentations, I am assured that I am giving the same information to each section of courses I teach.” When designing a lesson, Participant #05 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #05 rated the importance of student engagement a 4 out of 5. Additionally, s/he stated, “I would prefer engaged students, but it's not always the case.”

Participant #06 – West Elm – Pre-Test

Participant #06 stated in the survey that s/he had taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally, Participant #06 was familiar with the following Technology Integration Models: TIM. Participant #06 was most comfortable with the TIM model. Participant #06 stated that s/he used technology every day / almost every day in the classroom. Participant #06 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #06 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” Participant #06 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #06 responded, “Neutral.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #06 responded, “Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #06 responded, “Neutral.” For Participant #06 the primary focus for developing classroom activities and main motivation for technology use is “Am I getting them engaged, am I challenging them to be creative and to think critically?” When designing a lesson, Participant #06 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #06 rated the importance of student engagement a 5 out of 5.

Participant #07 – West Elm – Pre-Test

Participant #07 stated in the survey that s/he had taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally,

Participant #07 was familiar with the following Technology Integration Models: SAMR.

Participant #07 indicated that s/he were not comfortable with any model. Participant #07

stated that s/he used technology every day / almost every day in the classroom.

Participant #07 was asked to Agree or Disagree to a series of statements. When asked,

“You feel pressure to use technology in every lesson,” Participant #07 responded,

“Agree.” When asked, “When lesson planning, you design the lesson around the

educational technology first, “Strongly Disagree.” When asked, “When lesson planning,

you design the lesson around the academic content / NYS standards first,” Participant #07

responded, “Neutral.” When asked, “When lesson planning, you design the lesson around

what student skills you want them to learn first?” Participant #07 responded, “Strongly

Agree.” When asked, “When lesson planning, you design the lesson around character

education values first?” Participant #07 responded, “Neutral.” For Participant #07 the

primary focus for developing classroom activities and main motivation for technology

use is “Engagement.” When designing a lesson, Participant #07 felt that it was most

important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very

Important), Participant #07 rated the importance of student engagement a 5 out of 5.

Participant #08 – West Elm – Pre-Test

Participant #08 stated in the survey that s/he had taken in-service or graduate level courses on educational technology prior to participation in this study. Additionally,

Participant #08 was familiar with the following Technology Integration Models: TIM.

Participant #08 was most comfortable with the TIM model and used technology every

day / almost every day in the classroom. Participant #08 was asked to Agree or Disagree

to a series of statements. When asked, “You feel pressure to use technology in every

lesson,” Participant #08 responded, “Agree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Neutral.” When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #08 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #08 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #08 responded, “Agree.” For Participant #08 the primary focus for developing classroom activities and main motivation for technology use is “to instruct and practice new information.” When designing a lesson, Participant #08 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #08 rated the importance of student engagement a 5 out of 5.

Participant #09 – Island Acres – Pre-Test

Participant #09 stated in the survey that s/he had taken in-service or graduate level courses on educational technology prior to participation in this study. However, Participant #09 was not familiar with any of the listed Technology Integration Models. Participant #09 stated that s/he used technology every day / almost every day in the classroom. Participant #09 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #09 responded, “Strongly Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Neutral.” When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” participant #09 responded, “Disagree.” When asked, “When lesson planning, you design

the lesson around what student skills you want them to learn first?” Participant #09 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #09 responded, “Strongly Agree.” For Participant #09 the primary focus for developing classroom activities and main motivation for technology use is “to meet specific accommodations for my special needs students.” When designing a lesson, Participant #09 felt that it was most important that students learn character. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #09 rated the importance of student engagement a 5 out of 5. Participant #09, was given the opportunity to provide additional comments and stated,

My lessons are centered around skill acquisition and character building. The latter part of this year I have participated in numerous webinars and online PDs to learn about different platforms I can use to best meet the needs of my students. I have never heard of any of the models cited at the beginning of the survey however based on what I researched I believe what I do best matches TPACK.

Participant #10 – Island Acres – Pre-Test

Participant #10 stated in the survey that s/he had not taken in-service or graduate level courses on educational technology prior to participation in this study. However, Participant #10 was not familiar with any of the listed Technology Integration Models. Participant #10 stated that s/he used technology 2 or 3 times a week in the classroom. Participant #10 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #10 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” Participant #10 responded, “Neutral.” When asked if, “When lesson planning, you

design the lesson around the academic content / NYS standards first,” Participant #10 responded, “Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #10 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #10 responded, “Neutral.” For Participant #10 the primary focus for developing classroom activities and main motivation for technology use is “teaching a concept using visual aids.” When designing a lesson, Participant #10 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #10 rated the importance of student engagement a 4 out of 5.

Participant #11 – Island Acres – Pre-Test

Participant #11 stated in the survey that s/he had taken in-service or graduate level courses on educational technology prior to participation in this study. However, Participant #11 was not familiar with any of the listed Technology Integration Models. Participant #11 stated that they use technology every day / almost every day in the classroom. Participant #11 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #11 responded, “Neutral.” When asked, “When lesson planning, you design the lesson around the educational technology first,” Participant #11 responded, “Disagree.” When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #11 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #11 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around

character education values first?” Participant #11 responded, “Strongly Agree.” For Participant #11 the primary focus for developing classroom activities and main motivation for technology use is “to make my lessons more interesting and to captivate my student's attention about different historic events and places.” When designing a lesson, Participant #11 felt that it was most important that students learn character. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #11 rated the importance of student engagement a 5 out of 5. Participant #11, was given the opportunity to provide additional comments and stated, “I find it is important to teach my students skills and the academic but if they are not in the emotional state to do so then we must first address their emotional health and the character education in order to be sure that they become a well-rounded adult.”

Participant #12 – Island Acres – Pre-Test

Participant #12 stated in the survey that s/he had not taken in-service or graduate level courses on educational technology prior to participation in this study. However, Participant #12 was not familiar with any of the listed Technology Integration Models. Participant #12 stated that s/he used technology every day / almost every-day in the classroom. Participant #12 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #12 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #12 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant

#12 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #12 responded, “Disagree.” For Participant #12 the primary focus for developing classroom activities and main motivation for technology use is “to instruct and practice new information.” When designing a lesson, Participant #12 felt that it was most important that students learn academic content. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #12 rated the importance of student engagement a 5 out of 5.

Research Question #2: What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) model?

Participants were asked to provide three lesson/activity examples of educational technology use prior to the professional development intervention section. There were responses were mapped to the PICRAT matrix by using the following evaluation method. To determine PIC – the researcher would evaluate if the activity was passive, interactive or creative. Kimmons (2018) defined “passive” as: “Students are observers, bystanders in their learning.” He defined interactive as: “Students engage in material in an interactive way.” Lastly, creative as “students are creating materials themselves” (Kimmons, 2018). To determine the RAT part of the matrix, the researcher used the flowchart below.

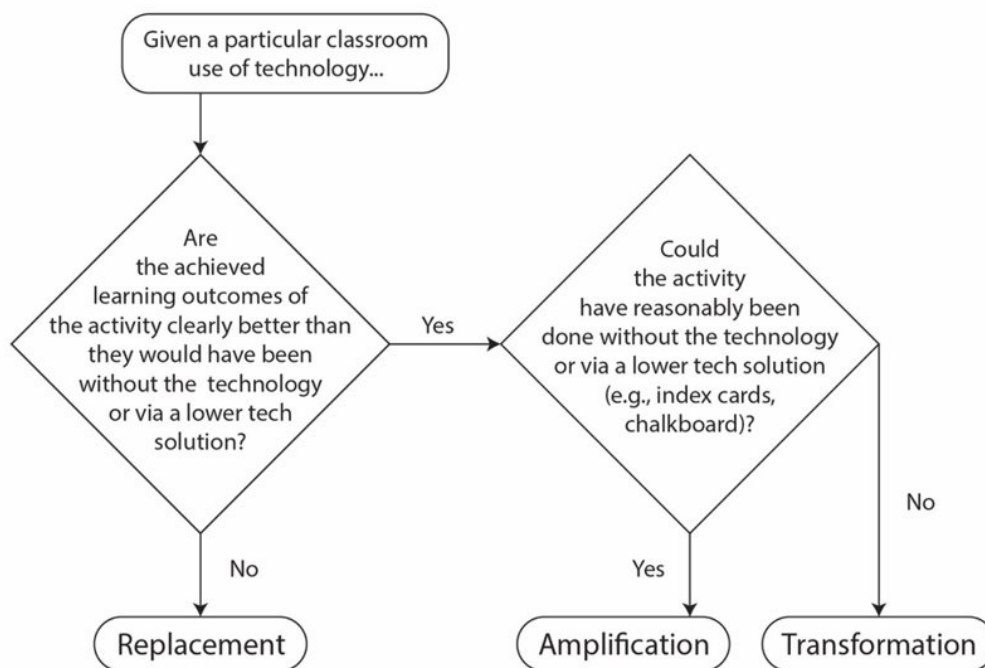


Figure 8. PICRAT Flowchart for deterring RAT (Hughes 2006, Kimmons, 2018).

First, the researcher determined, “are the achieved learning outcomes of the activity clearly better than they would have been without the technology or via a lower tech solution?” If the answer is “No” – the teacher’s use of technology replaces traditional practice. If the answer is “Yes,” we continue to the next question; “Could the activity have reasonably been done without the technology or via lower technology or via a lower tech solution (e.g., index cards, chalkboard)?” If the answer is “Yes,” – the teacher’s use of technology amplifies traditional practice. If the answer is “No” - the teacher’s use of technology transforms traditional practice. The flowchart is featured in Figure 8.

Using this system, the researcher determined where each of the provided activities would be on the PICRAT matrix. Additionally, the researcher gave each of the nine-boxes on the matrix a point value based on where it was located on the PICRAT matrix.

As explained in Chapter 3, Figure 8, the researcher assigned numerical values to the PICRAT matrix in order to measure change and shifts. The PICRAT Matrix was used as the instrumentation for the evaluation for the lesson activity examples. Additionally, the researcher used the PICRAT with assigned values to establish a score. Then the researcher averaged these three lesson activities to generate an average score for each participant.

Results from the Pre-Professional Development Activities Are Evaluated by Researcher

Table 9.

Researcher Evaluated Lesson Activities and Score Given.

Participant	District Name	Activity #1	Activity #2	Activity #3	Raw Pre-Score	Researcher Pre-Score Average
Participant #01	Sunset Grove	CR	IA	IA	9	3
Participant #02	Sunset Grove	IA	CA	PA	9	3
Participant #03	Ever Pines	IA	PR	CT	10	3.33
Participant #04	Ever Pines	IT	IA	IA	10	3.33
Participant #05	Ever Pines	IT	CT	IA	11	3.67
Participant #06	West Elms	IT	CT	IA	12	4
Participant #07	West Elms	IA	CA	IA	10	3.33
Participant #08	West Elms	PA	IA	CA	9	3
Participant #09	Island Acres	IT	IA	IR	9	3
Participant #10	Island Acres	IA	IA	IR	8	2.67
Participant #11	Island Acres	PA	IR	PT	7	2.33

Participant #12	Island Acres	CA	PR	IR	7	2.33
Overall Average						3.0825

The Professional Development Intervention Sessions

The professional development sessions were given over a two-week period. There were several options for the participants to choose from. Participants attended a Zoom session at one of the scheduled times. Zoom is a popular professional video conferencing software. Participants were instructed to not use their names as display names or use their cameras during the zoom session. The researcher shared his screen of the PowerPoint Online presentation (see Appendix H). Sessions were attended by between one to three participants. The length of the session varied based on the questions at the end of the session. Note in Session 03, one of the participants were disconnected so the researcher had to wait to resume the professional development session. Transcripts of each session can be found in Appendix K through P. Summary of the sessions is outlined in Table 10.

Table 10.

Session Dates, Times, Duration, and Participant Details.

Session	Date	Time	Duration	Number of Participants	Participants
Session #01	June 29 th	4:00 PM	30:41	2	#07, #12
Session #02	June 29 th	8:00 PM	33:14	3	#02, #05, #08
Session #03	July 1 st	6:00 PM	41:21*	2	#11, #12
Session #04	July 2 nd	5:00 PM	28:07	1	#01
Session #05	July 6 th	10:00 AM	33:50	3	#03, #04, #06
Session #06	July 10 th	10:00 AM	37:02	1	#09

*One of the participants was disconnected – extra time was given to reconnect.

Outline and Overview of the Professional Development Session

The researcher took great care in developing the presentation and the purpose of each slide. The following is a thick description of each slide in the presentation and the rationale behind it in the professional development session. Each slide is represented in Table 11.

Table 11.

Thick Description of all slides in the professional development session.

Slide #	Description and Rationale for the Slide
#01	Title Slide– It was important to have a title for the Professional Development session to introduce the topic to the participants.
#02	A brief overview of Educational Technology and the need for educators to evaluate and quantify it. This sets the stage for the following few slides for the participants.
#03	An Overview of the Six Criteria and Guiding Questions for Evaluating Technology Integration Models. They will be asked to do this after the professional development session for the PICRAT matrix (Kimmons & Hall, 2016a).
#04	The SAMR Model – the most common and well-known model for educational technology integration. An overview of this model helps put it in context with the subsequent models. It also gives us an opportunity to apply the Six Criteria to an established model.
#05	TPACK Model – the second most common and well-known model.
#06	Opportunity to evaluate these models based on Kimmons & Hall’s Six Criteria. Table from Kimmons (2020)
#07	Other Models that participants might have been familiar with.
#08	Opportunity to evaluate these models based on Kimmons & Hall’s Six Criteria. Table from Kimmons (2020)
#09	The Introduction to the PICRAT Matrix. This four and half minute video is a great overview of PICRAT and makes it simple to understand. It was developed by Royce Kimmons himself and found on his YouTube channel.
#10	Overview slide to breakdown the PICRAT matrix by the X axis and Y axis. It is important for the participants to understand that that you can move along the X and Y, sometimes simultaneously.
#11	A deep breakdown of the PIC – Passive, Interactive, Creative– Student’s relationship to Technology – tying in student engagement. – tying in student engagement.
#12	A deep breakdown of the RAT – Replaces, Amplifies, Transforms Teacher’s Traditional Practice relationship to Technology
#13	This slide is important because it shows the participant how to distinguish between RAT and PIC. The flowchart gives two questions that will lead to determining the role of the technology in terms of teacher practice (RAT). The images are reminders of the relationship between the content and the students to determine the PIC.
#14	Mapped Activities from the Participants. The researcher felt it important
#15	for the participants to see the PICRAT matrix in action. Taking the
#16	participants responses from my initial collection for documentation, the
#17	researcher showcased where their own activities would fall on the
#18	

#19	PICRAT matrix. In each professional development session, researcher
#20	went through a few of them to give examples. It varied each time.
#21	
#22	
#23	
#24	
#25	
#26	A meta-chart of 36 activities mapped to the PICRAT matrix. I think it is important that the participants get to see where their colleagues collectively chart on the PICRAT matrix.
#27	There is a quiz with an answer key on Royce Kimmons' website. It gives ten examples that participants can attempt to map to the PICRAT model. This is a good practical exercise for the participants.
#28	Recap of how to use the flowchart and images. At this time, I also mentioned that I would be collecting more lesson activity examples following this professional development session.
#29	Link to the survey. The survey was also emailed with a copy of the PowerPoint at the conclusion of the session.

Research Question #3: To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?

Research Question #3 can be divided into two main parts. The first part focuses on the teacher perceptions of educational technology integration which is measured by survey responses provided by the participants. The second part focuses on instructional practice which is measured by the lesson activity documentation provided by the participants. The lesson activities provided after the professional session were evaluated by the participants and by the researcher using the PICRAT Matrix.

Part I - Teacher Perceptions After the Professional Development Session

Participant #01 Sunset Grove – After Intervention

Participant #01 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #04 on July 2nd 2020. After which they were asked follow up questions in a survey. Participant #01 was asked to Agree or Disagree to a series of statements. When

asked, “You feel pressure to use technology in every lesson,” Participant #01 responded, “Agree.” This was a shift from the pre-survey from Disagree to Agree. When asked, “When lesson planning, you design the lesson around the educational technology first,” Participant #01 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #01 responded, “Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #01 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #01 responded, “Strongly Agree.” For Participant #01 the primary focus for developing classroom activities and main motivation for technology use is “engagement.” When designing a lesson, Participant #01 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #01 rated the importance of student engagement a 5 out of 5.

Participant #02 Sunset Grove – After Intervention

Participant #02 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #02, on June 29th at 8:00 PM. After which they were asked follow up questions in a survey. Participant #02 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #02 responded, “Disagree.” This was a shift from the pre-survey from Strongly Disagree to Disagree. When asked, “When lesson planning, you design the lesson around the educational technology first,” Participant #02 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #02

responded, “Agree.” This was a shift from the pre-survey from Strongly Agree to Agree. When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #02 responded, “Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #02 responded, “Agree.” For Participant #02 the primary focus for developing classroom activities and main motivation for technology use is to “enhance lessons and to create opportunity for higher order thinking.” When designing a lesson, Participant #02 felt that it was most important that students learn skills. This was a shift from the pre-survey from students learn character to learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #02 rated the importance of student engagement a 5 out of 5.

Participant #03 – Ever Pines – After Intervention

Participant #03 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #05, on July 6th, 2020 at 5:00 PM. After which they were asked follow up questions in a survey. Participant #03 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #03 responded, “Neutral.” This was a shift from the pre-survey from Disagree to Neutral. When asked, “When lesson planning, you design the lesson around the educational technology first,” “Neutral.” This was a shift from the pre-survey from Strongly Disagree to Neutral. When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #03 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student

skills you want them to learn first?” Participant #03 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #03 responded, “Agree.” For Participant #03 the primary focus for developing classroom activities and main motivation for technology use is to “build an experience that cannot be done without technology.” This was a change from the pre-survey where Participant #03 stated “students learn skills.” When designing a lesson, Participant #03 felt that it was most important that students learn academic content. This was a shift from the pre-survey where Participant #03 stated “students learn skills.” On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #03 rated the importance of student engagement a 5 out of 5.

Participant #04 – Ever Pines – After Intervention

Participant #04 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #05, on July 6th, 2020 at 5:00 PM. After which they were asked follow up questions in a survey. Participant #04 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #04 responded, “Neutral.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Neutral.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #04 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #04 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #04 responded, “Strongly

Agree.” For Participant #04 the primary focus for developing classroom activities and main motivation for technology use is to “make it more comfortable for students to use resources, develop a platform that allows students on home tutoring an easier transition back. Create meaningful lessons that students can use and relate to.” When designing a lesson, Participant #04 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #04 rated the importance of student engagement a 5 out of 5.

Participant #05 – Ever Pines – After Intervention

Participant #05 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #02, on June 29th, 2020 at 8:00 PM. After which they were asked follow up questions in a survey. Participant #05 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #05 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Strongly Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #05 responded, “Strongly Agree.” This was a shift from the pre-survey from Agree to Strongly Agree. When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #05 responded, “Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #05 responded, “Strongly Disagree.” This was a shift from the pre-survey from Disagree to Strongly Disagree. For Participant #05 the primary focus for developing classroom activities and main motivation for

technology use is “to prepare them for what colleges will expect them to know how to do.” When designing a lesson, Participant #05 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #05 rated the importance of student engagement a 4 out of 5.

Participant #06 – West Elm – After Intervention

Participant #06 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #05, on July 6th, 2020 at 10:00 AM. After which they were asked follow up questions in a survey. Participant #06 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #06 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #06 responded, “Agree.” This was a shift from the pre-survey from Neutral to Agree. When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #06 responded, “Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #06 responded, “Agree.” This was a shift from the pre-survey from Neutral to Agree. For Participant #06 the primary focus for developing classroom activities and main motivation for technology use is “To teach our students to be 21st century learners and to think about how I’m using the technology - for fun or is it to truly engage them and help them create something they couldn't do without technology.” When designing a lesson, Participant #06 felt that it was most important that students

learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #06 rated the importance of student engagement a 5 out of 5.

Participant #07 – West Elm – After Intervention

Participant #07 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #05, on June 29th, 2020 at 4:00 PM. After which they were asked follow up questions in a survey. Participant #07 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #07 responded, “Agree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” This was a shift from the pre-survey from Strongly Disagree to Disagree. When asked, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #07 responded, “Neutral.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #07 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #07 responded, “Neutral.” For Participant #07 the primary focus for developing classroom activities and main motivation for technology use is “Engagement.” When designing a lesson, Participant #07 felt that it was most important that students learn skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #07 rated the importance of student engagement a 5 out of 5.

Participant #08 – West Elm – After Intervention

Participant #08 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix

Session #02, on June 29th, 2020 at 8:00 PM. After which they were asked follow up questions in a survey. Participant #08 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #08 responded, “Agree.” When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” This was a shift from the pre-survey from Neutral to Disagree. When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #08 responded, “Agree.” This was a shift from the pre-survey from Strongly Agree to Agree. When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #08 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #08 responded, “Strongly Agree.” This was a shift from the pre-survey from Agree to Strongly Agree. For Participant #08 the primary focus for developing classroom activities and main motivation for technology use is “I want the technology to engage the students so that they are interactive and interested in the content.” When designing a lesson, Participant #08 felt that it was most important that students learn character. This was a shift from the pre-survey from skills to character. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #08 rated the importance of student engagement a 5 out of 5.

Participant #09 – Island Acres – After Intervention

Participant #09 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #06, on July 10th, 2020 at 10:00 AM. After which they were asked follow up questions in a survey. Participant #09 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #09 responded, “Agree.” This was a shift from the pre-survey from Strongly to Agree. When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” This was a shift from the pre-survey from Neutral to Disagree. When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #09 responded, “Disagree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #09 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?” Participant #09 responded, “Agree.” This was a shift from the pre-survey from Strongly to Agree. For Participant #09 the primary focus for developing classroom activities and main motivation for technology use is to “enhance instruction.” When designing a lesson, Participant #09 felt that it was most important that students learn skills. This was a shift from the pre-survey from character to skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #09 rated the importance of student engagement a 5 out of 5.

Participant #10 – Island Acres – After Intervention

Participant #10 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #03, on July 1st, 2020 at 6:00 PM. After which they were asked follow up questions in a survey. Participant #10 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #10 responded, “Neutral.” This was a shift from the pre-survey from Disagree to Neutral. When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” This was a shift from the pre-survey from Neutral to Disagree. When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #10 responded, “Strongly Agree.” This was a shift from the pre-survey from Agree to Strongly Agree. When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #10 responded, “Agree.” This was a shift from the pre-survey from Strongly Agree to Agree. When asked, “When lesson planning, you design the lesson around character education values first?” Participant #10 responded, “Neutral.” For Participant #10 the primary focus for developing classroom activities and main motivation for technology use is “to engage students in a more meaningful way as well as reinforcing information that has already been taught to the students.” When designing a lesson, Participant #10 felt that it was most important that students learn academic content. This was a shift from the pre-survey from skills to academic content. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #10 rated the importance of student engagement a 4 out of 5.

Participant #11 – Island Acres – After Intervention

Participant #11 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #03, on July 1st, 2020 at 6:00 PM. After which they were asked follow up questions in a survey. Participant #11 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #11 responded, “Agree.” This was a shift from the pre-survey from Neutral to Agree. When asked, “When lesson planning, you design the lesson around the educational technology first,” “Strongly Disagree.” This was a shift from the pre-survey from Disagree to Strongly Disagree. When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #11 responded, “Agree.” This was a shift from the pre-survey from Disagree to Agree. When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #11 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around character education values first?”, Participant #11 responded, “Strongly Agree.” For Participant #11 the primary focus for developing classroom activities and main motivation for technology use is “To make the students more engaged in the lesson and learn more about the content.” When designing a lesson, Participant #11 felt that it was most important that students learn skills. This was a shift from the pre-survey from character to skills. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #11 rated the importance of student engagement a 5 out of 5.

Participant #12 – Island Acres – After Intervention

Participant #12 attended a virtual professional development session on Educational Technology Integration and Models with a focus on the PICRAT matrix Session #01, on June 29th, 2020 at 4:00 PM. After which they were asked follow up questions in a survey. Participant #12 was asked to Agree or Disagree to a series of statements. When asked, “You feel pressure to use technology in every lesson,” Participant #12 responded, “Strongly Agree.” This was a shift from the pre-survey from Disagree to Strongly Agree. When asked, “When lesson planning, you design the lesson around the educational technology first,” “Disagree.” When asked if, “When lesson planning, you design the lesson around the academic content / NYS standards first,” Participant #12 responded, “Strongly Agree.” When asked, “When lesson planning, you design the lesson around what student skills you want them to learn first?” Participant #12 responded, “Disagree.” This was a shift from the pre-survey from Strongly Agree to Disagree. When asked, “When lesson planning, you design the lesson around character education values first?” Participant #12 responded, “Strongly Disagree.” This was a shift from the pre-survey from Disagree to Strongly Agree. For Participant #12 the primary focus for developing classroom activities and main motivation for technology use is “Engaging the students in the lesson.” When designing a lesson, Participant #12 felt that it was most important that students learn academic content. On a scale of 1-5 (1 – Not Important, 5 – Very Important), Participant #12 rated the importance of student engagement a 5 out of 5.

Teacher Perceptions and Evaluation on the PICRAT Matrix

After the professional development intervention session, the participants were asked to share their thoughts on the PICRAT Matrix. Additionally, they were asked to evaluate the PICRAT matrix using the Six Criteria for Evaluating Instructional Technology models.

Participant #01 – Sunset Grove – Teacher Perceptions on the PICRAT Matrix

Participant #01 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #01 responded, “I feel this is a strong, easy to understand model that allows teachers to reflect on their lessons and find ways to elevate them with helpful technologies.” Participant #01 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #01 responded “Yes” and explained “The model is eye-opening and focuses on the important reasons and ways we should be implementing technologies.”

Participant #02 – Sunset Grove – Teacher Perceptions on the PICRAT Matrix.

Participant #02 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #02 responded, “I found the PICRAT model to be so much clearer. I think it serves as a really good tool to pair with lesson development. It clearly shows the roles of both educator and students, forcing the educator to really assess what the students will be doing.” Participant #02 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #02 responded “Yes” and explained “I think it helps me

understand student interaction more and helps me understand the purpose of technology in my lesson.”

Participant #03 – Ever Pines – Teacher Perceptions on the PICRAT Matrix

Participant #03 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #03 responded, “It provides clarity on both student and teacher engagement. I really like how clear it is compared to the other models.” Participant #03 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #03 responded “Yes” and explained “SAMR model is annoying to use since it does not provide enough distinction between them. Also, the PICRAT can be used to focus on the student’s engagement in your lesson not just the lesson.”

Participant #04 – Ever Pines – Teacher Perceptions on the PICRAT Matrix

Participant #04 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #04 responded, “It provides clarity on both student and teacher engagement. I really like how clear it is compared to the other models.” Participant #04 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #04 responded “Yes” and explained “SAMR model is annoying to use since it does not provide enough distinction between them. Also, the PICRAT can be used to focus on the student’s engagement in your lesson not just the lesson.”

Participant #05 – Ever Pines – Teacher Perceptions on the PICRAT Matrix

Participant #05 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #05 responded, “Compared to SAMR, it is more student-focused. By using a grid rather than a hierarchy, there is more flexibility.” Participant #05 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #05 responded “Maybe” and explained “I already thought it was vital and have been dragging my department along. I’m not sure it changes my view, but it will help me change other viewpoints.”

Participant #06 – West Elm – Teacher Perceptions on the PICRAT Matrix

Participant #06 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #06 responded, “Far easier to understand at a glance.” Participant #06 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #06 responded “Yes” and explained “I am able to clearly see where I have landed in this model versus other matrices.”

Participant #07 – West Elm – Teacher Perceptions on the PICRAT Matrix

Participant #07 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #07 responded, “I think that it is straightforward and provides more clarity than some of the other models out there. I found it easier to see where some of my lessons fall.” Participant #07 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #07 responded “Yes” and explained “Sometimes it can be difficult to tell whether it is worth integrating some technology pieces. I never go for “bells and whistles” and oftentimes educational technology tools feel like nothing more than that. So I enjoyed seeing a model that solidified the degree to which technology transforms lessons.”

Participant #08 – West Elm – Teacher Perceptions on the PICRAT Matrix

Participant #08 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #08 responded, “I feel that this model addresses both the teacher objectives and the student outcomes or achievement. In other words I always start my planning with the question of What is it that I want the students to learn and this model allows me to reflect and plan on how I can use the technology to have the students be the most creative they can be in achieving the skills/ goals of the lesson.” Participant #08 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #08 responded “No” and explained “I have been integrating technology for the past 6 years into my lessons and I feel that I really try to learn and research various technology tools that would bring my lessons to a higher level. However, the PICRAT model does give me a clearer visual diagram of what I am actually trying to achieve.”

Participant #09 – Island Acres – Teacher Perceptions on the PICRAT Matrix

Participant #09 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #09 responded, “PICRAT gives teachers the opportunity to allow students creative expression and a way to truly provide enrichment across the curriculum.” Participant #09 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?”. Participant #09 responded “Yes” and explained “Technology is more than a digital chalkboard. It can be used to connect and build understanding of material and the world.”

Participant #10 – Island Acres – Teacher Perceptions on the PICRAT Matrix

Participant #10 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #10 responded, “PICRAT gives teachers the opportunity to allow students creative expression and a way to truly provide enrichment across the curriculum.” Participant #10 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #10 responded “Yes” and explained “Technology is more than a digital chalkboard. It can be used to connect and build understanding of material and the world.”

Participant #11 – Island Acres – Teacher Perceptions on the PICRAT Matrix

Participant #11 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #11 responded, “It is one of the more organized ways of thinking about technology integration within the classroom. Teachers should really look to move away from the passive use of technology and move towards transforms. interactive and creative in order for students to learn important skills and content.” Participant #11 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?” Participant #11 responded “Yes” and explained “Yes because I feel my school relies on passive use of technology and once and awhile utilizes technology as a transform or interactive way. I would like to engage my students as much as possible while still addressing IEP Goals and this is a great way for the students to really become much more involved in classroom activities.”

Participant #12 – Island Acres – Teacher Perceptions on the PICRAT Matrix

Participant #12 was asked questions about the PICRAT matrix in particular, specifically, “Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT?” Participant #12 responded, “The PICRAT model taught me a lot of education technology integration. The matrix box helps narrow down what each type of resource is. I like how it is also flexible, some resources can fall under more than one box. I find that the "student's relationship to tech is" side is easier to categorize the examples/resources than the "teacher's use of tech.” Participant #12 was asked, “Do you feel that the PICRAT model changes your view on educational technology integration?”. Participant #12 responded “Yes” and explained “When I create my lessons, this model can guide me when selecting which type of educational technology resource. For previous lessons that I already have, I can use this to determine where my resources are categorized on the PICRAT matrix.”

Overall Results of The Six Criteria to the PICRAT Matrix

Participants at were asked to use Kimmon’s and Hall’s (2016b) Six Criteria for Evaluating Technology Integration Models (based on Kuhn (2013) to evaluate the PICRAT matrix. Table 12 shows the questions in the model.

Table 12.

Six Criteria for Evaluating Instructional Technology Integration Models (Kimmons & Hall 2016b).

Criterion	Guiding Question
Clarity	Is the model sufficiently simple, clear, and easy to understand, with no hidden complexities?
Compatibility	Does the model complement/support existing educational practices deemed valuable to teachers?
Fruitfulness	Does the model elicit fruitful thinking as teachers grapple with problems of technology integration?
Technology Role	Does the model treat technology integration as a means for achieving specific pedagogical or other benefits (rather than an end in itself)?
Scope	Is the model sufficiently parsimonious to ignore aspects of technology integration not useful to teachers, but sufficiently comprehensive to guide their practice?
Student Focus	Does the model clearly emphasize students and student outcomes?

Table 13.

Sunset Grove Teacher Perceptions of the PICRAT Model.

Six Criteria for Evaluating Technology Integration Models	P#01	P#02
How would you rate the Clarity of the PICRAT model? 1 - Unclear / Confusing 4 - Easy to Understand	4	4
How would you rate the Compatibility of the PICRAT model? 1 - Difficult to Implement 4 - Easy to Implement	4	4
How would you rate the Fruitfulness of the PICRAT model? 1 - Does not lead to meaningful reflection 4 - Leads to meaningful reflection	4	4
How would you rate the Technology Role of the PICRAT model? 1 - Technology is the main focus of the model 4 - Technology is viewed as means to guide practice	4	4
How would you rate the Student Focus of the PICRAT model? 1 - Not Important 4 - Important	4	4
How would you rate the Scope of the PICRAT model? 1 - Narrow 4 - Broad	4	4

Table 14.

Ever Pines Teacher Perceptions of the PICRAT Model.

Six Criteria for Evaluating Technology Integration Models	P#03	P#04	P#05
How would you rate the Clarity of the PICRAT model? 1 - Unclear / Confusing 4 - Easy to Understand	4	3	4
How would you rate the Compatibility of the PICRAT model? 1 - Difficult to Implement 4 - Easy to Implement	4	2	4
How would you rate the Fruitfulness of the PICRAT model? 1 - Does not lead to meaningful reflection 4 - Leads to meaningful reflection	4	3	4
How would you rate the Technology Role of the PICRAT model? 1 - Technology is the main focus of the model 4 - Technology is viewed as means to guide practice	4	4	3
How would you rate the Student Focus of the PICRAT model? 1 - Not Important 4 - Important	4	3	4
How would you rate the Scope of the PICRAT model? 1 - Narrow 4 - Broad	4	3	4

Table 15.

West Elm Teacher Perceptions of the PICRAT Model.

Six Criteria for Evaluating Technology Integration Models	P#06	P#07	P#08
How would you rate the Clarity of the PICRAT model? 1 - Unclear / Confusing 4 - Easy to Understand	4	4	4
How would you rate the Compatibility of the PICRAT model? 1 - Difficult to Implement 4 - Easy to Implement	4	4	4
How would you rate the Fruitfulness of the PICRAT model? 1 - Does not lead to meaningful reflection 4 - Leads to meaningful reflection	4	4	4
How would you rate the Technology Role of the PICRAT model? 1 - Technology is the main focus of the model 4 - Technology is viewed as means to guide practice	3	2	4
How would you rate the Student Focus of the PICRAT model? 1 - Not Important 4 - Important	4	4	4
How would you rate the Scope of the PICRAT model? 1 - Narrow 4 - Broad	4	4	4

Table 16.

Island Acres Teacher Perceptions of the PICRAT Model.

Six Criteria for Evaluating Technology Integration Models	P#09	P#10	P#11	P#12
How would you rate the Clarity of the PICRAT model? 1 - Unclear / Confusing 4 - Easy to Understand	4	4	4	3
How would you rate the Compatibility of the PICRAT model? 1 - Difficult to Implement 4 - Easy to Implement	4	4	4	2
How would you rate the Fruitfulness of the PICRAT model? 1 - Does not lead to meaningful reflection 4 - Leads to meaningful reflection	4	4	4	4
How would you rate the Technology Role of the PICRAT model? 1 - Technology is the main focus of the model 4 - Technology is viewed as means to guide practice	4	3	3	4
How would you rate the Student Focus of the PICRAT model? 1 - Not Important 4 - Important	4	3	4	4
How would you rate the Scope of the PICRAT model? 1 - Narrow 4 - Broad	4	3	4	3

Tables 13 – 16 depict the scores of each individual participant. Figure 25 shows the averages of these values. Overall, the participants reported the highest average value on “Fruitfulness” and the lowest average value in “Role of the Technology.” Table 17 below shows the average values of these criteria from all 12 participants. Overall, the participants felt that the PICRAT was “easy to understand,” “easy to implement,” “leads to meaningful reflection,” “technology is viewed as means to guide practice,” “student focus is important and the scope is broad.”

Table 17.

Averages of Teacher Responses using Six Criteria for Evaluating Technology Integration Models.

Six Criteria	Average Value
Clarity 1 - Unclear / Confusing 4 - Easy to Understand	3.83
Compatibility 1 - Difficult to Implement 4 - Easy to Implement	3.67
Fruitfulness 1 - Does not lead to meaningful reflection 4 - Leads to meaningful reflection	3.92
Technology Role 1 - Technology is the main focus of the model 4 - Technology is viewed as means to guide practice	3.33
Student Focus 1 - Not Important 4 - Important	3.83
Scope 1 - Narrow 4 - Broad	3.67

Comparison of Pre & Post Professional Development Responses

When comparing the responses before the professional development intervention session and after the professional development session, there was a slight change in participants feeling that student engagement was very important. Figure 26 shows this shift. Additionally, there was a change in the way the overall participants felt about the importance of character education and academic content. Before the professional development, when asked “what they felt was the most important?” – 25% of the participants responded with “academic content.” After the professional development, the

participants had valued “character education” at 25% and swapping with academic content as depicted in Table 18 and Figure 9 respectively.

Table 18.

The comparison of responses before and after the professional development session (1 – Not Important | 5 – Very Important).

Question	Average Pre-Professional Development	Average Post-Professional Development
How important is student engagement in learning?	4.75	4.83

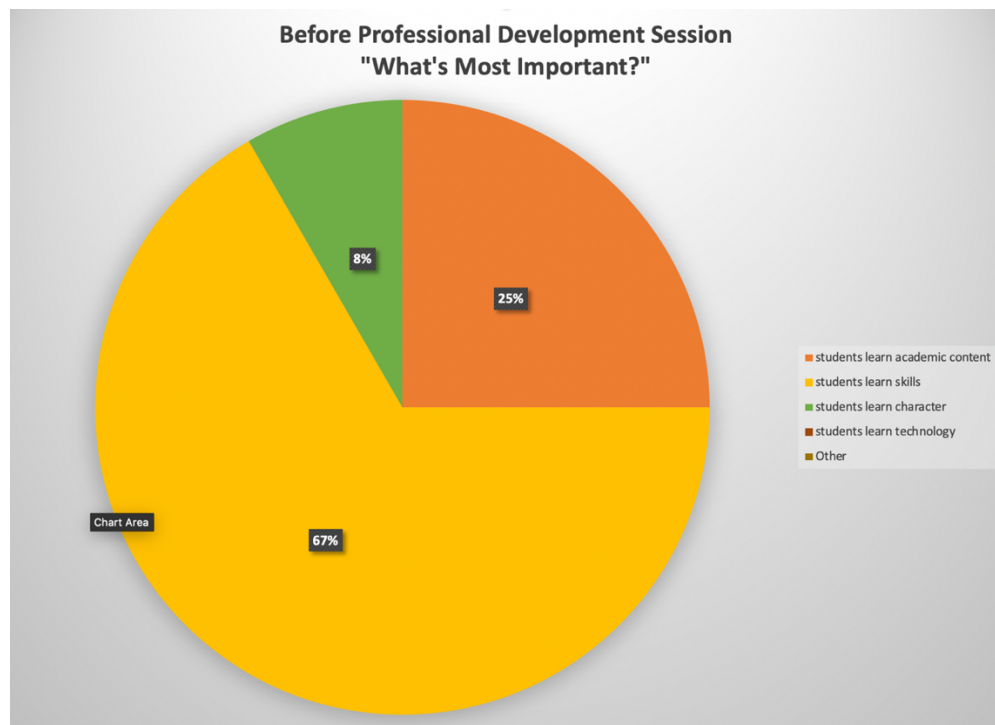


Figure 9. Chart of Participants Responses – “What’s Most Important?” – Before Professional Development Intervention Session.

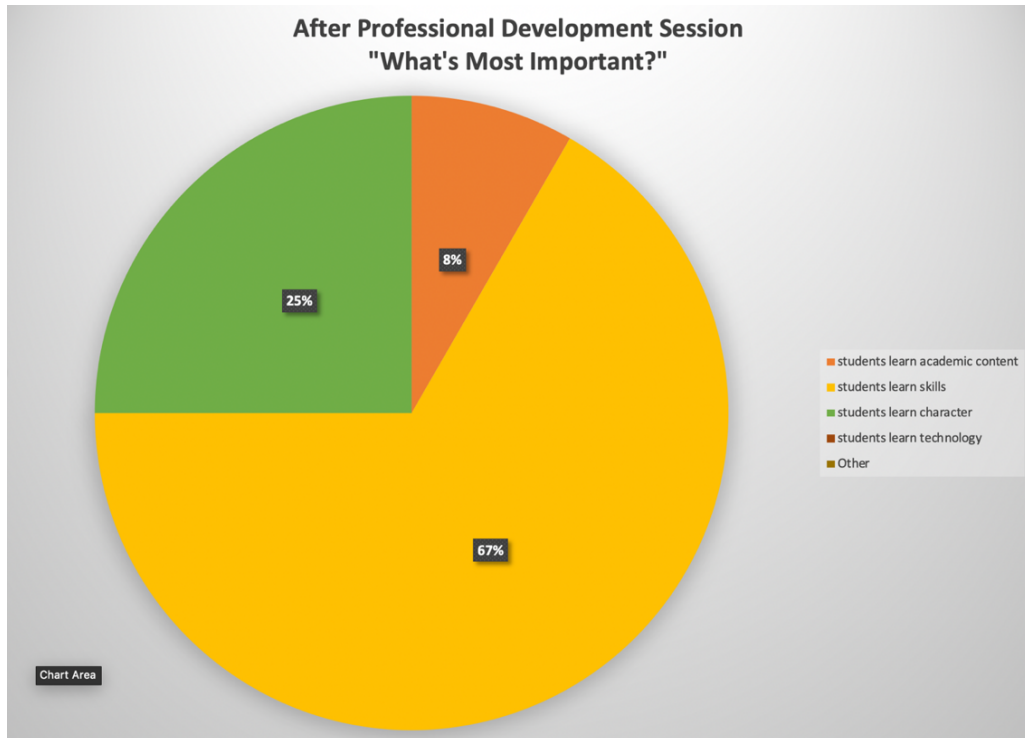


Figure 10. Chart of Participants Responses – “What’s Most Important?” – After Professional Development Intervention Session.

Rubric for Converting Responses into Numbers Based on Participants Responses

Table 19.

Values assigned to the responses based on the participants statements.

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
You feel pressure to use technology in every lesson.	-2	-1	0	1	2
When lesson planning, you design the lesson around the educational technology first.	-2	-1	0	1	2
When lesson planning, you design the lesson around the academic content / NYS standards first.	-2	-1	0	1	2
When lesson planning, you design the lesson around what student skills you want them to learn first?	-2	-1	0	1	2
When lesson planning, you design the lesson around character education values first?	-2	-1	0	1	2

Statements Pre & Post Professional Development with Movement on a Scale

Table 20.

Comparison of Participant Responses to Statements Before and After Professional Development Session.

		Sunset Grove		Ever Pines			West Elms			Island Acres			
	Statements	01	02	03	04	05	06	07	08	09	10	11	12
PRE	You feel pressure to use technology in every lesson.	-1	-2	-1	0	-1	-1	1	1	-2	-1	0	-1
POST	You feel pressure to use technology in every lesson.	1	-1	0	0	-1	-1	1	1	1	0	1	2
Movement		+2	+1	+1	0	0	0	0	0	+3	+1	+1	+3
PRE	When lesson planning, you design the lesson around the educational technology first.	-1	-1	-2	0	-2	-1	-2	0	0	0	-1	-1
POST	When lesson planning, you design the lesson around the educational technology first.	0	-1	0	0	-2	-1	-1	-1	-1	-1	-2	-1
Movement		+1	0	+2	0	0	0	+1	-1	-1	-1	-1	0
PRE	When lesson planning, you design the lesson around the academic content / NYS standards first.	1	2	2	2	1	0	0	2	-1	1	-1	2
POST	When lesson planning, you design the lesson around	1	1	2	2	2	1	0	1	-1	2	1	2

	the academic content / NYS standards first.												
Movement		0	-1	0	0	+1	+1	0	-1	0	+1	+2	0
PRE	When lesson planning, you design the lesson around what student skills you want them to learn first?	2	1	2	2	1	1	2	2	2	2	2	2
POST	When lesson planning, you design the lesson around what student skills you want them to learn first?	2	1	2	2	1	1	2	2	2	1	2	-1
Movement		0	0	0	0	0	0	0	0	0	-1	0	-3
PRE	When lesson planning, you design the lesson around character education values first?	0	1	1	2	-1	0	0	1	2	0	2	-1
POST	When lesson planning, you design the lesson around character education values first?	0	1	1	1	-2	1	0	2	1	0	2	-2
Movement		0	0	0	-1	-1	+1	0	+1	-1	0	0	-1
Absolute Value Totals		3	2	3	1	2	2	1	3	5	4	4	7
Average Per Statement		.6	.4	.6	.2	.4	.4	.2	.6	1	.8	.8	1.4

Changes in Teacher Perceptions and Statements Before and After the Professional Development Session

The researcher assigned numerical values to each value on the scale as shown in Figure 29. When looking at the shift in statements and their attitudes in Figure 30. There is a clear shift after the professional development session that there is more pressure (overall +12 toward Agree) that “You feel pressure to use technology in every lesson.” When given the statement: “When lesson planning, you design the lesson around the educational technology first,” overall there was a minimal shift (overall +1 toward Agreeing). When given the statement: “When lesson planning, you design the lesson around the academic content / NYS standards first.” overall there was a minimal shift (+3 toward Agree). When given the statement: “When lesson planning, you design the lesson around what student skills you want them to learn first?” overall there was a shift (-4 toward Disagree). When given the statement: “When lesson planning, you design the lesson around character education values first?” overall there was a shift (-2 toward Disagree).

If you take the absolute value of the shifts, Participant #12, had the biggest change (7) in their feelings toward the five statements overall. Participants #04 and Participants #07 had the least change (1) in their feelings after the Professional Development.

Island Acres School District overall had the biggest average change in their feelings after the professional development session (with an absolute value of 5). Whereas Sunset Grove had an average of 2.5, Ever Pines had an average of 2, and West Elm had an average of 3.

Part II - Teacher Instructional Practice after the Professional Development Session

After the professional development session, teachers were asked to provide lesson activity documentation. In addition to the researcher evaluating the lesson activities with

the PICRAT matrix, the participants were also asked to answer where they felt it fell on the PICRAT matrix. The researcher's evaluation and score are shown in Figure 31. The participants' self-reported score is shown in Figure 34. After the lesson activities were evaluated with the PICRAT matrix by both the researcher and the self-reported participant, the researcher assigned a point value to each and averaged them together to get an overall score for each participant, school, and the overall sample. Self-reporting was compared to the researcher's evaluation to determine if there was any difference.

Results from the Post-Professional Development Activities are Evaluated by Researcher

Table 21.

Researcher Evaluated Lesson Activities and Score Given After Professional Development Intervention.

Participant	District Name	Activity #1	Activity #2	Activity #3	Raw Post-Score	Researcher Post-Score Average
#01	Sunset Grove	IA	CA	CT	12	4
#02	Sunset Grove	CT	CA	CT	14	4.67
#03	Ever Pines	IT	CA	CT	13	4.3
#04	Ever Pines	IT	CT	IA	12	4
#05	Ever Pines	CT	CT	CA	14	4.67
#06	West Elms	CA	IA	CT	12	4
#07	West Elms	CT	IR	IA	10	3.33
#08	West Elms	CT	CA	IR	11	3.67
#09	Island Acres	CA	IA	CA	11	3.67
#10	Island Acres	PA	IA	CR	8	2.67
#11	Island Acres	CT	CA	IA	11	3.67
#12	Island Acres	CA	PR	IA	8	2.67
Overall Average						3.776

Comparison of Educational Technology Integration

The researcher compared the results from the activities provided prior to the professional development session to the activities after the professional development session. The researcher noted the change in the types of activities as measured by the PICRAT matrix. All of the participants either stayed the same or improved after the Professional Development Session. The biggest increase was a total of 4 points or an average of 1.33 spread over the three examples. Three participants moved up 3 points, for an average of 1 spread over the three examples. Four participants improved 2 points for

an average of .67 spread over the three examples. One participant improved 1 point for an average of .33 spread over the three examples. Lastly, three participants remained the same. A summary of results is shown in Figure 32.

Comparison between the Pre-Score Average and Post Score Average

Table 22.

Researcher Evaluated Lesson Activities and Score Compare before and after Professional Development Session.

Participant	School District	Researcher Pre-Score Average	Researcher Post-Score Average	Researcher Score Change Average
Participant #01	Sunset Grove	3	4	1
Participant #02	Sunset Grove	3	4.67	1.67
Participant #03	Ever Pines	3.33	4.3	1
Participant #04	Ever Pines	3.33	4	0.67
Participant #05	Ever Pines	3.67	4.67	1
Participant #06	West Elms	4	4	0
Participant #07	West Elms	3.33	3.33	0
Participant #08	West Elms	3	3.67	0.67
Participant #09	Island Acres	3	3.67	0.67
Participant #10	Island Acres	2.67	2.67	0
Participant #11	Island Acres	2.33	3.67	1.33
Participant #12	Island Acres	2.33	2.67	0.33

The Number of Instances of Each PICRAT Box Before and After the Professional Development Session

Overall, the participants second set of activities were more heavily focused on the higher PICRAT levels of the matrix in particular the Creative / Amplifies and Creative / Transforms boxes. In fact, 61% of all of the post-professional development lesson activities were in the Creative / Amplifies or Creative / Transforms box compared to 13% prior to the professional development session. The summary is shown in Table 23.

Table 23.

Number of Instances of each level of PICRAT, before and after intervention with the difference.

Participant	Number Pre-Professional Development Researcher	Number Post Professional Development Researcher	Difference Between Pre PD and Post PD
Passive / Replaces	2	1	-1
Passive / Amplifies	3	1	-2
Passive / Transforms	1	1	0
Interactive / Replaces	4	2	-2
Interactive / Amplifies	14	8	-6
Interactive / Transforms	4	2	-2
Creative / Replaces	1	1	0
Creative / Amplifies	4	10	+6
Creative / Transforms	1	11	+10

Comparison Between the Post-Score Average (Researcher) and Post Score Average Self-Reported

Additionally, the researcher asked the participants to determine where they thought their activities on the PICRAT matrix. This is depicted in the “Self-Reported Difference Average.” The negative numbers mean that the participant evaluated their own use of educational technology lower on the PICRAT matrix than the researcher. A positive number indicated that the participant evaluated their own use of educational technology higher on the PICRAT matrix than the researcher. Only five participants had different scores than the researcher, four of which had the participants self-reporting at a lower than the researcher evaluated them. The full results are below in Tables 24, 25, and 26.

Table 24.

Self-Reported Evaluation of Lesson Activities and Score Given After Professional Development Intervention.

Participant	District Name	Activity #1	Activity #2	Activity #3	Raw Post-Score	Self-Reported Post-Score Average
Participant #01	Sunset Grove	IA	CA	CT	12	4
Participant #02	Sunset Grove	CA	CA	CT	13	4.33
Participant #03	Ever Pines	IA	CA	CT	12	4
Participant #04	Ever Pines	PR	CT	IT	10	3.33
Participant #05	Ever Pines	CT	CT	CA	14	4.67
Participant #06	West Elms	CA	IA	CT	12	4
Participant #07	West Elms	IT	PR	IA	8	2.67
Participant #08	West Elms	CT	CA	IR	11	3.67
Participant #09	Island Acres	CA	IA	CA	11	3.67
Participant #10	Island Acres	IR	IR	CR	8	2.67
Participant #11	Island Acres	CT	CA	IA	12	4
Participant #12	Island Acres	CA	PR	IA	8	2.67
Self-Reported Avg						3.64

Table 25.

Comparison between the Post-Score Average (Researcher) and Post Score Average (Self-Reported).

Participant	School District	Researcher Post-Score Average	Self-Reported Post-Score Average	Researcher / Self-Reported Difference Average
Participant #01	Sunset Grove	4	4	0
Participant #02	Sunset Grove	4.67	4.33	-0.33
Participant #03	Ever Pines	4.3	4	-0.33
Participant #04	Ever Pines	4	3.33	-0.67
Participant #05	Ever Pines	4.67	0	0
Participant #06	West Elms	4	0	0
Participant #07	West Elms	3.33	2.67	-0.67
Participant #08	West Elms	3.67	0	0
Participant #09	Island Acres	3.67	0	0
Participant #10	Island Acres	2.67	0	0
Participant #11	Island Acres	3.67	4	0.33
Participant #12	Island Acres	2.67	2.67	0

Table 26.

The difference between the researcher's score and the self-reported score.

Participant	Number Post Professional Development Researcher	Number Post Professional Development Self-Reported	Difference Between Researcher and Self-Reported
	1	3	+2
Passive / Replaces			
Passive / Amplifies	1	0	-1
Passive / Transforms	1	0	-1
Interactive / Replaces	2	3	+1
Interactive / Amplifies	8	7	-1
Interactive / Transforms	2	2	0
Creative / Replaces	1	1	0
Creative / Amplifies	10	11	+1
Creative / Transforms	11	9	-2

Triangulation of Quantitative and Qualitative Data

Guba and Lincoln (1994) stress the importance of data corroboration, in taking data that is both qualitative and quantitative and makes for a more reliable study. The researcher was careful to code the qualitative data into themes that can be analyzed with the quantitative data that was collected from the surveys. The qualitative data from the lessons activities was given a numerical value when assigned to the PICRAT matrix and applied with a point scale. Lastly, the open response questions on the surveys were coded into a list of themes. The themes were ranked in Table 27.

Member Checking and Transcript Review

After the sessions were transcribed, each participant received the transcript of the session that they participated in. They were asked to review the transcript for accuracy in particular their own responses and questions. Member checking is important because it ensures that the data is not misquoted or taken out of context.

Interviews

Interviews were conducted based on the shift from the pre-lesson activity results and shifts in perceptions. Two of the participants met the pre-established threshold for interview, Participant #02 and Participant #11. This is because they shifted an average of more than 1 point on the PICRAT matrix as evaluated by the researcher.

These two participants were asked a series of questions as outlined in Appendix Q. According to Saldana (2013) and Miles et al. (2014), coding interviews can take on various different styles and methods. The most applicable method for coding for this type of research is “Process Coding.” The reason for this is that this study used participant interaction and measured the consequences of the interaction (Saldana, 2013). The

transcripts and the coding of the transcripts can be found on the Appendix R and Appendix S.

By measuring the commonalities of the phrases said in the transcript, the responses were coded and the following top themes emerged: Professional Development, PICRAT as a Planning tool, Student skills, Positive thoughts on PICRAT, PICRAT as a reflective tool, and Student Engagement. The interviewees both felt the importance of professional development, and how PICRAT can be used as a planning tool for teachers and can improve student's engagement and acquisition of skills.

Table 27.

Coded Themes after Interviews with the Two Participants.

Coding Theme	Total
Professional Development	18
PICRAT As A Planning Tool	14
Student Skills	7
PICRAT (Positive)	6
PICRAT As A Reflective Tool	6
Student Engagement	5
Communication	4
Equity Of Access	4
Technology Makes Things Easier	3
Online Learning	3
Increase In Use	3
Use Of Technology	3
Socialization	3
G-Suite (Google Products)	3
Social Media	2
Video Calls	2
Organization	2
Learning	2
Use Of Rubrics	2
Fear	2
Student Choice and Voice	2
Creativity	2
Electronic Payments	1
Videos	1
Reliability Of Internet	1
Student Centered	1
Student Digital Citizenship	1
Collaboration Tool	1
Playing Computer Games	1
Critical Thinking	1

Summary of Chapter

Research questions were addressed for the following: teacher perceptions and instructional practice with educational technology. Demographic and School District data

was presented. Data was shown for pre-professional development session and post professional development session surveys. Lesson activities collected before and after the professional development session were scored and tabulated. Lastly, interviews were conducted of two of the individuals that met the threshold for interview. Data was analyzed and reviewed and presented as findings into to individually address the research questions. Triangulation was achieved through the evaluation of lesson activities with PICRAT and the process coding of the free response survey questions.

In the final chapter, the researcher will unpack and address the data presented in Chapter 4 as to what the implications are for the research questions, future practice, future research, and beyond.

CHAPTER 5 - DISCUSSION

Organization of Chapter

This chapter is set up in the following manner. It begins with a review and summary of the study. Next, it provides discussion of the findings in relation to each research question. Afterward, the limitations of the study are explored in detail. Lastly, the recommendations for future practice and future research are presented along with the conclusions.

Introduction

As K-12 school districts invest more and more resources into educational technology, it is more important than ever that teacher's attitudes and instructional practice with educational technology promotes learning that engages students at the highest level. It was important to the researcher to understand teacher perceptions and of educational technology models and their level of integration. In addition, it was critical to see the impact of professional development on both teacher perceptions and instructional practice. Three research questions guided this study:

1. What are secondary teacher perceptions and prior knowledge of educational technology integration models?
2. What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?
3. To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?

This dissertation surveyed 12 participants from four different suburban school districts and asked questions about educational technology and educational technology integration models. Participants also participated in a professional development session on the PICRAT matrix. Each of the school districts had different student race and ethnicity demographics, as well as different levels of ENL (English Language Learners), Special Education students, and economically disadvantaged students. Participants prior experience level with educational technology varied, as did their experience and level of professional development. Below is the initial framework that was established prior to the study for understanding change with perceptions and practice, based on Guskey's (2002) and Lewin's (1947) models for change.

Implications of Findings

There were three questions that guided this study. However, the first two questions were designed to set up a baseline for comparison for the third question. The third and final question was multifaceted and was intended to be a comparison of the baseline after the professional development intervention session.

Research Question #1: What are secondary teacher perceptions and prior knowledge of educational technology integration models?

The first question: "What are secondary teacher perceptions and prior knowledge of educational technology integration models?" This question establishes a baseline and allows the comparison for subsequent questions and data for teacher attitudes and beliefs on educational technology integration models.

First, when analyzing the teachers' beliefs and attitudes toward technology, it seems that it is favorable, but not to the point that the technology overshadows other reasons for designing lessons. Overall, the teacher perceptions stated that overwhelming

teachers felt that student engagement was very important in learning (4.75 out of 5.0; 1 – Not Important, 5 – Very Important). Seventy-Five percent of teachers felt that students learning skills was most important. On average, 16.7% of teachers felt pressure to use technology in every lesson. On average, 66.7% of teachers felt that they should not design a lesson around technology first, the remaining 33.3% were neutral. On average, 66.7% of teachers felt that they should design a lesson around the New York State and/or academic content first. One hundred percent of participants said that when designing a lesson, they should design it around the skills they want the students to learn. Lastly, only 50% of the participants felt they should develop lessons around character education. Based on these responses, the only thing that all teachers agreed on is that designing lessons around skills students should learn, followed by the academic content. The technology was not the most important factor in designing lessons for the secondary teachers. This is important, because as Thieman (2008) stated, technology is merely a teaching and learning tool, not the end means. However, teachers understood the importance of the technology and the role that the technology should play in the classroom, as many of them used technology daily or at least twice a week. As far as technology integration models, 41% of the participants were not familiar with any educational technology models, and 25% of the participants were only familiar with one of the models.

Research Question #2: What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?

The second question, “What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?” The purpose

of this question was to establish a baseline for the lesson activities prior to the professional development sessions.

When looking at the teachers' provided lesson activity examples as evaluated by the PICRAT matrix, they ranged in various levels. Overall, there was an average of 3.0825, in the researchers quantified PICRAT scale. When looking at the mode of the PICRAT matrix, prior to the professional development 38.9% or 14/36 lesson activities fell into the Interactive / Amplifies category. There was only one instance of Creative / Transforms integration prior to the professional development session. Although, the teachers' lesson activities did provide interactive experiences for students, and mostly do more than replacement use of technology, there was little creative or transformative educational technology integration.

Research Question #3: To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?

The third question, was "To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools?" This question was designed as the heart of this study. After the professional development session, participants were given the same statements they had prior to the professional development session, they were also asked to evaluate the PICRAT Matrix. Lastly, they were asked to provide additional lesson examples again and self-report where they were on the PICRAT matrix. To answer this question, it can be divided into two parts: Teacher Perception and Teacher Practice.

Impact of the Professional Development on Teacher Perceptions

First, looking at the statement reactions, there was an immediate shift. See the figures below. When asked if “they felt pressure to use technology in every lesson?” This time 50% of the participants felt that they agreed or strongly agreed with the statement. This was a 33% increase compared to prior to the professional development session. This was clearly an impact of the professional development session. Participants felt that by knowing more about Technology Integration there was added pressure when designing their lessons. For the second statement, “When lesson planning, you design the lesson around the educational technology first?” there was no change after the professional development on average. For the third statement, after the professional development, there was shift to 83.4% of participants felt they agreed or strongly agreed that, “When lesson planning, you design the lesson around the academic content / NYS standards first.” compared to 66.7% prior. Interestingly, though there was an average 8.3% decrease toward agreement on “designing lessons around student skills first,” when comparing the pre-professional development data and the post professional development responses. Lastly, after the professional development there was a 58.4% agreement toward designing around character education compared to 50% prior to the professional development. There was a slight increase in student engagement overall from an average rating of 4.75 out of 5.00 to 4.83 out of 5.00 after the professional development sessions. Additionally, there was a shift in the importance between, character education to a focus on the academic content with an increase of 2 additional responses shifting “learning character education” as the most important to “learning academic content.”

Impact of the Professional Development on Teacher Instructional Practice

Teachers were asked to again provide new lesson activities that incorporated educational technology integration after the professional development session.

Additionally, they were asked to self-report where they thought each lesson activity landed on the PICRAT matrix.

When looking at the teachers provided lesson activity examples as evaluated by the PICRAT matrix, they ranged in various levels, but were more consolidated in the higher levels than prior to the professional development. Overall, there was an average of 3.776, in the researcher's quantified PICRAT matrix scale. When looking at the mode of the PICRAT matrix, after the professional development 58.3% or 21/36 lesson activities fell into the Create / Amplifies or Creative / Transforms categories. The mode was Creative / Transforms. This was a huge shift. Overwhelmingly, the teachers' lesson activities provided creative and transformative experiences for students compared to prior to the professional development. When analyzing some of the responses, the teachers felt comfortable with the PICRAT model and it made it easier for them to design lesson activities that pushed them and the students more to creative and/or transformative experiences.

Relationship to Prior Research

Prior to this study, it was stated that, Guskey (2002) defined his own Model of Teacher Change. It consisted of three outcomes of change from professional development:

1. Change in teacher practice.
2. Change in student learning outcomes.
3. Change was in teachers' beliefs and attitudes.

Perhaps most important was the order. Teachers were willing to change their practice before they considered the students or their own beliefs. However, once the teachers implemented the change in practice, they might be inspired to change the student learning outcomes. Once teachers see positive results in student learning outcomes, they might change their beliefs, attitudes, and overall perceptions. Guskey's model is depicted in Figure 11.

Although student learning outcomes were not able to be measured due to the limitations of the coronavirus pandemic, teachers' instructional practice and beliefs did shift after the professional development. However, it would be interesting to see if teachers' instructional practice and beliefs remain the same over an extended period of time.

Combining this process with Lewin's ideas about Unfreezing, Change, and Re-freezing, one might consider the professional development the "heat" to begin the melting process as the catalyst for change (Guskey, 2002; Lewin, 1947).

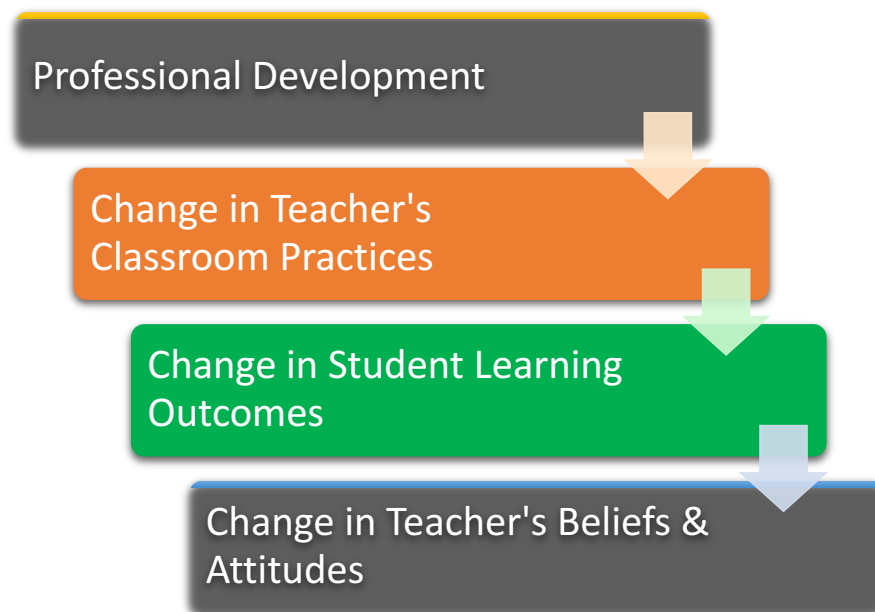


Figure 11. Guskey's Model of Professional Development Change (Guskey, 2002).

However, after the research, it was determined that teacher's attitudes toward educational differed after the professional development session and their instructional practice planning noticed changes immediately. This is in contradiction to Guskey's model. This study's experience was:

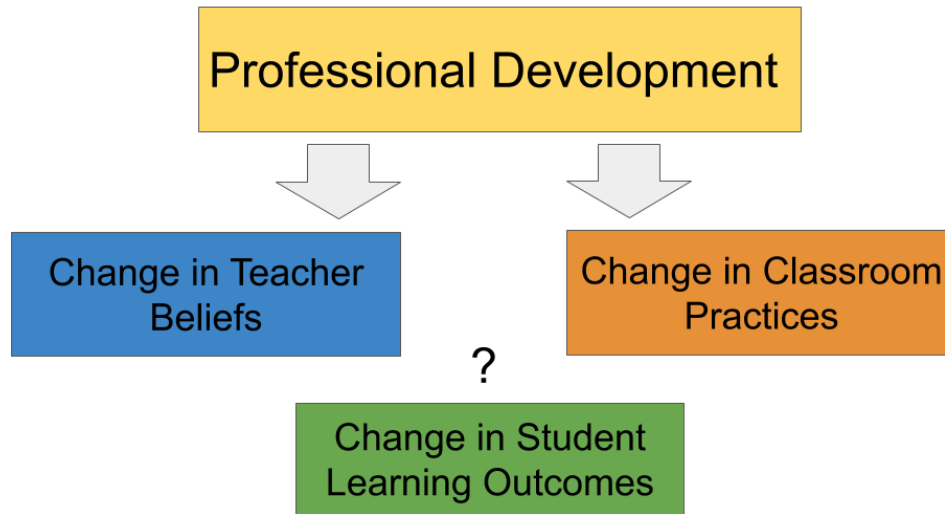


Figure 12. Updated Framework based on this study.

The updated Framework (Figure 12) shows a difference between Guskey's model of Professional Development and the model that represents the results of this study. It appeared that both the Change in Beliefs and Change in Classroom practices shifted as a result of the professional development session. It is possible, that outside factors like the global pandemic made the participants more open to change, or more mailable. Without knowing the overall impact of these changes on the student learning outcomes, it is difficult to ascertain if the teachers would have felt differently if they saw positive or negative results quickly. However, despite these limited parameters teachers were able to

provide proof that their instructional practice and teacher perceptions did indeed shift positively.

Overall, teachers want to use technology; however, few of them were trained in a particular model. Many of them use technology as a replacement or a low-level activity that is interactive for students or amplifies their teaching. However, after proper introduction to an educational technology integration model, particularly PICRAT, their focus of the technology use and the design of their lessons reached a higher level on integration, even when measured against another model like SAMR. Teachers were more motivated to bring their lessons into a higher level of either traditional practice or student interaction with the educational technology. When presented Kimmons and Hall's (2016b) Six Criteria for evaluating Educational Technology Integration models, participants, participants on average found it favorable. When looking at the impacts on their instructional practice after the professional development, there was a higher level of integration in 75% of the participants, and no change in the other 25%.

One of the other interesting result from the participants was the idea that the PICRAT matrix could be used as a reflective tool and well as a planning tool.

Much like Schon's (1983) reflection-in-action and reflection-on-action and Reid's (2004) reflection-for-action, as previous stated, these types of reflections all focus on the learning of the teacher and the importance acknowledging change as a process (Larrivee, 2000). The teachers' responses reflect the shared values of these statements.

Summary of the Discussion

The overall of the impact of the professional development had many interesting impacts. First, it shifted the teacher's focus of importance of technology use in a lesson. Although, based on the research, educational technology should just be a tool, the

teachers felt an added importance to using the technology in the lesson (Carlson 2014; Monahan 2005; Thieman, 2008). Perhaps, overall, the most striking impact was the shift in the types of lessons that the teachers designed. On average they collectively shifted two places in the PICRAT matrix. That is a huge improvement. Based on the responses of the teachers, they felt it was easy for them to use the PICRAT matrix as a way to evaluate their lesson activity to see where they are and use it to plan to move to a higher-level box, either up, right, or both. Perhaps, this is one of the reasons that the PICRAT matrix was so well received, compared to other models, it allowed itself to be used both as a reflective tool and planning tool simultaneously. Interestingly enough, participants only received about 30 minutes of professional development and were not able to use the PICRAT matrix to help plan and enhance lessons, they were able to use it to help self-report. Out of the 36 lesson activities provided by the participants, the researcher only disagreed with only five of the examples provided. All of the examples were within one box and four out of the five undervalued their lessons when measured by PICRAT according to the researcher. For the remaining 31 lesson activities, the researcher and the participants agreed on the rating for each lesson activity on the PICRAT matrix.

When you look at the demographics and the responses and the changes, there is not a big difference between Sunset Grove, Ever Pines and West Elms in terms of student demographics. The only big difference was that West Elms teacher received much more professional development and their teachers shifted less than the other participants in the study. However, Island Acres was a much different population in terms of race, ethnicity, and economically disadvantaged. The teachers at Island Acres perceptions and beliefs

shifted the most, and they were the least familiar with Educational Technology models prior to the study.

Limitations of the Study

There were several limitations in this study. Some of these limitations were anticipated and some were not. The researcher knew that the study would face some limitations many of them relate to time and scope. However, the researcher did not foresee the global pandemic of COVID-19 for the study.

One limitation is be the sample population. This particular study was based on curated volunteers. If there was more time to conduct the study, the researcher would have likely had more participants perhaps from a bigger pool.

A second limitation is the type of data collection. Due to several school district policies and the COVID-19 pandemic, the researcher was not able to conduct classroom observations. As an alternative, the researcher collected lesson examples provided by the participants and analyzing them using the PICRAT matrix. Ideally, instead of providing examples of classroom lesson activities the researcher would observe the classroom activities first-hand.

Third, the data collected is self-reported, without the researcher actually seeing lessons taught in the classroom, it cannot be verified if what they said on paper, was the same in actual practice.

Fourth, participants in this study only had a few weeks to implement the PICRAT matrix. Ideally, it would have been better to have the teachers implement over a longer time period. Additionally, professional development should not be a “one-and-done” model, professional development with multiple sessions is proven to be more effective,

due to the parameters of this study only one professional development session was able to be given in the time frame.

Fifth, since the researcher is providing the professional development session on the PICRAT matrix and not the other models, participants might feel the need to show favorable feelings toward it even if it is not genuine. Participants were asked to answer the questions openly and honestly, but there might have been unintended pressure for them to provide “better” answers than they did prior to the professional development session. As such, the researcher assumptions and bias toward educational technology integration was thoughtfully considered throughout the process. Participants’ perceptions inform their practice. Although, the researcher made every attempt to not show his bias, his own lens and life experience may have shaped the way the researcher interpreted and analyzed the data.

Lastly and perhaps the biggest limitation and disruptor of the study was that data was collected during the COVID-19 pandemic between the months of May and August. When New York State closed schools in mid-March for what would become the remainder of the school year, teachers participating in the study had been out of the classroom since mid-March and were forced almost overnight to a virtual instruction model using technology. Although this shift was traumatic for all teachers and students, some of them embraced this change with relative ease, and others were very uncomfortable to use technology as a bridge between learning and connection with their students (Goldstein, 2020). This historic change in education, surely may have had an impact on teacher perceptions, attitudes, and beliefs. Almost all lesson activities had to have a technology focused delivery method to their students. Depending on how their

school district responded to the shift to remote learning and the resources provided to them, this might have an impact on their willingness to not only participate in a study about educational technology, but also change their perceptions and instructional practices.

Additional COVID-19 Pandemic Limitations

Currently in the United States and around the world, there is an outbreak of the novel coronavirus, COVID-19. Many schools have been closed for several weeks in New York State and around the country. Currently, it is uncertain when schools will resume normal operations. Many schools have moved to online instruction as a means to keep the continuity of learning for students. This development may have serious implications for this study. Participants might be more willing to embrace professional development on educational technology, or they might be overwhelmed and not have the time to participate in the study. Depending on how the online learning goes, their perceptions might change rapidly. I was able to collect my data remotely through online means and discussion. Teachers delivering lessons might need to also conduct their lessons and activities in an online format. The situation may change rapidly, in either direction. The researcher adjusted accordingly to these changes as needed.

Recommendations for Future Practice

There are several stakeholders that would benefit from the results. Current and future Administrators and teachers, might see the value of giving their teachers professional development on technology integration models and picking a particular one to provide training on. School districts can see the benefit of having a return on their investment in technology purchases, with the technology be used more effectively in the classroom. With the PICRAT matrix, educators in general might see it as a viable

upgrade from other existing educational technology integration models. College teacher preparation programs would benefit because they can see the benefit of infusing educational technology integration models into their curriculum, perhaps alongside some staples like Bloom's Taxonomy.

Professional Development for teachers even in small doses has a major impact immediately on the teacher. Continued professional development could have an even deeper impact on the teachers and in turn the students they serve. Districts could select one of these technology integration models as part of district initiative and continue to reference it through any additional professional development that is given by the district.

School Districts and Policy Makers

The implications for School Districts and their policy makers are evident. Professional development has an immediate impact on teachers' attitudes and beliefs and a bigger impact on their instructional practice. When encouraging educational technology use by teachers, providing them with a framework, model, or matrix like the PICRAT matrix, teachers are more likely to use the educational technology to its full potential. School Districts might want to focus on a model in their educational technology initiatives in their school district.

Educators

Educators would be wise to take professional development when possible as it proves to have an overall impact on instructional practice. Using a model like the PICRAT matrix as both a planning and a reflective tool helps the teachers have a starting point to work from and a goal to strive toward. Student engagement is at the center of the PICRAT matrix and as the teachers reported skills are the most important, the technology tools can be a vessel for learning in the classroom, not only increasing engagement, but also increasing overall understanding.

Higher Education

Teacher preparation programs should offer educational technology integration models along with the traditional pedagogical models, like Bloom Taxonomy. Many of the participants stated that they took graduate courses in an educational technology program at the local state university, but not every teacher takes these courses. As access to technology becomes ubiquitous for our teachers and students, it becomes more

paramount that prospective teachers learn this skills and have them become an integral part of their planning and lesson design process.

Educational Technology Vendors

Companies that provide technology tools, hardware, software, webware, or other services should design them with potential ways that teachers can use them best with students in the classroom. Educational technology integration models should incorporate these into their design principles. Involving educators in the process and these models will help the vendors provide the educators with the best tools and then the best practices to implement these effectively in their classrooms.

Recommendations for Future Research

Based on the limitations of this study, in particular the global COVID-19 pandemic, future research could accomplish several objectives that were unable to be completed under the scope of this study.

First, future researchers might want to explore a longer period of time for the research and more frequent professional development. In this study, the researcher focused on the PICRAT matrix, but future researchers might want to focus on other models or provide long-term professional development on the PICRAT matrix over time.

Second, future researchers may want to observe classroom instruction from teachers. The researcher could only use the documentation as reference, but it is possible that the actual classroom instruction was different – more or less interaction or student involvement. This was immeasurable due to COVID-19 and/or due to teacher union restrictions.

Third, and perhaps most important, would be to determine how changes in student outcomes impact teachers' beliefs and attitudes and instructional practice. This would

benefit from a longer study with greater access to student data, but that was one of the missing pieces of this study, that might have proved relevant.

Fourth, future researchers might want to investigate the long-term impact of the professional development. Additionally, investigating if teachers continue to feel the way that they do after continued professional development, implementation, and determining the student learning outcomes. Due to the scope of this study, and the unforeseen limitations and drastic changes in education during the pandemic, it was not possible to gauge the impact on student learning outcomes and the teachers' attitudes and beliefs once the students were involved.

Lastly, this study only had a dozen participants and only focused on secondary teachers. Further research with a larger sample than included more teachers from different regions and grade levels might yield different results.

Conclusions

This case study method examined secondary teachers' perceptions and instructional practice before and after professional development educational technology integration and the PICRAT matrix. The research questions were: What are secondary teacher perceptions and prior knowledge of educational technology integration models?, What types/levels of educational technology integration are occurring in the secondary classroom as categorized by the PICRAT (Passive, Interactive, Creative, Redefinition, Amplification, Transformation) matrix?, To what extent does participants experience after professional development on the PICRAT matrix affect teacher perception and practice of educational technology integration in secondary schools? Findings revealed that professional development impacted teachers' perceptions, attitudes, and instructional

practice immediately. Participants were more excited to use educational technology and would be likely to share the PICRAT matrix with colleagues.

After the completion of the study, the researcher realized that no matter how small, professional development can inspire change in teacher perceptions and instructional practice immediately. Meaningful change occurred overall, in participants regardless of their experience with educational technology, teaching experience, school district demographics and regardless of their own initial responses. In particular, the PICRAT model was seen as an important tool for planning and reflection of developing a lesson activity with instructional technology.

EPILOGUE - COVID-19 PANDEMIC

Introduction

The researcher saw this looming potential giant limitation as an opportunity to collect additional data related on the COVID-19 outbreak. Participants were asked to answer additional optional opened questions related to the COVID-19 Outbreak, forced quarantine and the shift to Remote Learning.

COVID-19 Questions and Optional Data

This study took place during the COVID-19 global pandemic during the months of May – July. Many of the responses and data collected was based on teaching and learning conducted remotely during a state-wide quarantine. In addition to collecting the intended data for the purpose of this study, the researcher saw an opportunity to add additional optional questions related to the COVID-19 outbreak. Below are the questions and the responses depicted in Table 28.

Optional Question 1: To what extent has the COVID-19 Outbreak and the move to remote learning impacted your perceptions of educational technology?

Table 28.

Coded Free Responses for Optional Question #1.

Themes	Responses
Value/Importance of Tech	It has made me realize there is more value in educational technology beyond simply engagement. It became a necessity.
Importance of Training in Tech	Need more training on educational technology with faculty as well as students.
Value/Importance of Tech	In my opinion, it has made my district invest more money in updating their older and overly taxed district technology system. I think it has also developed the need for emergency planning and moving all your lessons and materials online.

Value/Importance of Tech	I am relieved that we were already learning use some of the educational technology tools that were used in remote learning. It just proves how important it is to use educational technologies in the classroom because we need to prepare our students for the real world full of technology.
Importance of Training in Tech	Thank goodness I took classes when I did! am my department's expert instead of the dinosaur.
Importance of Training in Tech	I think it has forced a lot of people that were hesitant about technology to learn how to integrate it.
Value/Importance of Tech	I would have been dead in the water without this technology.
Importance of Training in Tech, More Use of Technology, Value/Importance of Tech	I understand how little I know about educational technology and my need for professional development. I thought I used technology effectively in my classroom. I now know there is so much more to learn.
Importance of Training in Tech, More Use of Technology, Value/Importance of Tech	COVID-19 has impacted my perception of education technology by showing how important these skills are to not only the students but the teachers as well. I think that educational technology is working well for some students, but many others are finding it challenging. I also work with a special education population.
Social Aspect is Missing	Technology provides a virtual classroom that allows the fundamental lessons to be taught. But the social aspect is hindered since group work which relies on multiple individuals to be responsible for the time, they can meet up is not monitored.
Importance of Training in Tech	I feel I need to learn as much as possible
Importance of Training in Tech	It made me realize that I have the skills to teach completely remotely and be comfortable with it.

Table 29.

Emerging Themes based on Coded Free Responses for Optional Question #1.

Themes	
Value/Importance of Tech	6
Importance of Training in Tech	7
Social Aspect is Missing	1

Based on the responses, the emerging themes were overwhelming that the value and importance of educational technology was more important than before. Additionally, participants valued the importance of student and teacher training with the technology. One participant stated that there were concerns that social interaction was missing from virtual instruction. Responses to Optional Question 2 are shown in Table 30.

Optional Question 2: To what extent has the COVID-19 Outbreak and the move to remote learning impacted your use of educational technology?

Table 30.

Coded Free Responses for Optional Question #2.

Themes	Responses
More Use of Technology	I have had to use it every day since we ended school on March 13, 2020
More Use of Technology	I know it is necessary more now than ever before
Technology Use Needs be Engaging	Using tools like Screencastify is more helpful for students who need visual and audio directions.
More Use of Technology Technology Use Needs be Engaging	Increased significantly I am all about it and a big encourager if others using it. It needs to be practical yet engaging and modeling for other teachers instead of just telling them to go to any given site, is a huge help.

Technology Use Needs be Engaging, Changing Teaching Pedagogy	Teaching new math topics has been extremely difficult. Videos and Google Meet can only help the students so much, but removing paper, pencil, and hands-on manipulatives definitely through a big wrench into the end of this year.
More Use of Technology, Changing Teaching Pedagogy	I always have taken numerous summer courses to update my learning of technology but because of my limited district resources, I really didn't use the technology as much as I would have liked to. However, due to COVID-19, I feel like that will differently change within the coming academic school years because districts will be forced to invest highly in technology. For example, I will not be giving out homework on paper, everything will be given out via Google Classroom. I will also post daily notes and all activities on the Google Classroom page even when we are physically learning in school because students and parents need to have immediate access to all of these materials.
More Use of Technology	Initially it was hard and uncomfortable, but now I feel more knowledgeable using it.
More Use of Technology	I went from using it for engagement to using it for everything.

Table 31.

Emerging Themes based on Coded Free Responses for Optional Question #2.

Themes	
More Use of Technology	6
Changing Teaching Pedagogy	2
Technology Use Needs be Engaging	4

Based on the responses the emerging themes stated that since the COVID-19 outbreak, that teachers have been forced to use more technology than ever before. Additionally, participants stated that their teaching pedagogy needs to change and update to incorporate the technology. Lastly, the participants stated that technology use needed

to be more engaging or rather than solely used as a way to engage the students. The coding of this process is shown in Table 31.

COVID-19 Discussion and Conclusions

Since the transition to remote learning in the wake of the COVID-19 pandemic, there are so many questions, topics, and studies that can be performed. The global pandemic has likely changed our world forever, but I feel that education is one of the most impacted areas of society. Students, teachers, and parents almost overnight had to adapt to a new way of doing things. The impact of this on the health of the students, teachers, and other stakeholders is too soon to determine, but based on the participants responses, technology value and the importance of training/professional development was on the fore-front of their minds. Lastly, teachers were concerned about the missing piece of socialization that students get from school. The group of participants were all secondary teachers, so the students were in most cases old enough to be somewhat independent. However, one would imagine that younger students would have more difficulty than the older students learning online. As the pandemic continues to impact education at the completion of this dissertation it is too early to gauge the long-term impact. However, it only underscores more the importance of educational technology and the value of professional development for teachers.

APPENDICES

APPENDIX A

International Society for Technology in Education Essential Conditions

Shared Vision

Proactive leadership develops a shared vision for educational technology among all education stakeholders, including teachers and support staff, school and district administrators, teacher educators, students, parents and the community.

Empowered Leaders

Stakeholders at every level are empowered to be leaders in effecting change.

Implementation Planning

All stakeholders follow a systematic plan aligned with a shared vision for school effectiveness and student learning through the infusion of information and communication technology (ICT) and digital learning resources.

Consistent and Adequate Funding

Ongoing funding supports technology infrastructure, personnel, digital resources and staff development.

Equitable Access

All students, teachers, staff and school leaders have robust and reliable connectivity and access to current and emerging technologies and digital resources.

Skilled Personnel

Educators, support staff and other leaders are skilled in the selection and effective use of appropriate ICT resources.

Ongoing Professional Learning

Educators have ongoing access to technology-related professional learning plans and opportunities as well as dedicated time to practice and share ideas.

Technical Support

Educators and students have access to reliable assistance for maintaining, renewing and using ICT and digital learning resources.

Curriculum Framework

Content standards and related digital curriculum resources align with and support digital age learning and work.

Student-Centered Learning

Planning, teaching and assessment all center on the needs and abilities of the students.

Assessment and Evaluation

Teaching, learning, leadership and the use of ICT and digital resources are continually assessed and evaluated.

Engaged Communities

Leaders and educators develop and maintain partnerships and collaboration within the community to support and fund the use of ICT and digital learning resources.

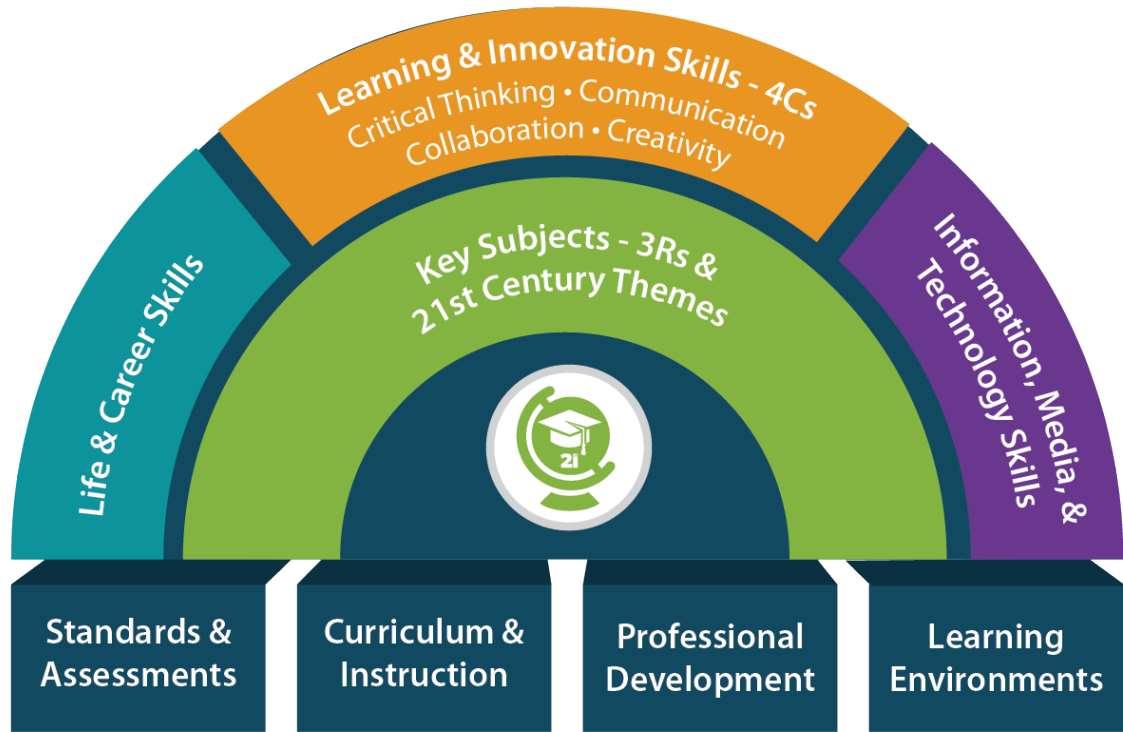
Support Policies

Policies, financial plans, accountability measures and incentive structures support the use of ICT and other digital resources for both learning and district/school operations.

Supportive External Context

Policies and initiatives at the national, regional and local levels support schools and teacher preparation programs in the effective implementation of technology for achieving curriculum and learning technology (ICT) standards (International Society for Technology in Education, 2019, <https://www.iste.org/standards/essential-conditions>).

APPENDIX B
Battelle for Kids Framework



© 2019, Battelle for Kids. All Rights Reserved.

P21 Framework: (<http://www.battelleforkids.org/networks/p21/frameworks-resources>)

APPENDIX C

Request for Participants and Expectations



Dear Educator,

My name is Donald H. Heberer Jr. I am a doctoral student at St. John's University. I am engaged in a research project entitled, Educator Perceptions and Practice Integrating Educational Technology. The purpose of this study is to determine teacher's perceptions of educational technology integration and which integration models' teachers use in developing and delivering lessons. The study will include a professional development session, surveys and an interview session. These will all be conducted virtually.

To complete this study, participants will complete two short surveys, participate in an online professional development session and a post session interview. The online professional development session should take approximately one hour. There will be more than one time available to you. The post professional development session interview should take approximately an hour and will be digitally recorded for verification of findings. The online professional session and the post session interview would be conducted at a time of your choosing from a list of timeslots. Lastly, participants will be asked to share three educational technology activities that they used in their classroom at two different points during the duration of the study for a total of six.

In this study, I undertake to safeguard your anonymity by omitting the use of names of the participants and their school districts. Confidentiality will be assured by the erasure of digitally recorded material on completion of transcriptions. This initial letter serves as a request to participate in the study.

If you wish to participate in this research study, please email back your intention. If you have any questions, please email at Donald.heberer18@stjohns.edu or call at 631-672-1857. You will be sent a preliminary screener survey to determine if you meet the requirements of the study.

If at any time you would like to contact my advisor Dr. Gil, please feel free to do so at gile@stjohns.edu. Thank you in advance for your time and consideration.

Sincerely,
Donald H. Heberer Jr.

WWW.STJOHNS.EDU

APPENDIX D

Informed Consent for Respondents



Title of Project: Teacher Perceptions & Practice of Educational Technology Integration

St. John's University, Department of Administration and Supervision

Investigator: Donald H. Heberer Jr.

I. Purpose of this Research/Project: The purpose of this study is to collect teacher perceptions and practice of educational technology integration models. Teachers who are willing, able and comfortable with integration of educational technology will be asked to participate in this qualitative study.

II. Procedures: The researcher will provide a survey to the participant (approximately 10 minutes). After the survey, the participant will provide the researcher with 3 examples of educational technology activities in the classroom. The researcher will then categorize the examples using a specific educational technology integration model. Then participants will attend an online professional development session for approximately one hour. The session will be audio recorded. The participants will then complete a post-session survey (approximately 10 minutes). A few weeks later, participants will be interviewed for approximately one hour. The interviews will be audio recorded. Participants will submit another list of three educational technology activities for a total of six. All interactions will be conducted virtually.

III. Risks: There are minimal risks associated with this study. You will be able to omit any questions that do not feel comfortable answering.

IV. Benefits: No promise or guarantee of tangible benefits has been made for participating in this study. As a result of participation in the study, you may reflect more on educational technology integration models. However, your participation will help improve educational technology practice. Additionally, the professional development slide deck will be shared with the participants upon the completion of the study. Upon completion of the study, researcher will share a condensed summary of the findings with the participants.

V. Extent of Anonymity and Confidentiality: The information you provide will be confidential. All data will be secured in a separate Google / Gmail Account that will have two- factor authentication. Data will be stored in a password protected folder in the Google Drive of that account and will not be shared with anyone other than the researcher. Names and locations of respondents will remain anonymous. No one other than the researcher has access to Google Account. All recordings will be destroyed after successful approval of the project.

VI. Compensation: There is compensation for participating in this study. At the completion of the study, a participant will be selected at random to receive a \$100 Amazon Gift Card.

VII. Freedom to Withdraw: As a respondent, you are free to withdraw from the study at any time without penalty. You are also free to not answer any statement that you choose.

VIII. Subject's Responsibilities: By completing the letter, it is implied that the following is true:

1. I voluntarily participated in this study.
2. I will answer the statements honestly.

IX. Subject's Permission: I have read the Consent Form and conditions for this study. I explicitly give my consent to be audio recorded during the professional development session and during the interview. I have had all my questions answered. By completing and returning the letter, it is implied that I acknowledge the above and give my voluntary consent.

Participant's Name (PRINT)

Participant's Signature

Researcher's Signature

DATE

WWW.STJOHNS.EDU

APPENDIX E Request for Volunteers – Survey



Request for Volunteers - Screener

Thank you for participating in this study. This data will be kept confidential. Your initials will only be used for transcription purposes only. Your school district name will be replaced with a different name to protect your privacy.

* Required

Letter of Informed Consent

Please read through this letter of Informed Consent. This will outline the expectations of the participants throughout the study. Please note: Participation in the study is completely voluntary and you may withdraw at any time.

1. A copy of the letter of consent can be found here: <https://bit.ly/HebererInformedConsent> *

- I have read the letter of consent and I wish to participate in this study. I will email my signed and scanned consent form to donald.heberer18@my.stjohns.edu
- I do not wish to participate in this study.

Next



* Required

2. Your Full Name *

Your name will be kept anonymous and confidential throughout the study

Enter your answer

3. Your Personal Email Address *

Your email address will be kept anonymous and confidential throughout the study. Please do not put your school district email address.

Enter your answer

4. School District *

This information will NOT be shared in this study.

Enter your answer

5. Grade Level / Grade Level *

If you teach more than one please indicate.

Enter your answer

6. Please indicate the number of years you've been teaching. *

Enter your answer

7. What teaching areas are you certified in? *

Please list all of them.

Enter your answer

8. What degrees do you currently hold? *

Undergraduate, Graduate, Post-Graduate, etc

Enter your answer

9. What other professional certifications & certificates have you earned? *

Please list as many as you can think of: (ie: Google Certified Educator, Microsoft Innovative Teacher, etc)

Enter your answer

10. What educational technology hardware do you have available to you in your school? *

Please list as many as possible

Enter your answer

11. What educational technology software/web-based subscriptions do you have available to you in your school? *

Please list as many as possible.

Enter your answer

12. What educational technology support staff do you have available to you in your school? *

Please list as many as possible.

Enter your answer

13. How often does the school district provide professional development related to educational technology? *

Daily

Weekly

Monthly

Quarterly

Yearly


Never

Other

14. What is your primary way to learn about new educational technologies? *

Please select the option that is your main source to learn new Educational Technology and best practices.

- Outside of School / Graduate level professional development
- Learning on your own
- Social Media groups / Personal Learning Networks
- Regional Workshops - ASSET, BOCES, etc.
- In-School / in-service professional development
- EdTech Conferences - Local, Regional and National
- Other

15. Optional Question: Describe how you and/or your school district has adapted learning during the COVID19 "New York Pause" since March 18th 2020. 

Enter your answer

Back

Submit

APPENDIX F
Sample Emails for Accepting / Rejecting Participants

Hello,

Thank you for completing the screening survey for this study. You have been selected as one of the participants in this study.

The first part of the data collection will be the initial survey. Please read the questions carefully.

<https://forms.office.com/Pages/ResponsePage.aspx?id=P4nfNtQNJ0GXpbxTe83GKsB5VIA8fhlGhsIRQ3SopMJUOEhORTdLRzBKMVVTNTNCMktLT045NFg2WC4u>

The end of the survey, it asks for three lesson examples using educational technology. Please briefly describe them, but be sure to explain how you used the technology in instructional practice as well as the student's use of the technology in the examples you provide.

It should take about 10-15 minutes of your time. Please complete this as soon as possible.

I appreciate your time in participating in this study.

Thank you,

Don Heberer

Hello,

Thank you for completing the screening survey for this study. Unfortunately, you did not meet the criteria to participate in this study.

I appreciate your time and interest in this study.

Thank you,

Don Heberer

APPENDIX G Initial – Survey



Initial Survey

Thank you for participating in this study. This data will be kept confidential. Your initials will only be used for transcription purposes only. Your school district name will be replaced with a different name to protect your privacy.

* Required

1. Your Full Name *

Your name will be kept anonymous and confidential throughout the study

Next



* Required

Prior Knowledge of Educational Technology

Please answer the following questions openly and honestly.

2. Have you taken any graduate courses or in-service courses that focused on the integration of educational technology in the classroom? *

Yes

No

3. Select any of the following technology integration models you have learned about through graduate courses, in-service courses, or professional development: *

LoTi / H.E.A.T Framework: Higher-order thinking, Engaged learning, Authentic connections, and Technology use

PICRAT- Passive, Interactive, Creative, Replacement, Amplification, Transformation

RAT - Replacement, Amplification, Transformation

SAMR - Substitution, Augmentation, Modification, and Redefinition

TAM - Technology Acceptance Model

TIM Matrix - Technology Integration Matrix

TIP - Technology Integration Planning Model

TPACK - Model that overlaps Pedagogical, Content and Technological Knowledge

NONE

Other

4. Which of these models do you feel most comfortable with? *

- LoTi / H.E.A.T Framework: Higher-order thinking, Engaged learning, Authentic connections, and Technology use
- PICRAT- Passive, Interactive, Creative, Replacement, Amplification, Transformation
- RAT - Replacement, Amplification, Transformation
- SAMR - Substitution, Augmentation, Modification, and Redefinition
- TAM - Technology Acceptance Model
- TIM Matrix - Technology Integration Matrix
- TIP - Technology Integration Planning Model
- TPACK - Model that overlaps Pedagogical, Content and Technological Knowledge
- NONE
- Other

5. On average, how often do you use educational technology in the classroom? * 

- everyday / almost everyday
- 2 or 3 times a week
- once a week
- less than once a week
- rarely

4. Which of these models do you feel most comfortable with? *

- LoTi / H.E.A.T Framework: Higher-order thinking, Engaged learning, Authentic connections, and Technology use
- PICRAT- Passive, Interactive, Creative, Replacement, Amplification, Transformation
- RAT - Replacement, Amplification, Transformation
- SAMR - Substitution, Augmentation, Modification, and Redefinition
- TAM - Technology Acceptance Model
- TIM Matrix - Technology Integration Matrix
- TIP - Technology Integration Planning Model
- TPACK - Model that overlaps Pedagogical, Content and Technological Knowledge
- NONE
-

5. On average, how often do you use educational technology in the classroom? * 

- everyday / almost everyday
- 2 or 3 times a week
- once a week
- less than once a week
- rarely

6. When developing your classroom activities for your students, what is the main motivation for educational technology use? *



* Required

Statements

7. For the following statements please state your feelings below. *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
You feel pressure to use technology in every lesson.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around the educational technology first.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around the academic content / NYS standards first.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around what student skills you want them to learn first?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around character education values first?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



* Required

8. Which of the following do you feel is most important? *

- students learn academic content
- students learn skills
- students learn character
- students learn technology
- Other

9. How important is student engagement in learning? (1 - Not Important, 5 Very Important) *

- 1
- 2
- 3
- 4
- 5

10. Any additional thoughts or comments you'd like to share:

Enter your answer

Three Educational Activity Examples

Please provide some details on three activities you've done with your students this year that you've used educational technology. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

11. Educational Technology Activity #1 *

Please provide some details on one activity that you've done with your students this year that you've used educational technology. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

Enter your answer

12. Educational Technology Activity #2 *

Please provide some details on one activity that you've done with your students this year that you've used educational technology. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

Enter your answer

13. Educational Technology Activity #3 *

Please provide some details on one activity that you've done with your students this year that you've used educational technology. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

Enter your answer

Optional

14. (Optional) To what extent has the COVID-19 Outbreak and the move to remote learning impacted your perceptions of educational technology?

Enter your answer

15. (Optional) To what extent has the COVID-19 Outbreak and the move to remote learning impacted your use of educational technology?

Enter your answer

Back

Submit

APPENDIX H Post PD Survey and Lessons



Post Survey

Thank you for participating in this study. This data will be kept confidential. Your initials will only be used for transcription purposes only. Your school district name will be replaced with a different name to protect your privacy.

* Required

1. Your Full Name *

Your name will be kept anonymous and confidential throughout the study

Next

Prior Knowledge of Educational Technology

Please answer the following questions openly and honestly.

2. When developing your classroom activities for your students, what is the main motivation for educational technology use? *

Enter your answer

3. For the following statements please state your feelings below. * 

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
You feel pressure to use technology in every lesson.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around the educational technology first.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around the academic content / NYS standards first.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around what student skills you want them to learn first?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When lesson planning, you design the lesson around character education values first?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



* Required

4. Which of the following do you feel is most important? *

- students learn academic content
- students learn skills
- students learn character
- students learn technology
- Other

5. How important is student engagement in learning? (1 - Not Important, 5 Very Important) *

- 1
- 2
- 3
- 4
- 5

Back

Next



* Required

PIC-RAT Model

6. How would you rate the Clarity of the PICRAT model?

- 1 - Unclear / Confusing
- 4 - Easy to Understand *

- 1
- 2
- 3
- 4

7. How would you rate the Compatibility of the PICRAT model?

- 1 - Difficult to Implement
- 4 - Easy to Implement *

- 1
- 2
- 3
- 4

8. How would you rate the Fruitfulness of the PICRAT model?

- 1 - Does not lead to meaningful reflection
- 4 - Leads to meaningful reflection *

- 1
- 2
- 3
- 4

9. How would you rate the Technology Role of the PICRAT model?

1 - Technology is the main focus of the model

4 - Technology is viewed as means to guide practice *

1 2 3 4

10. How would you rate the Student Focus of the PICRAT model?


1 - Not Important

4 - Important *

1 2 3 4

11. How would you rate the Scope of the PICRAT model?

1 - Narrow

4 - Broad * 

1 2 3 4

Back

Next

12. Compared to what you know about other models of educational technology integration, what are your thoughts on PICRAT? *

Please explain in a few sentences.

Enter your answer

13. Do you feel that the PICRAT model changes your view on educational technology integration? *

Yes

No

Maybe

14. Please explain your answer from Question 13. *

Enter your answer

15. (Optional) To what extent has the COVID-19 Outbreak and the move to remote learning impacted your use of educational technology?

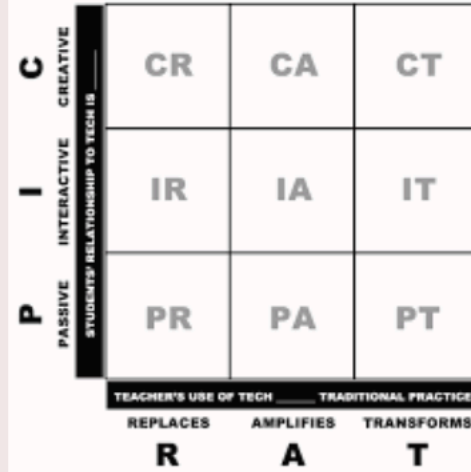
Enter your answer

16. (Optional) Any additional thoughts or comments you'd like to share:

Enter your answer

* Required

Three Educational Activity Examples - Post-Professional Development Session on PICRAT



Please provide some details on THREE educational technology activity that you've designed for your students since the professional development session on the PICRAT Model. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology

2

Educational Technology Activity #1 *

Please provide some details on one educational technology activity that you've designed for your students since the professional development session on the PICRAT Model. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

Enter your answer


3

Which of the nine-box matrix boxes do you feel best describes this activity? *

<http://roycekimmons.com/tools/picrat> for a refresher on PICRAT

- Passive / Replaces
- Passive / Amplifies
- Passive / Transforms
- Interactive / Replaces
- Interactive / Amplifies
- Interactive / Transforms
- Creative / Replaces
- Creative / Amplifies
- Creative / Transforms

4

Educational Technology Activity #2 * 

Please provide some details on one educational technology activity that you've designed for your students since the professional development session on the PICRAT Model. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

Enter your answer

5

Which of the nine-box matrix boxes do you feel best describes this activity? *

<http://roycekimmons.com/tools/picrat-> for a refresher on PICRAT

- Passive / Replaces
- Passive / Amplifies
- Passive / Transforms
- Interactive / Replaces
- Interactive / Amplifies
- Interactive / Transforms
- Creative / Replaces
- Creative / Amplifies
- Creative / Transforms

6

Educational Technology Activity #3 * 

Please provide some details on one educational technology activity that you've designed for your students since the professional development session on the PICRAT Model. Please describe the educational technology and explain how you used it in the classroom. Focus on the context the technology was used in instructional practice and the student's interaction with the technology.

Enter your answer

7

Which of the nine-box matrix boxes do you feel best describes this activity? *

<http://roycekimmons.com/tools/picrat> for a refresher on PICRAT

- Passive / Replaces
- Passive / Amplifies
- Passive / Transforms
- Interactive / Replaces
- Interactive / Amplifies
- Interactive / Transforms
- Creative / Replaces
- Creative / Amplifies
- Creative / Transforms

Back

Submit

APPENDIX I
Professional Development Session Slides



ST. JOHN'S
UNIVERSITY

PROFESSIONAL
DEVELOPMENT
SESSION

Department of Administration and Instructional Leadership
Doctoral Candidate: Donald H. Heberer Jr.
Mentor: Dr. Annunziato

History of
Educational
Technology
Integration



Educational Technology integration models all have various ways of measuring educational technology integration.



Standards Based



Content Based



Skills Based



Relationship Based

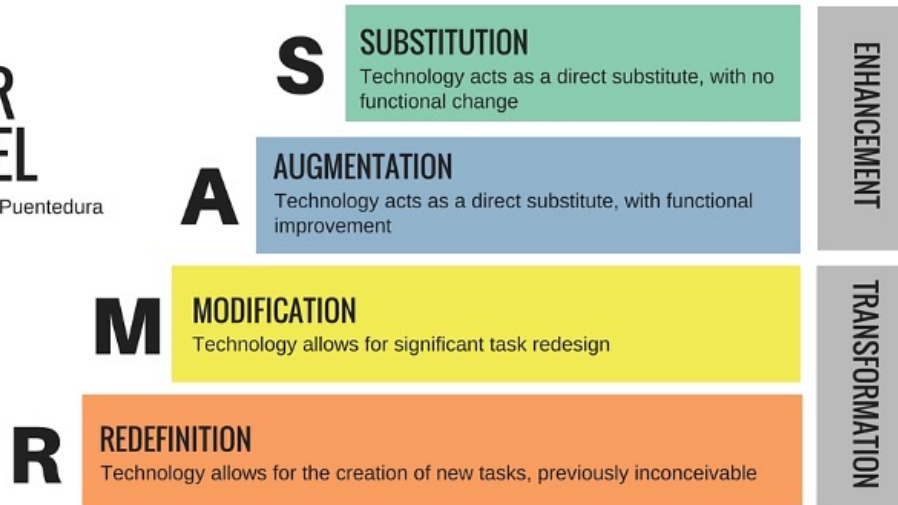
Six Criteria and Guiding Questions for Evaluating Technology Integration Models

Kimmons & Hall's Six Criteria (2016b)

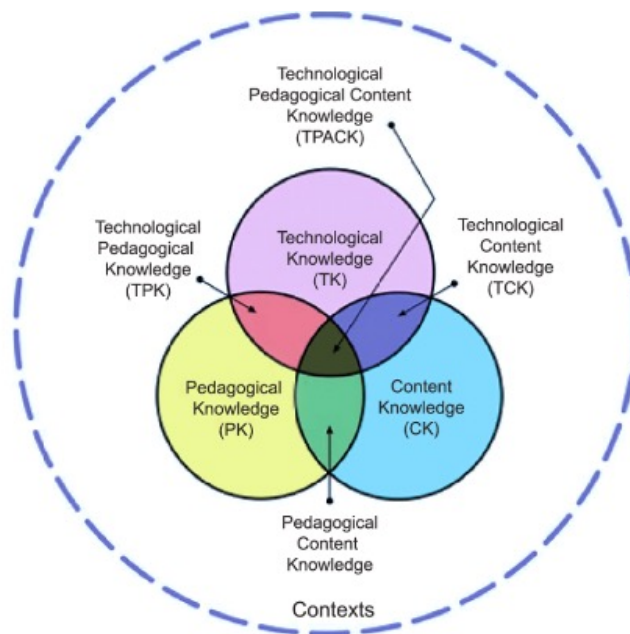
Criterion	Guiding Question
Clarity	Is the model sufficiently simple, clear, and easy to understand, with no hidden complexities?
Compatibility	Does the model complement/support existing educational practices deemed valuable to teachers?
Fruitfulness	Does the model elicit fruitful thinking as teachers grapple with problems of technology integration?
Technology Role	Does the model treat technology integration as a means for achieving specific pedagogical or other benefits (rather than an end in itself)?
Scope	Is the model sufficiently parsimonious to ignore aspects of technology integration not useful to teachers, but sufficiently comprehensive to guide their practice?
Student Focus	Does the model clearly emphasize students and student outcomes?

THE SAMR MODEL

Dr. Ruben R. Puentedura



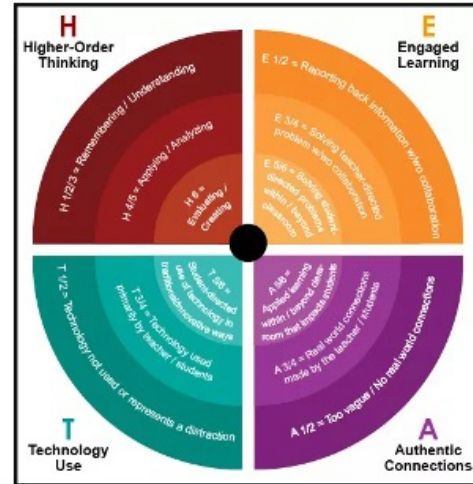
TPACK



Model	Primary Limitations, Criticisms, or Difficulties	Further Reading
SAMR	<p>Clarity: Level boundaries are unclear (e.g., substitution vs. augmentation).</p> <p>Fruitfulness: Level distinctions may not be meaningful for practitioners.</p> <p>Student Focus: Student activities are implied at each level but are not explicit or inherent in each level's definition.</p>	Puentedura (2003)
TPACK	<p>Clarity: Boundaries are fuzzy, and hidden complexities seem to exist.</p> <p>Compatibility: Does not explicitly guide useful classroom practices (e.g., lesson planning).</p> <p>Fruitfulness: Distinctions may not be empirically verifiable or hierarchical (e.g., TPACK vs. PCK).</p> <p>Scope: May be too comprehensive for teachers (i.e., lacks parsimony for their context).</p>	<p>Koehler & Mishra (2009)</p> <p>Mishra & Koehler (2007)</p>

Other Models

- LoTi / H.E.A.T
- TIM
- TAM
- TIP
- RAT

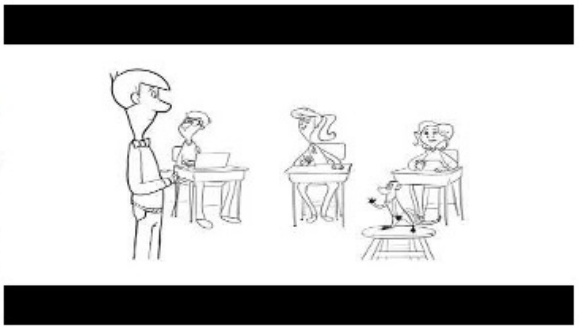


However, few of them measure student's relationship to the technology when evaluating educational technology integration.

Model	Primary Limitations, Criticisms, or Difficulties	Further Reading
LoTi	Fruitfulness: Too many levels are provided (seven on a single axis), level distinctions are difficult, and teachers may not agree with hierarchical claims or find value in the hierarchy.	Moersch (1995)
RAT	Clarity: Transformation can be difficult for teachers to understand (and is a contested construct). Student Focus: Students are implied in pedagogy but are not central.	Hughes, Thomas, & Scharber (2006)

The PICRAT Matrix

• <https://youtu.be/bfVuG620Bto>



PICRAT Matrix

The PICRAT Model / Matrix – this uses a nine-box matrix and has a dual axis approach:

X – **Teacher's** use of Tech ____ Traditional Practice.

Replaces, Amplifies, Transforms

Y – **Student's** Relationship to Tech is ____.

Passive, Interactive, Creative

P PASSIVE STUDENTS' RELATIONSHIP TO TECH IS	CR	CA	CT
	IR	IA	IT
	PR	PA	PT
	TEACHER'S USE OF TECH ____ TRADITIONAL PRACTICE		
	R	A	T
	REPLACES	AMPLIFIES	TRANSFORMS

PIC - **Student's** Relationship to Tech is ____.

Passive: Students are observers, bystanders in their learning.

Interactive: Students engage in material in an interactive way - they are active learners

Creative: Students are creating materials themselves; they are creative learners rather than interactive or passive ones.

P I C STUDENTS' RELATIONSHIP TO TECH IS	CREATIVE	CR	CA	CT
	INTERACTIVE	IR	IA	IT
	PASSIVE	PR	PA	PT
		TEACHER'S USE OF TECH	TRADITIONAL PRACTICE	
		REPLACES	AMPLIFIES	TRANSFORMS
		R	A	T

RAT - **Teacher's** use of Tech ____ Traditional Practice

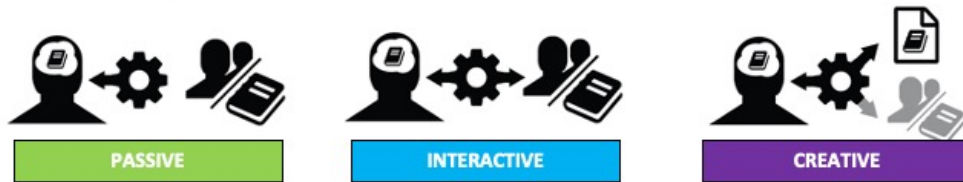
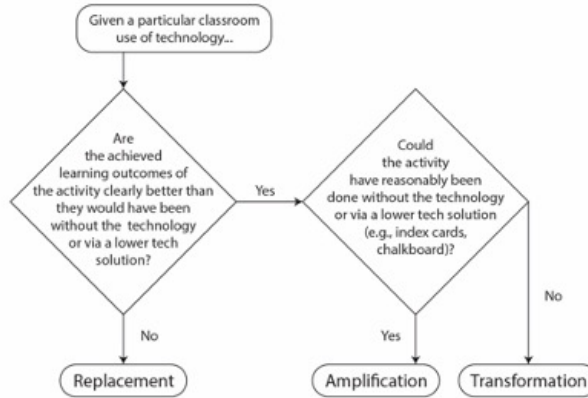
Replacement: Changes the appearance of our practices or dressings of our practices but not the practice itself. It doesn't affect teaching or learning practices and behaviors. It can increase access but it doesn't improve learning.

Amplifying: Technology improves the efficiency of tasks or introduces new functions to original tasks.

Transforming: It introduces new activities and learning that are impossible without technology.

Take away the technology – take away the learning too.

P I C STUDENTS' RELATIONSHIP TO TECH IS	CREATIVE	CR	CA	CT
	INTERACTIVE	IR	IA	IT
	PASSIVE	PR	PA	PT
		TEACHER'S USE OF TECH	TRADITIONAL PRACTICE	
		REPLACES	AMPLIFIES	TRANSFORMS
		R	A	T



Examples Provided

Screencastify for listening comprehension practice for the Italian checkpoint B exam. Students listened to the oral script while using the practice exam link with the multiple choice answers. They listened to passages in Italian while reading the questions and choices in both Italian and English.

Edpuzzle - students watched a video in Italian on environmental issues in the different regions of Italy and responded to a variety of questions - including multiple choice, true/false, open-ended. This included the listening, reading and writing skills

Voicethread - Students were given an oral/ video prompt in Italian with multiple questions to respond to in Italian via video or audio -The topic was vacationing in Italy - where would you go? with whom? when? why? for how long? etc... They were required to speak for a minute to speak for 60-90 seconds.

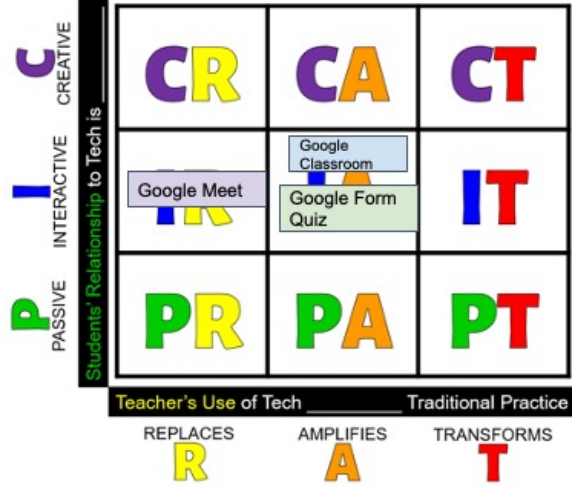
C I P	Students' Relationship to Tech is	CREATIVE	CR	Voicethread CA	CT
		INTERACTIVE	IR	Edpuzzle IA	IT
		PASSIVE	PR	Screencastify PA	PT
		Teacher's Use of Tech	Traditional Practice		
		REPLACES	AMPLIFIES	TRANSFORMS	
		R	A	T	

Examples Provided

Google Forms
Google forms having students take an online quiz

Google Classroom
Google classroom to assign daily assignments

Google Meet
Google meet to teleconference with students

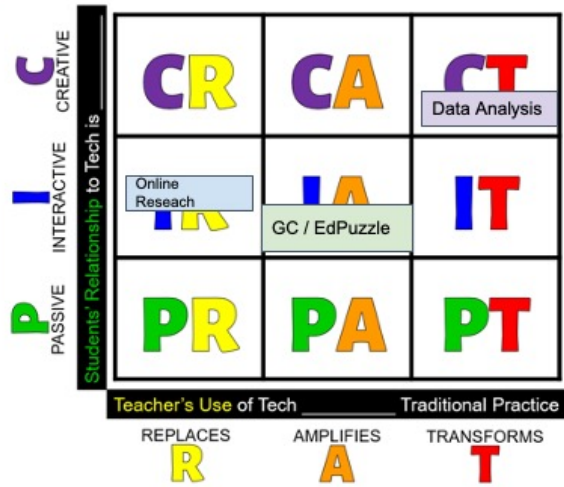


Examples Provided

EdPuzzle / Google Classroom
In this course we have been using google classroom and Edpuzzle to continue a flip classroom. Students are given a video that is recorded using screencastify then uploaded to youtube. The youtube video is posted and an edpuzzle with questions are developed as a homework/direct lesson activity. We use google classroom as the main platform for communication and update of the edpuzzles. There is also a weebly website that was created that has a calendar to pace out each unit.

Online Research and Data Analysis
CER Students were given a video on youtube about microplastics in the ocean They were given chromebooks to research the effects of micro plastics that enter the seafood chain and how the effects can disturb human life. The students were tasks to compile a data sheet of usable resources online resources and briefly peer review them.

Data Analysis
Students used an online data bank provided by the district to research Capsaicin levels from selective plants. These plants were selectively bred to increase those levels. Students then shared data among groups of 4 and create a poster that highlighted the focus on selective breeding. Students were given the green light to change the selective breeding to domestic or farm animals. These were assignments were placed on google classroom and a google doc was created to share individual research while at home.

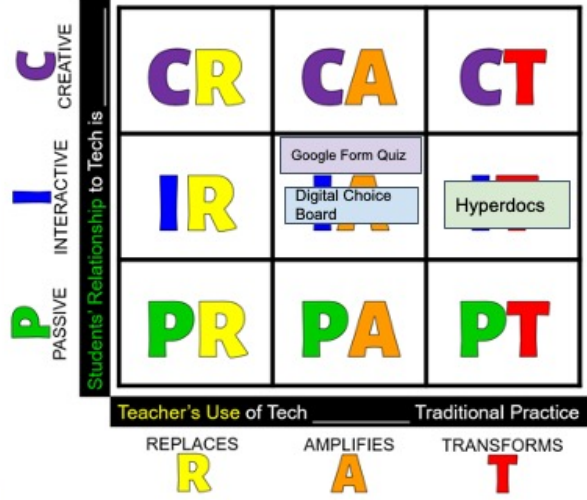


Examples Provided

HyperDocs
One example of how technology was used in the classroom was by creating HyperDocs. HyperDocs are a central document that contains links to all components of a lesson or activity. Using this method helps students stay organized using technology and gives them a clear indication of what needs to be done for each step to complete all aspects of the task.

Digital Choice Boards
One example of how technology was used in the classroom is digital-choice boards. This is similar to the game 'tic-tac-toe' where students must complete 3 activities on the board. Activities may include: watching a video, answering a discussion board question, creating a Google Slides presentation on the topic, reading a digital text, etc.

Google Form Quiz
One example of how technology was used in the classroom was using Google Forms. Google Forms is a great tool to use for information and formal assessments. I often use Google Forms for quick quiz assessments online that give students a grade instantly once completed. Students like this because they receive their score faster than waiting for the teacher to grade their work and give it back.

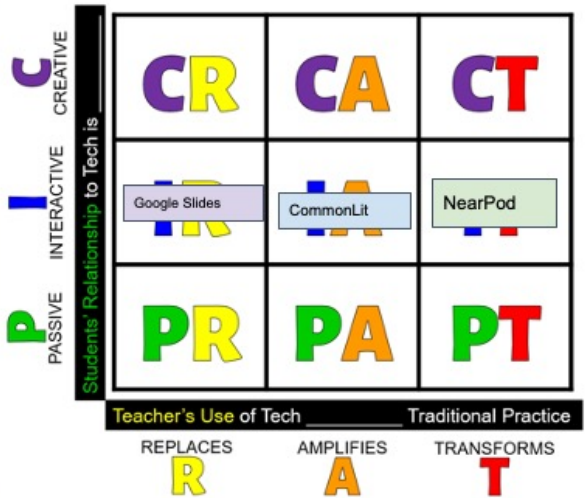


Examples Provided

NearPod
I use Nearpod with my students to introduce and go deeper into topics with my students. Nearpod has introductory to advanced lessons in each subject area. Students access Nearpod on assigned iPads that are available in the classroom. The platform allows me to use YouTube videos, and use a combination of independent and cooperative activities to deepen understanding. Informal assessments are done throughout the lesson, and it ends with a formal assessment at the end.

CommonLit
I've begun to use CommonLit with my student. It is a literacy website that provides guided reading questions to help build comprehension. Students are able to annotate the reading and teachers can see student annotations. In addition, there is a read aloud feature for struggling and non-readers.

Google Slides
The pandemic has forced me learn about the various Google Apps. Google Docs and Slides allow me to work on assignments with students to help improve their writing. I am able to model how to edit.



Examples Provided

Digital Escape Room
I worked with an English teacher to create a digital escape room for Romeo and Juliet using Google Forms. Students are tasked with citing properly, recalling character descriptions and other items from the play and students had to work together to "escape" the room. This taught them how to work together, work methodically and quietly and the students were engaged and competitive and they shared that they had to really dig deep to remember other items to help them complete the activity.

Flipgrid
I worked with Spanish teachers to create a "Whodunit" lesson. We used a variety of technology to work on the 4 skills of Speaking, Listening, Reading and Writing. We used thinklink with a map to the school with audio recording at each dot for the students to hear testimonials, we used google docs to create a newspaper that detailed what happened that day and students were able to listen to the audio as many times as needed to hear authentic Spanish and read the newspaper at home or at school. They were later tasked with other activities that did not use technology (Interviewing me in person and in Spanish as an eye witness) and then they used flipgrid to make a statement as to why they thought one of the suspects was the criminal. The students FLIPPED over this lesson and all activities, even the non tech ones.

PearDeck
In an English class, we used pear deck to review text from "To Kill a Mockingbird". Students worked with the class at the teacher pace and later worked on other slides in the pear deck in groups at their own pace and then we came together. This tool is great because as a teacher, I can see all students participate, I can refer to any and all student work and "hear" from a student that might otherwise be super quiet. I can gauge how students are doing while they work without wasting time or embarrassing them and the students get their own takeaways at the end of the sessions.

Examples Provided

Quizlet Live
Students used Quizlet live to review material.

Creating Infographic
Students created an infographic to spread awareness about the Census.

Chromebook Research
Students have used Chromebooks to research a budget and establish financial goals.

C I P	CREATIVE INTERACTIVE PASSIVE	Students' Relationship to Tech is	CR	CA	CT Flipgrid
			IR	IA PearDeck	IT Escape Room
			PR	PA	PT
			Teacher's Use of Tech	Traditional Practice	
			REPLACES R	AMPLIFIES A	TRANSFORMS T

C I P	CREATIVE INTERACTIVE PASSIVE	Students' Relationship to Tech is	CR	CA Creating Infographic	CT
			IR	IA Quizlet	IT
			PR	PA Chromebook Research	PT
			Teacher's Use of Tech	Traditional Practice	
			REPLACES R	AMPLIFIES A	TRANSFORMS T

Examples Provided

Quizlet
The students in a language classroom have difficulty in learning new vocabulary. I find Quizlet learning tools helpful. I usually teach my students how to pronounce the words and expressions related to the topic. Then the students either create their own Quizlet or one is provided. At this point, the students use the learning tools on Quizlet such as flashcards, learn, write, and spell to memorize the vocabulary and expressions. They also take the Quizlet test to assess how much learning has taken place. They submit their results on Google Classroom. Once they know the material well enough, then we play Quizlet Live. And I think this game is a good way to get students to learn anything. Their motivation comes from the fact that they want to compete and win as a team against the other teams. That's when you see the students engaged. They help each other and they take pleasure in the process. With a partner, students create a dialogue based on the vocabulary learned. They use Google docs to collaborate. They are given the choice to video tape their dialogue and turn them in on Google Classroom. Or to present their dialogue in front of the class. Finally, the formal test is administered using Google forms.

iMovie / YouTube
Discovering the impressionist painters. Each student chooses one impressionist painter and does some research online about his life, his style, his paintings using a presentational tool such as Google slide, Youtube, iMovie... to present to the class. In this project, the students used technology to learn at their own pace. They are usually engaged in this project. Since they picked the painter themselves and they have prior and general knowledge about the impressionist movement that incites them to learn more. They are always amazed when they find out the struggle and the challenges that most of the painters had to face at the time in which they lived.

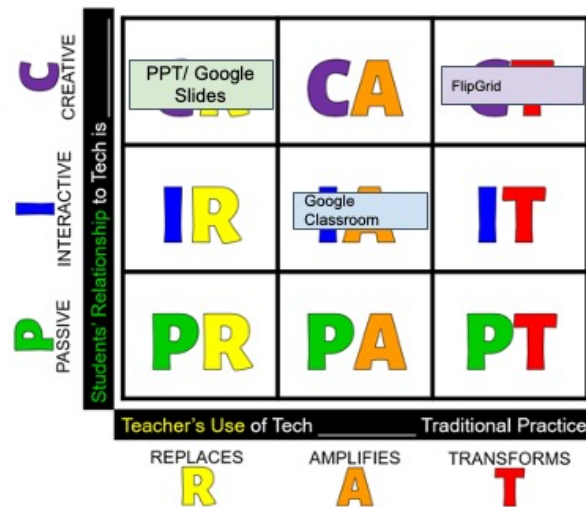
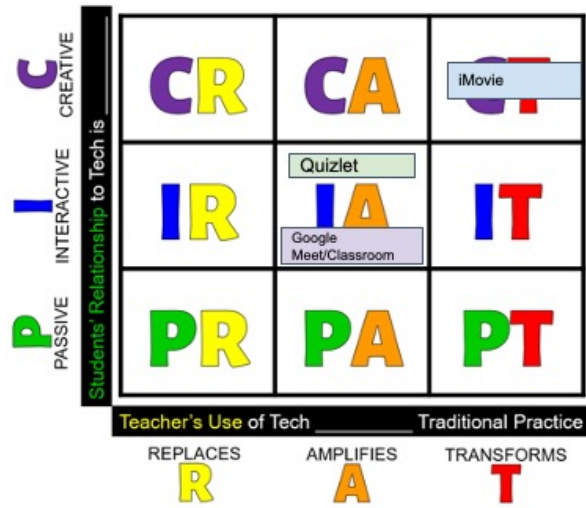
Google Classroom and Google Meet
From March up to now all interaction between teachers and students has been based on technology. Google Classroom is the platform that I used to post and receive assignments from students. We communicate via Remind, Classroom, and email. I also had at least once a week a Google Meet Conference to present the material. It ranges from grammar points to vocabulary, from reading to listening; from writing to speaking. Conversations in my AP French class, the students had to actively participate in a conversation. The topics were from the CollegeBoard - MyAP platform. The students were given the topic of conversation and they have to react, respond, interact in a meaningful way, and appropriately as they hear their interlocutor. They had to record their answers and submit them on Classroom for grading. During our Google Meet Conference, I gave them some feedback on their work. Students appreciated the fact that despite the confinement, they were still able to prepare themselves for their AP French Exam. They remained engaged and were able to work in a productive way thanks to technology.

Examples Provided

Google Slides / PPT
Students worked in small groups and researched a foreign city (using Chromebooks) and created a travelogue of their city using Screencastify with a PowerPoint or Google slide presentation. The groups watched one another's videos and used a Google form to comment on them.

Google Classroom
Students watched a video on a cultural topic. I used the question feature in Google classroom to have them explain why or why not they would participate in the event. Students had the opportunity to respond to one another.

Flipgrid
After reading comprehensions (with Google docs), listening comprehensions (Google form quiz, Google doc quiz), and an organizer (Google doc), instead of writing an essay, students used FlipGrid to record their responses.



Examples Provided

Google Slides

To review a unit, I like to create scavenger hunts around them that allow the students a chance to move around solving problems and self-check their answers. The answer to a question will be found on the top of the next question. This year I took this successful idea and created a virtual scavenger hunt using Google slides, where the answer to each question needed to be typed into the end of the Tinyurl.com link. Bringing technology into this activity allowed me a chance to give the students links to videos for help, easily monitor their progress, and differentiate for all levels in my room. To give the students a chance to still walk around, I infused a few questions in there that forced the students to check in with me to explain their answer before being given a card with the next link on it.

Google Meet / Google Classroom

Luckily before we left school, all of my 5th graders were given the opportunity to bring their Chromebooks home to complete their work. Because of this, I was able to use Google Classroom as a main component throughout all of the weeks of the remote learning experience. I not only communicated with my students using the stream with the ability to attach links and videos, but was able to assign, grade, and comment on work. The classroom also had its own designated Google Meet link that we used to video chat once a week to discuss any successes or problems. Google classroom also makes it easy to link to other websites I used, like Khan Academy and EdPuzzle, that automatically graded the lessons and transferred the grades into the GC gradebook. The application was a lifesaver!

Quizlet

During group days, I have the students rotate around to three stations. One of these stations is always using technology and their chromebook. We have a subscription with ST Math, which is self-paced and allows the students to strength their own deficiencies that they struggled with during their diagnostic test. (Side note: During remote learning, we are now using iReady Math to do the same thing and the students are asked to complete 30 minutes of lessons a week.) We also have a subscription to IXL.com, which is a great way to assign a specific skill for the students to enhance their ability in it. Quizlet is a great tool for vocabulary that I will plug into that spot too to have the students pre-learn or review the words.

Examples Provided

Pre-Recorded Videos

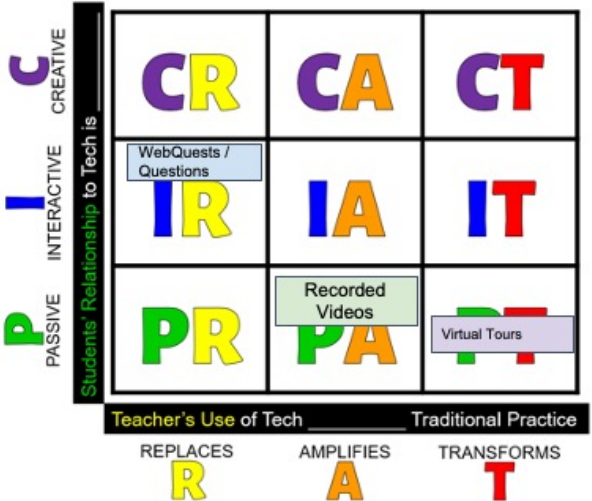
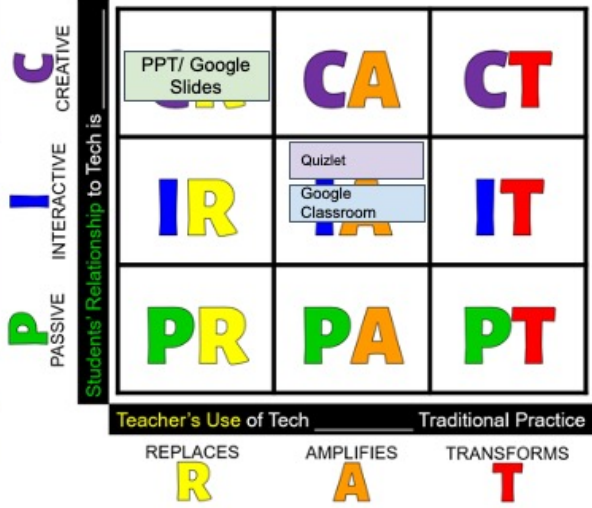
Due to the fact that many of my students are sharing devices with siblings or needed to obtain jobs during the CoronaVirus Pandemic, I would prerecord videos on Google Meet and present a PowerPoint based on specific topics that were covered in a chapter packet created by my teacher.

WebQuests

My students greatly enjoy performing WebQuests. While I was teaching Forensic Science, this is how my co-teacher and I would normally start a unit because it is a great way to introduce students to new vocabulary and have them watch mini videos and answer questions about scientific procedures that we will be mimicking in class such as fingerprinting and comparing tire tracks and footprints.

Virtual Tours

My English Academy Class and Resource Romm classes love when we are able to use take free virtual tours of museums, historic sites, and college campuses to physically see something they are learning about. They are able to view anything from a piece of art, a college campus or trade school tour, or tour historic sites such as the Parthenon where they were able to see restoration work being done and receive an explanation in English.

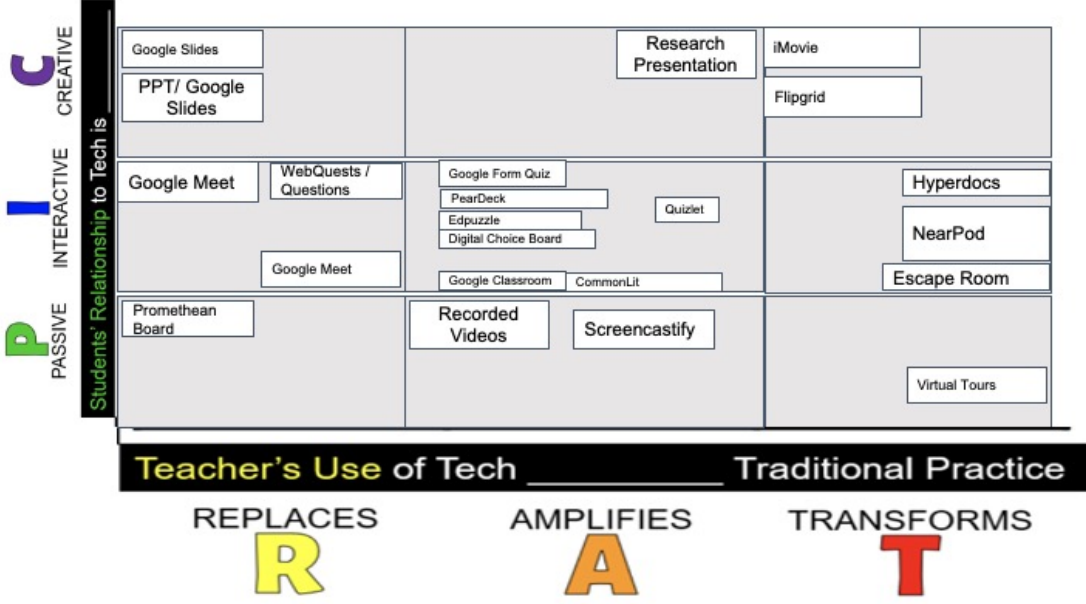
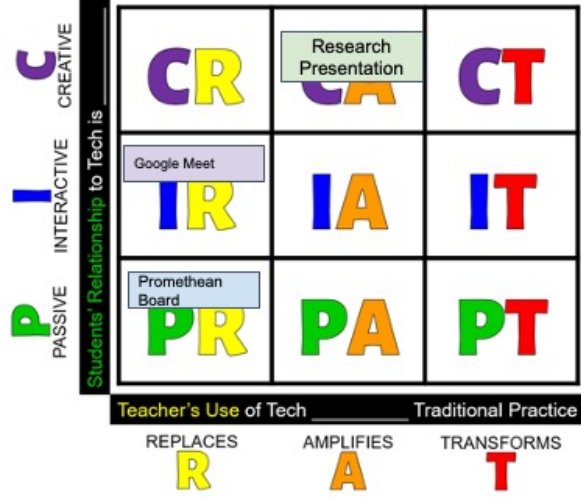


Examples Provided

Research / Presentation
 (Pre-Corona)- I had the students create a research presentation using google slides on a body system disease. They had to share the PowerPoint with me and their partner. Once they were done, they had to upload and submit on Google classroom. Once completed, the students then had to present their PowerPoint in the front of the classroom by using the computer and projector.

Promethean Board
 (Pre-Corona)- Active Inspire Pen- For the Do Now's, I would select volunteers to come to the Promethean board and write their answers using the Pen. I would also have other volunteers come up to correct the work if their was an error using the pen in a different color.

Google Meet
 (During Corona)- Used Google Meet to teach lessons and facilitate discussion. The lessons were recorded and posted for students to use as a reference or resource to help with their assignments.



PIC-RAT Quiz

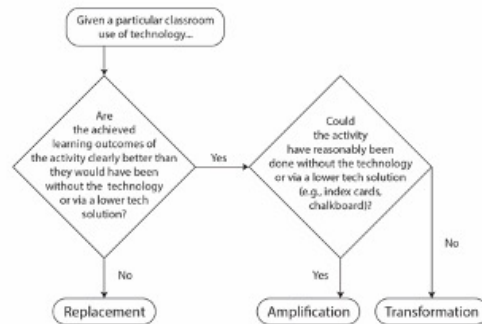
1. A teacher uses PowerPoint as part of her lecture.
2. Students are asked to keep an online journal in a blog.
3. Students pass a touch-enabled tablet around the room and write a collaborative poem.
4. Students play an online role-playing game about John Smith and Pocahontas.
5. Students write answers to math problems on an interactive whiteboard.
6. Students organize geometric shapes in patterns on an iPad.
7. A teacher creates a video to introduce herself to her students on the first day.
8. Students make an animated video to tell a story.
9. A teacher designs a WebQuest (inquiry-driven online lesson) for students to complete on their own time.
10. A teacher uses Facebook to remind her students about homework.

STUDENTS' RELATIONSHIP TO TECH IS	CREATIVE	CR	CA	CT
	INTERACTIVE	IR	IA	IT
	PASSIVE	PR	PA	PT
		TEACHER'S USE OF TECH	TRADITIONAL PRACTICE	
		REPLACES	AMPLIFIES	TRANSFORMS
		R	A	T

How can educators begin to implement PICRAT?

- **Teacher's** use of Tech
 ____ Traditional Practice.
 - **Replaces, Amplifies, Transforms**

- **Student's** Relationship to Tech is ____.
- **Passive, Interactive, Creative**





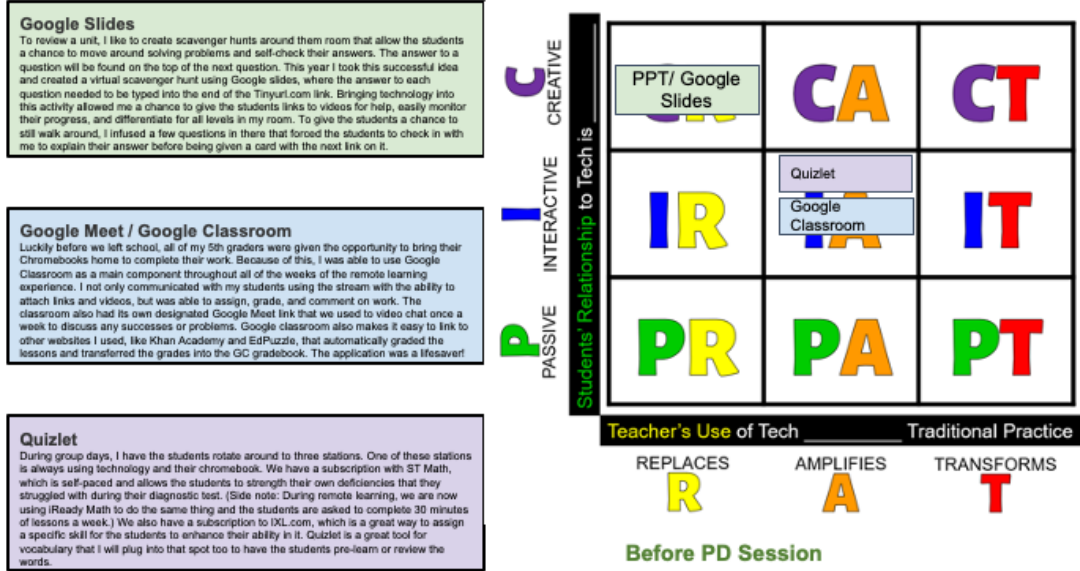
<https://forms.office.com/Pages/ResponsePage.aspx?id=P4nfNtQNJOGXpbxTe83GKsB5VIA8fhIGhsiRQ3SoPMJUMTIXNkpTSEVPROVUREVYSEITNEFLSk1IRi4u>

APPENDIX J

Researcher Pre-Professional Development Evaluation with PICRAT Matrix Compared to Researcher Post Professional Development Evaluation, with Self-Reported Participant Evaluation

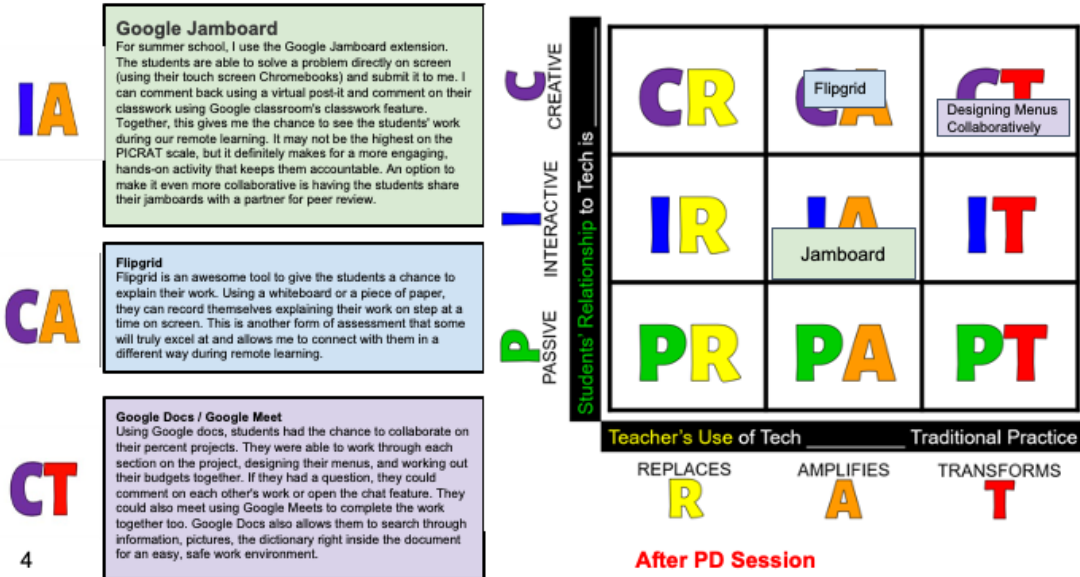
Sunset Grove – Participant #01

3



Sunset Grove – Participant #01

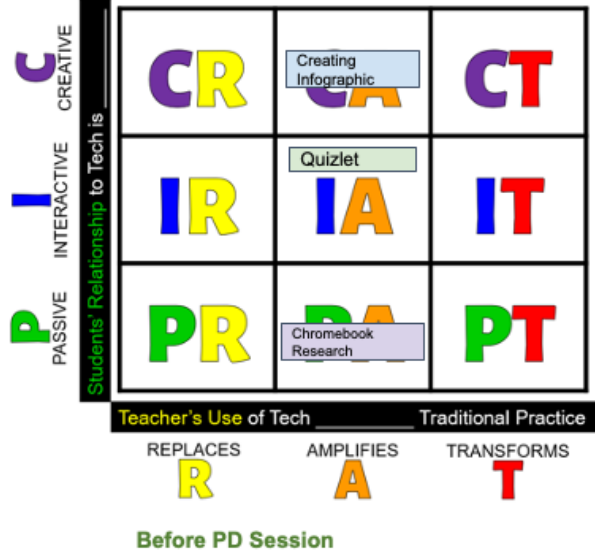
4



Sunset Grove – Participant #02

3

<p>Quizlet Live Students used Quizlet live to review material.</p>
<p>Creating Infographic Students created an infographic to spread awareness about the Census.</p>
<p>Chromebook Research Students have used Chromebooks to research a budget and establish financial goals.</p>

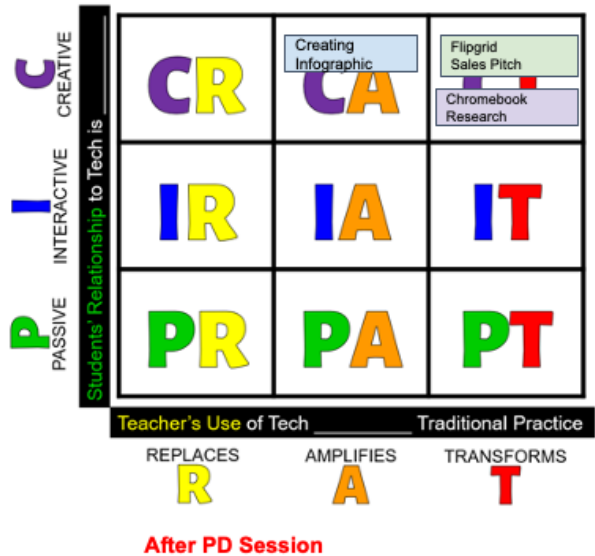


Sunset Grove – Participant #02

4.6

<p>CA</p>	<p>FlipGrid Sales Pitch As part of my Government class's Genius Hour project students film "Elevator Pitches" on FlipGrid. Students view their peers FlipGrids and provide them feedback on their Elevator Pitches. Students will be able to have a dialogue and practice "selling" their ideas in a professional way.</p>
<p>CA</p>	<p>Creating Infographic I had students participate in several lessons on why people don't participate in the Census. The students would pick an underrepresented group and create an infographic to persuade them to participate. These infographics would be then sent out to the community through Social Media to help and inform.</p>
<p>CT</p>	<p>Chromebook Research I have a lesson on Personal Finance that has students complete a budgeting exercise for their futures. Students would pretend they scored their dream job and have to see how they would budget based on their projected salary and desired place to live. Students have to research how much rent, car payments, phone bills, transportation costs and taxes cost. Students utilize Google Docs, Forms and access a wide variety of websites to get this information.</p>

4.3



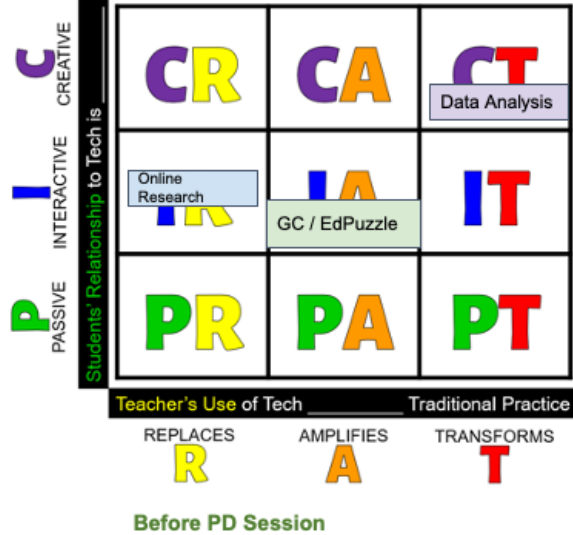
Ever Pines – Participant #03

3.3

EdPuzzle / Google Classroom
 In this course we have been using google classroom and Edpuzzle to continue a flip classroom. Students are given a video that is recorded using screencastify then uploaded to youtube. The youtube video is posted and an edpuzzle with questions are developed as a homework/direct lesson activity. We use google classroom as the main platform for communication and update of the edpuzzles. There is also a weebly website that was created that has a calendar to pace out each unit.

Online Research and Data Analysis
 CER Students were given a video on youtube about microplastics in the ocean They were given chromebooks to research the effects of micro plastics that enter the seafood chain and how the effects can disturb human life. The students were tasks to compile a data sheet of usable resources online resources and briefly peer review them.

Data Analysis
 Students used an online data bank provided by the district to research Capsaicin levels from selective plants. These plants were selectively bred to increase those levels. Students then shared data among groups of 4 and create a poster that highlighted the focus on selective breeding. Students were given the green light to change the selective breeding to domestic or farm animals. These were assignments were placed on google classroom and a google doc was created to share individual research while at home.



Before PD Session

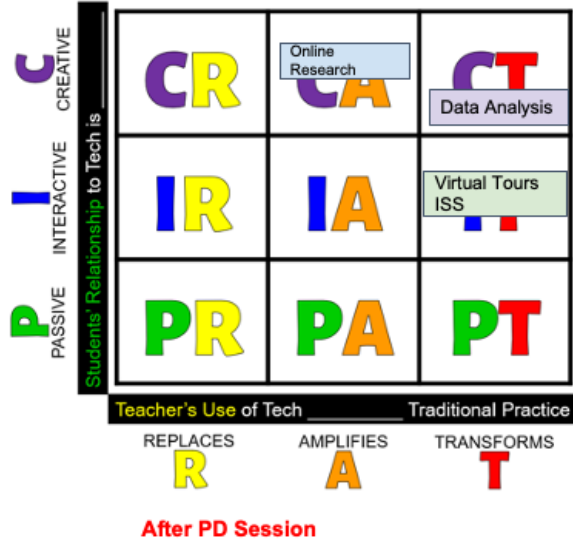
Ever Pines – Participant #03

4.3

IA
Virtual Tours ISS
 Students participate in a virtual tour of the International Space Station. They are to learning about the struggles astronauts face with everyday life activities. They write about what would be the most challenging part on living in space how ask questions that the astronauts can answer during a live feed or virtual interview.
https://www.nasa.gov/mission_pages/station/main/suni_iss_tour.html

CA
Closed System Creation
 Students will be watching a youtube video of a closed system. They will be researching how closed systems play a part of their daily lives and provide examples of what closed systems people use. Students will then write a procedure to recreate a closed system and couple it with cause and effect relationships that would open the system and the consequences it entails.

CT
Online Data Analysis Report
 Students used an online data bank provided by the district to research Capsaicin levels from selective plants. These plants were selectively bred to increase those levels. Students then shared data among groups of 4 and create a poster that highlighted the focus on selective breeding. Students were given the green light to change the selective breeding to domestic or farm animals. These were assignments were placed on google classroom and a google doc was created to share individual research while at home.



After PD Session

4

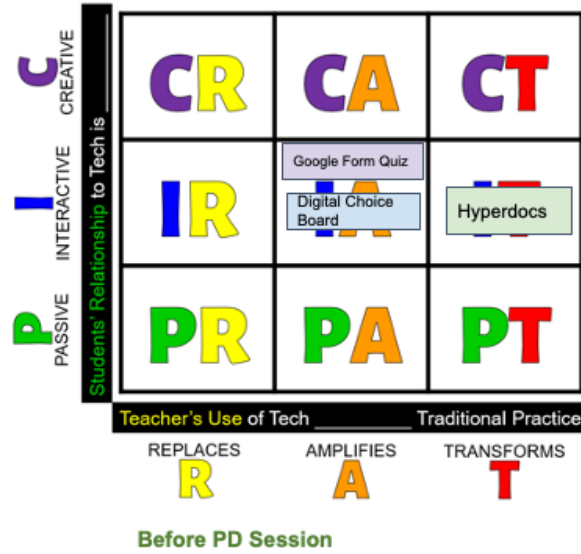
Ever Pines – Participant #04

3.3

HyperDocs
One example of how technology was used in the classroom was by creating HyperDocs. HyperDocs are a central document that contains links to all components of a lesson or activity. Using this method helps students stay organized using technology and gives them a clear indication of what needs to be done for each step to complete all aspects of the task.

Digital Choice Boards
One example of how technology was used in the classroom is digital-choice boards. This is similar to the game 'tic-tac-toe' where students must complete 3 activities on the board. Activities may include; watching a video, answering a discussion board question, creating a Google Slides presentation on the topic, reading a digital text, etc.

Google Form Quiz
One example of how technology was used in the classroom was using Google Forms. Google Forms is a great tool to use for information and formal assessments. I often use Google Forms for quick quiz assessments online that give students a grade instantly once completed. Students like this because they receive their score faster than waiting for the teacher to grade their work and give it back.



Ever Pines – Participant #04

4

PR

HyperDocs
An educational technology activity that I have designed for my students is the use of Hyperdocs. Hyperdocs streamline information making it much easier for students to follow instructions for multi-step activities. The teacher can add a video, Google Form, text source, etc.

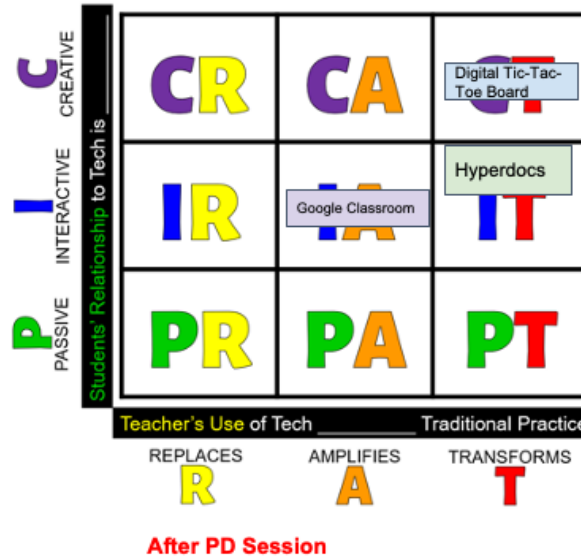
CT

Digital Tic Tac Toe Board
Another educational technology activity that I have designed is a digital tic-tac-toe board. This gives students more freedom and allows them to choose their mode of instruction. The teacher can also control how the students receive instruction by organizing the tic-tac-toe board in a certain way since there are only so many ways to solve the board. This activity could allow students to be creative, interact, and also be passive, depending on the assignments.

IT

Google Classroom Discussion Board
Another education technology that I have designed for my students is a Google Classroom discussion board. This is a separate classroom that all five classes join where students answer a question and they are required to comment on at least 2-3 other student's comments. There is a rubric for students to understand how to respond to their classmates for full credit.

3.3



Ever Pines – Participant #05

3.6

Quizlet
The students in a language classroom have difficulties in learning new vocabulary. I find Quizlet learning tools helpful. I usually teach my students how to pronounce the words and expressions related to the topic. Then the students either create their own Quizlet or one is provided. At this point, the students use the learning tools on Quizlet such as flashcards, learn, write, and spell to memorize the vocabulary and expressions. They also take the Quizlet test to assess how much learning has taken place. They submit their results on Google Classroom. Once they know the material well enough, then we play Quizlet Live. And I think this game is a good way to get students to learn anything. Their motivation comes from the fact that they want to compete and win as a team against the other teams. That's when you see the students engaged. They help each other and they take pleasure in the process. With a partner, students create a dialogue based on the vocabulary learned. They use Google docs to collaborate. They are given the choice to video tape their dialogues and turn them in on Google Classroom. Or to present their dialogues in front of the class. Finally, the formal test is administered using Google forms.

iMovie / YouTube
Discovering the impressionist painters. Each student chooses one impressionist painter and does some research online about his life, his style, his paintings using a presentational tool such as Google slide, Youtube, iMovie... to present to the class. In this project, the students used technology to learn at their own pace. They are usually engaged in this project. Since they picked the painter themselves and they have prior and general knowledge about the impressionist movement that incites them to learn more. They are always amazed when they find out the struggle and the challenges that most of the painters had to face at the time in which they lived.

Google Classroom and Google Meet
From March up to now all interaction between teachers and students has been based on technology. Google Classroom is the platform that I used to post and receive assignments from students. We communicate via Remind, Classroom, and email. I also had at least once a week a Google Meet Conference to present the material. It ranges from grammar points to vocabulary, from reading to listening, from writing to speaking. Conversations in my AP French class, the students had to actively participate in a conversation. The topics were from the CollegeBoard - MyAP platform. The students were given the topic of conversation and they have to react, respond, interact in a meaningful way, and appropriately as they hear their interlocutor. They had to record their answers and submit them on Classroom for grading. During our Google Meet Conference, I gave them some feedback on their work. Students appreciated the fact that despite the confinement, they were still able to prepare themselves for their AP French Exam. They remained engaged and were able to work in a productive way thanks to technology.

Students' Relationship to Tech is

CR	CA	CT iMovie
IR	IA Quizlet Google Meet/Classroom	IT
PR	PA	PT

Teacher's Use of Tech **Traditional Practice**

R **A** **T**

REPLACES **AMPLIFIES** **TRANSFORMS**

Before PD Session

Ever Pines – Participant #05

4.6

CT
Door to Adventure
Doors to adventure...With a partner, choose a city Spanish-speaking country. Decorate the door with a map, the name of the place, pictures of places of interest and traditional foods. (Computer research necessary to find information). Create a video of highlights narrated by your group (Screencastify, Google slides) and put the QR code for your video on the door. (Upper level)

CT
Create a Choose Your Own Adventure
With a partner or partners, choose one of the short stories we read in class. If the protagonist had made different choices, how would the story be different? Use Google forms to create a branching Choose-Your-Own Adventure story. One set of branches should be the original story, although you may simplify it. (IA for following other groups' stories; CT for creating them.) upper level

CA
Narrated PowerPowerPoint
A day in the life...(lower level)...find pictures on the web (or take new ones) showing your daily routine. Use the imperfect verb tense to label each picture. Create and record a narration. Use Google slides or Powerpoint

Students' Relationship to Tech is

CR	CA Narrated PPT	CT Create - CYOA Door to Adventure
IR	IA	IT
PR	PA	PT

Teacher's Use of Tech **Traditional Practice**

R **A** **T**

REPLACES **AMPLIFIES** **TRANSFORMS**

After PD Session

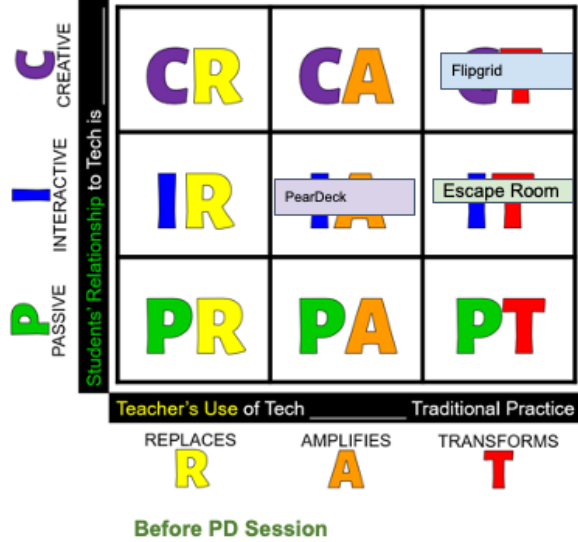
West Elms – Participant #06

4

Digital Escape Room
I worked with an English teacher to create a digital escape room for Romeo and Juliet using Google Forms. Students are tasked with citing properly, recalling character descriptions and other items from the play and students had to work together to "escape" the room. This taught them how to work together, work methodically and quietly and the students were engaged and competitive and they shared that they had to really dig deep to remember other items to help them complete the activity.

Flipgrid
I worked with Spanish teachers to create a "Whodunit" lesson. We used a variety of technology to work on the 4 skills of Speaking, Listening, Reading and Writing. We used Thinglink with a map to the school with audio recording at each dot for the students to hear testimonials, we used google docs to create a newspaper that detailed what happened that day and students were able to listen to the audio as many times as needed to hear authentic Spanish and read the newspaper at home or at school. They were later tasked with other activities that did not use technology (interviewing me in person and in Spanish as an eye witness) and then they used flipgrid to make a statement as to why they thought one of the suspects was the criminal. The students FLIPPED over this lesson and all activities, even the non tech ones.

PearDeck
In an English class, we used pear deck to review text from "To Kill a Mockingbird". Students worked with the class at the teacher pace and later worked on other slides in the pear deck in groups at their own pace and then we came together. This tool is great because as a teacher, I can see all students participate, I can refer to any and all student work and "hear" from a student that might otherwise be super quiet. I can gauge how students are doing while they work without wasting time or embarrassing them and the students get their own takeaways at the end of the sessions.



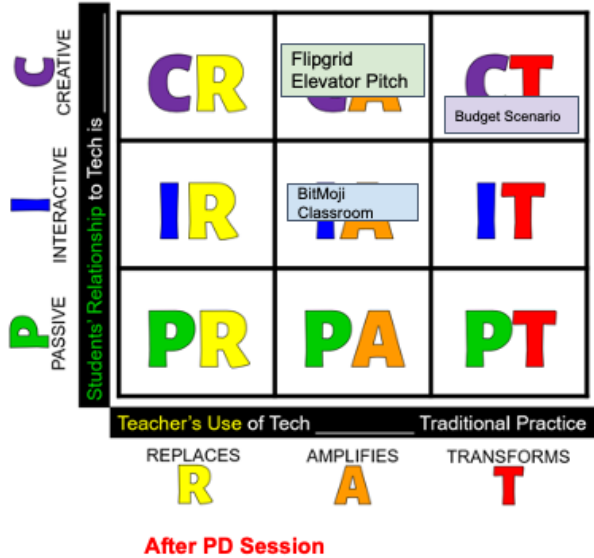
West Elms – Participant #06

4

Flipgrid Elevator Pitch
I created a flipgrid that encouraged our business and leadership students to access in preparation for mock interview day. Kids are always critiqued on how they respond to the request of the interviewer "Tell me about yourself". Students stutter or don't know where to begin or they simply give their name, what school they go to, etc instead of something that will set them apart from the other candidates. 1 topic in the grid is the student's 30-60 sec elevator pitch of who they are (selling, so to speak) and they can watch it, redo it and submit it for other teachers to evaluate. Another topic is for professionals to share their advice and their pet peeves and students can watch and later work on with a peer. Upper level Students can also share their good or bad experiences with those in the lower level leadership/classes

Bitmoji Classroom
I worked with the librarian to create her bitmoji classroom. Here she put herself in scenes and has interactive google slides to show book reviews, share new books that came in and more. Students have to option to comment on the Youtube videos of the book review or leave comments in the google classroom. We are encouraging their own book reviews for the librarian to use as well.

Budget Scenario
College Level Math revamped their College Budget lesson. Students were given a budget of \$1000 to furnish/decorate their dorm room. We have them searching through circulars, deals on websites, etc. and the students have to do the math to figure in sales tax, percentage off with a coupon, etc. put it into a google sheet and share with the teacher. They have to include certain items from a list of must haves - sheets, towels, and more - but could then go out and buy a tv if they chose to.



4

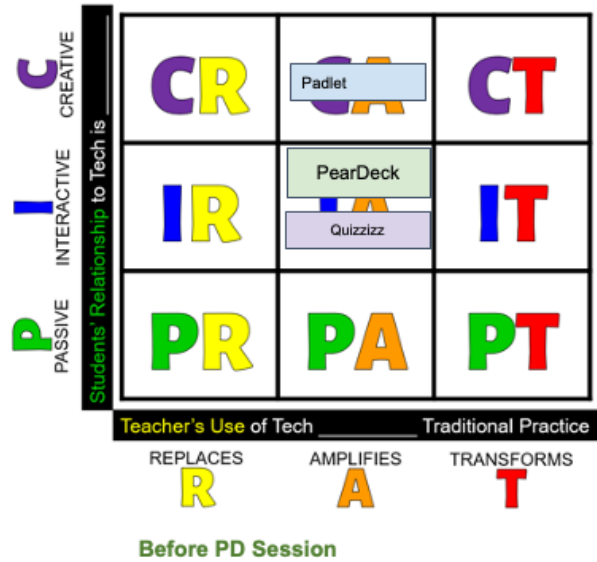
West Elms – Participant #07

3.3

PearDeck
I had an honors level class with some very bright students. But many of the students didn't know each other, so they were uncomfortable sharing. I asked my district to purchase pear deck for me, and it really transformed this class. So for this specific lesson, I had my students answering higher order thinking questions using Pear Deck, and they were engaged.

Padlet
To open up a lot of topics, I use Padlet. I don't love that the kids can see others' responses (and I think this may have even changed recently) before I see them. For this particular lesson, I was discussing the relationship between Nurse and Juliet in Romeo and Juliet, so I start the lesson asking students what qualities come to mind when I say "mother." Students recorded their answers on Padlet, and we can kick off the discussion about how Nurse functions as more of a mother than Juliet's own mother.

Quizzizz
To review for a unit test on Romeo and Juliet, I had my students use Quizzizz. I love the questions in the bank. It is a great tool that isn't time consuming and the kids love it!



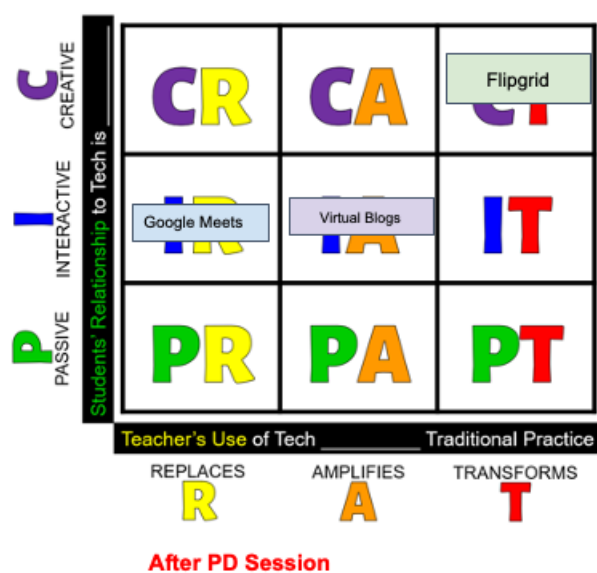
West Elms – Participant #07

3.3

IT
Flipgrid
In the case of virtual learning, I created a ice-breaker activity using Flipgrid. I will post grids with getting to know you questions that students will answer so that other students can watch their classmates' videos.

PR
Google Meets
In the case of virtual learning, I plan on using Google Meets for daily or weekly lessons.

IA
Virtual Blogs
I am looking for student blog websites and in the case of virtual learning, blogs will take the place of in-class student discussion.



2.6

After PD Session

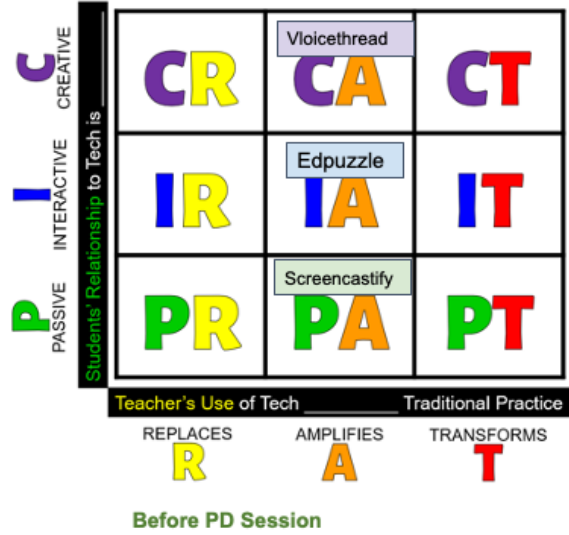
West Elms – Participant #08

3

Screencastify for listening comprehension practice for the Italian checkpoint B exam. Students listened to the oral script while using the practice exam link with the multiple choice answers. They listened to passages in Italian while reading the questions and choices in both Italian and English.

Edpuzzle - students watched a video in Italian on environmental issues in the different regions of Italy and responded to a variety of questions - including multiple choice, true/false, open-ended. This included the listening, reading and writing skills

Voicethread - Students were given an oral/ video prompt in Italian with multiple questions to respond to in Italian via video or audio -The topic was vacationing in Italy - where would you go?with whom? when? why? for how long? etc... They were required to speak for a minute to speak for 60-90 seconds.



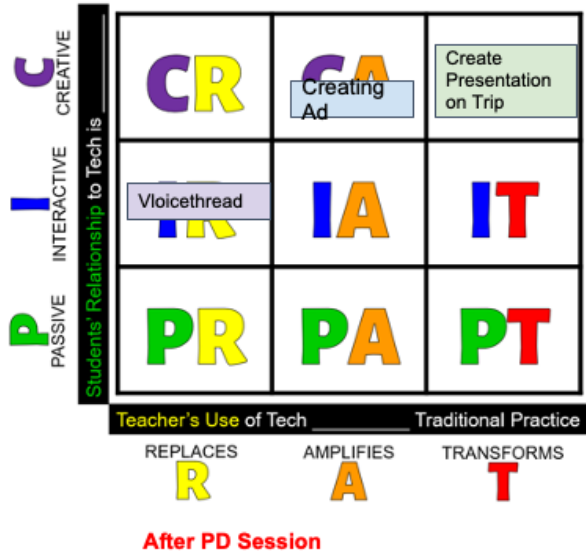
West Elms – Participant #08

3.6

CT
Planning on a Trip to Italy
Students had to create a "Trip to Italy" via a Prezi, Emaze or Google Slides. They had to include all means of Transportation, Lodging, Restaurants, nightlife and monuments to visit in each city that they researched. This was a project that I assigned early in my career wherein students researched using books and creating a poster board but now can use real time travel and hotel websites and include videos and virtual tours for sightseeing

CA
Create a Real Estate Ad
Students must research properties in Italy to rent or buy via a live website for a specifically assigned city in Italy and create La Mia Casa Ideale (my ideal house)using all the learned vocabulary and expressions, including a dialogue between a realtor and client - using a visual (they can choose a presentation tool of their choice)labeling all the rooms and furniture in the house.

IR
Voicethread
Students must work in pairs to practice speaking situations for the final exam using Voicethread with their Chromebooks during class in real time and submitting to me for review via an audio or video.



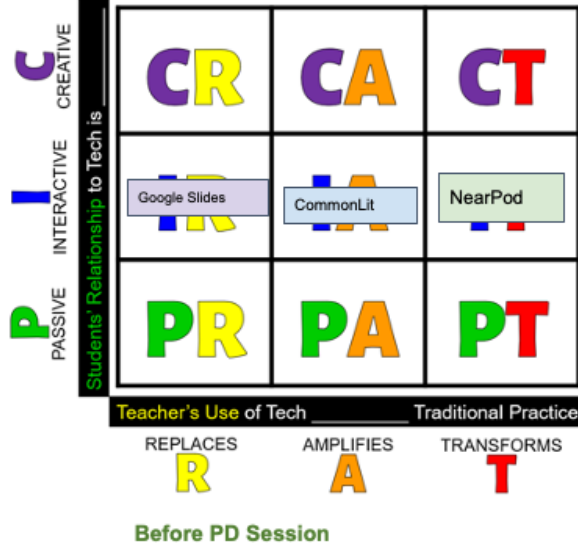
2 2

Island Acres – Participant #09

NearPod
I use Nearpod with my students to introduce and go deeper into topics with my students. Nearpod has introductory to advanced lessons in each subject area. Students access Nearpod on assigned iPads that are available in the classroom. The platform allows me to use YouTube videos, and use a combination of independent and cooperative activities to deepen understanding. Informal assessments are done throughout the lesson, and it ends with a formal assessment at the end.

CommonLit
I've begun to use CommonLit with my student. It is a literacy website that provides guided reading questions to help build comprehension. Students are able to annotate the reading and teachers can see student annotations. In addition, there is a read aloud feature for struggling and non-readers.

Google Slides
The pandemic has forced me learn about the various Google Apps. Google Docs and Slides allow me to work on assignments with students to help improve their writing. I am able to model how to edit.

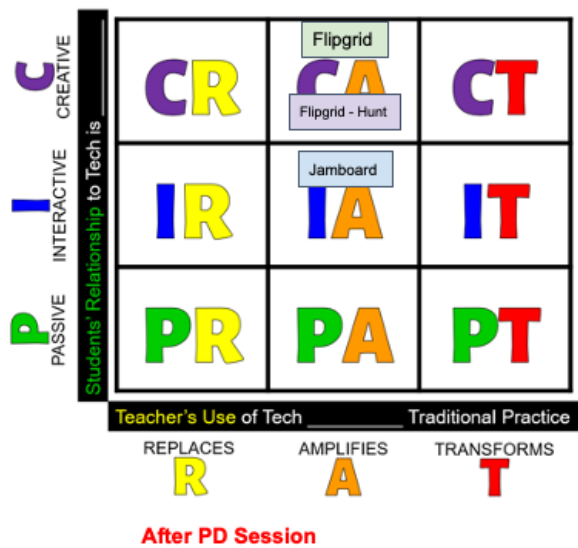


Island Acres – Participant #09

CA
Flipgrid
After engaging in reading/listening comprehension activity through CommonLit, students will respond to a prompt using FlipGrid. Students will be required to make a connection between the text and current events. Students will listen to classmate responses and be required to comment/ask follow up questions on at least two classmate videos.

IA
Jamboard
Students will be assigned groups. Using Jamboard, students will go through Algebra I Error Analysis questions and cooperatively discuss steps needed to solve equation.

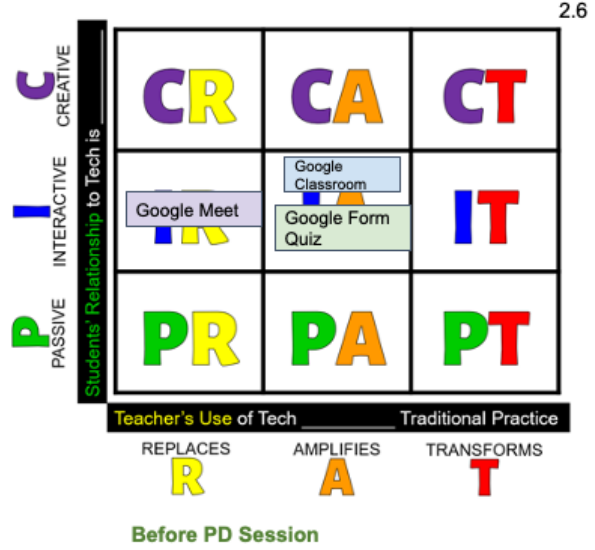
CA
Flipgrid - Hunt
Using FlipGrid, create a FlipHunt to introduce new students to the high school. Students will watch videos with clues directing them to hyperlinks in a virtual classroom. Students will share their solutions via FlipGrid to share new found knowledge of HS and its resources.



3.6

Island Acres – Participant #10

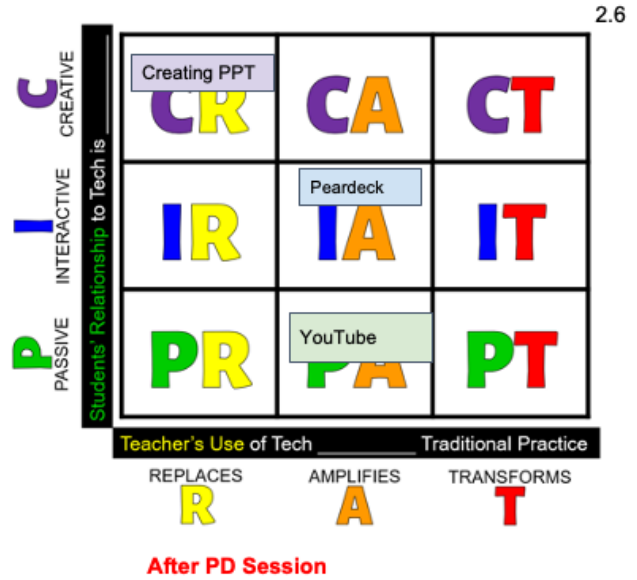
<p>Google Forms Google forms having students take an online quiz</p>
<p>Google Classroom Google classroom to assign daily assignments</p>
<p>Google Meet Google meet to teleconference with students</p>



Island Acres – Participant #10

<p>IR</p> <p>YouTube Using youtube videos to teach students synonyms. After each example have the student provide a synonym for the word shown then the other synonym will be revealed.</p>
<p>IR</p> <p>Peardeck Using Peardeck or the website that allows students to respond to questions in real time in order to determine immediately if the student was able to grasp the concept.</p>
<p>CR</p> <p>Create PowerPoints After teaching the students the concept of synonyms, the teacher will have the students create a powerpoint presentation with examples of synonyms and the student will have to present the concept with images etc...</p>

2.6



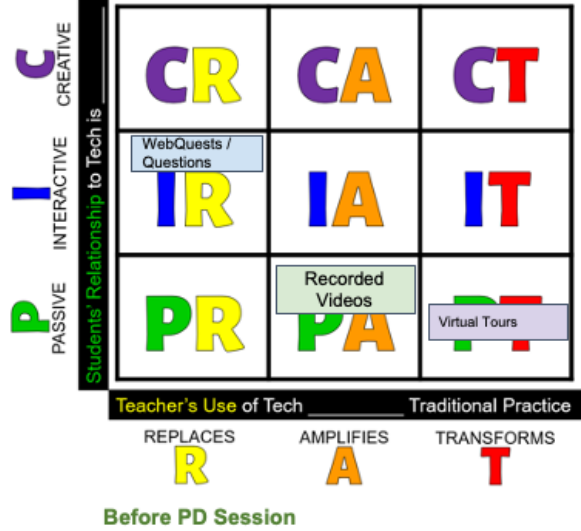
Island Acres – Participant #11

2.3

Pre-Recorded Videos
 Due to the fact that many of my students are sharing devices with siblings or needed to obtain jobs during the CoronaVirus Pandemic, I would prerecord videos on Google Meet and present a PowerPoint based on specific topics that were covered in a chapter packet created by my teacher.

WebQuests
 My students greatly enjoy performing WebQuests. While I was teaching Forensic Science, this is how my co-teacher and I would normally start a unit because it as a great way to introduce students to new vocabulary and have them watch mini videos and answer questions about scientific procedures that we will be mimicking in class such as fingerprinting and comparing fire tracks and footprints.

Virtual Tours
 My English Academy Class and Resource Romm classes love when we are able to use take free virtual tours of museums, historic sites, and college campuses to physically see something they are learning about. They are able to view anything from a piece of art, a college campus or trade school tour, or four historic sites such as the Parthenon where they were able to see restoration work being done and receive an explanation in English.



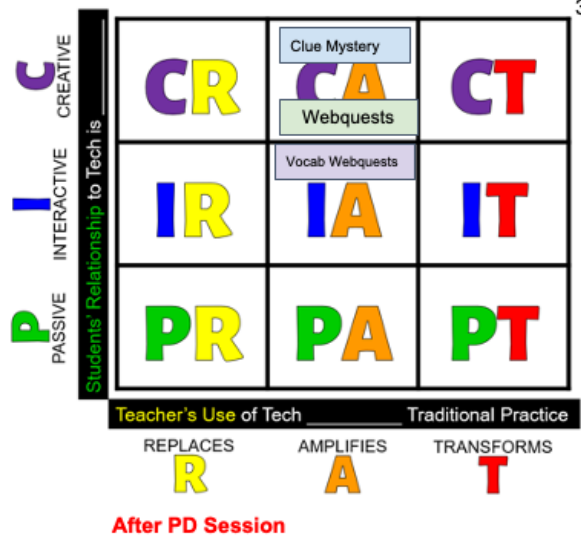
Island Acres – Participant #11

3.6

CT
Webquests and Create Questions
 Students will be paired up and choose a specific historic event to research and then plan questions, content-specific quests and a list of obstacles for students to complete in a break-out activity.

CA
Clue Mystery Activity
 A small group of students will research a past crime and then use the clues they found in research to write and leave clues in a crime scene exactly like a real-life version of Clue and have the rest of the class solve the crime. This will help students review evidence collection and crime scene techniques used in forensic departments around the world.

IA
Vocab Webquests
 Students will participate in a web quest at the beginning of the unit that will introduce students to important art, maps and vocabulary from the time period.



4

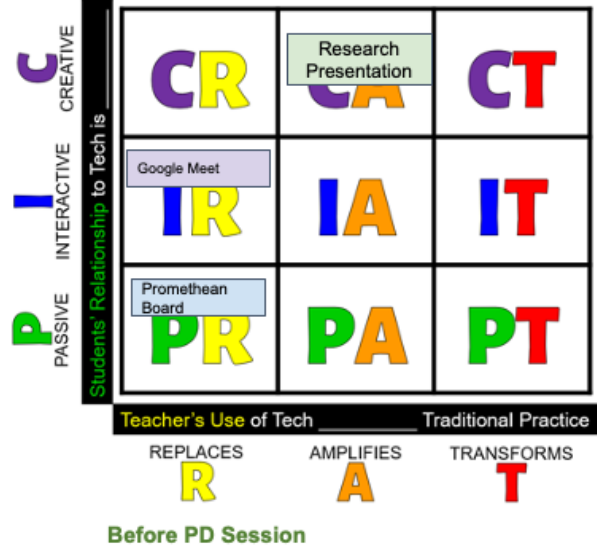
Island Acres – Participant #12

2.3

Research / Presentation
 (Pre-Corona)- I had the students create a research presentation using google slides on a body system disease. They had to share the PowerPoint with me and their partner. Once they were done, they had to upload and submit on Google classroom. Once completed, the students then had to present their PowerPoint in the front of the classroom by using the computer and projector.

Promethean Board
 (Pre-Corona)- Active Inspire Pen- For the Do Now's, I would select volunteers to come to the Promethean board and write their answers using the Pen. I would also have other volunteers come up to correct the work if their was an error using the pen in a different color.

Google Meet
 (During Corona)- Used Google Meet to teach lessons and facilitate discussion. The lessons were recorded and posted for students to use as a reference or resource to help with their assignments.



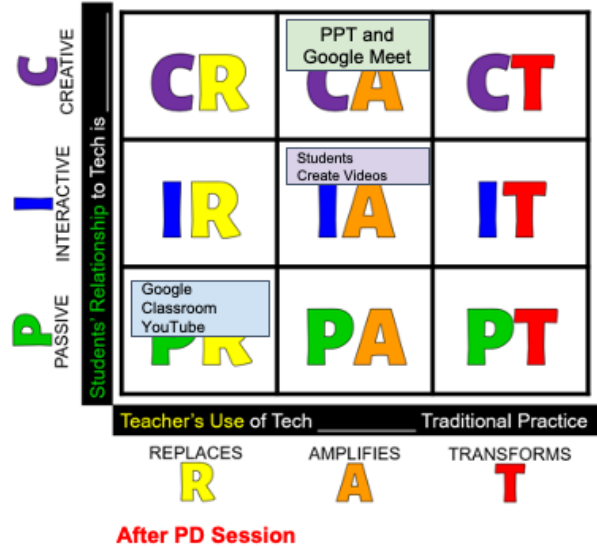
Island Acres – Participant #12

2.6

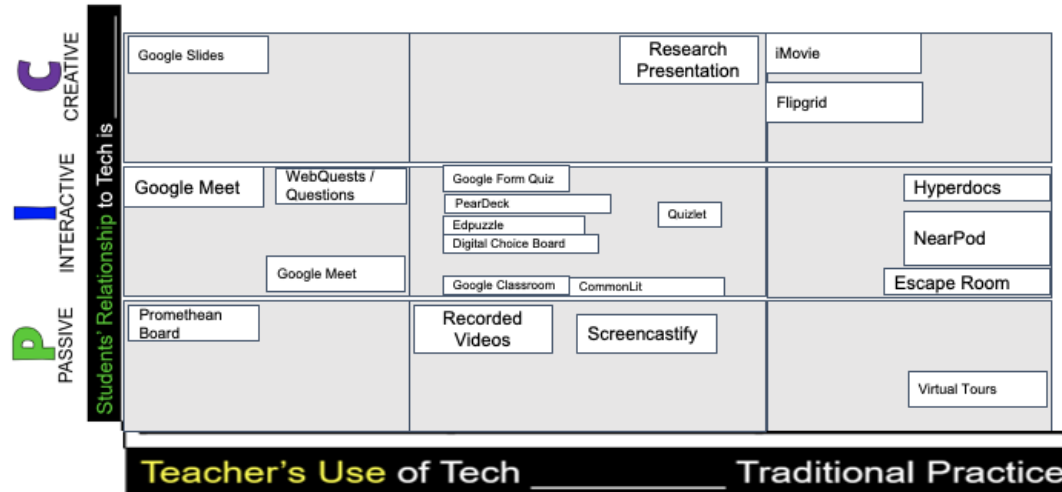
CA
PowerPoint and Google Meet
 Students had to create a PowerPoint presentation with a partner on a particular digestive system disease. They had to share the document with me and upload on google classroom. They then had to present their PowerPoint to the class by using Google Meet.

PR
Google Classroom and YouTube
 Students had to watch a kidney dissection video on YouTube. The students had to then answer questions on a Google Document and upload their answers on Google Classroom.

IA
Students Create Videos
 Students had a project where they had to create a video explaining anatomical terms. They then had to upload the video and share it with their classmates.

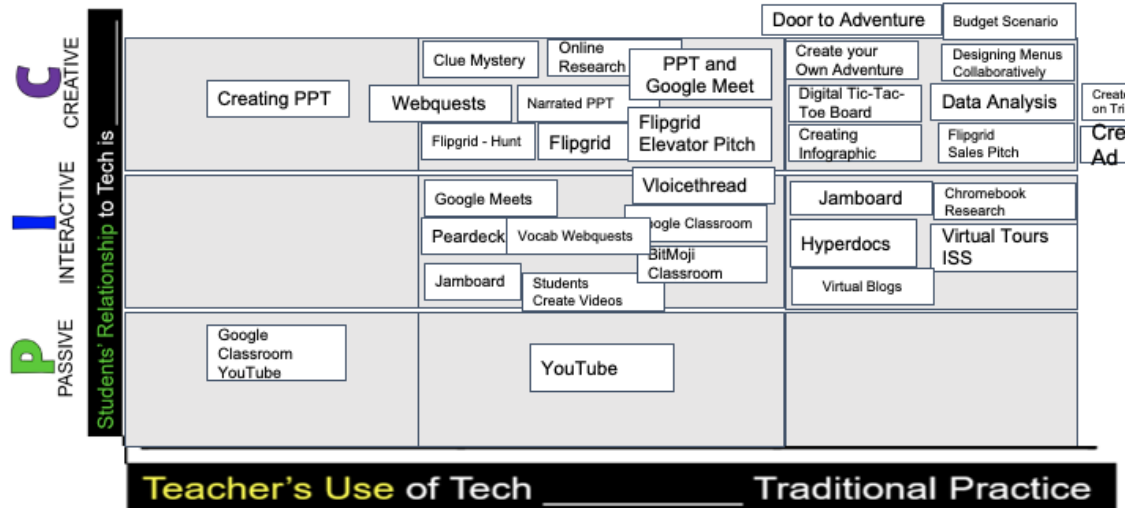


2.6



REPLACES **R** AMPLIFIES **A** TRANSFORMS **T**

META DATA Before PD



REPLACES **R** AMPLIFIES **A** TRANSFORMS **T**

META DATA After PD

APPENDIX K
Professional Development Session Transcript
Session 01 - June 29, 4:00 PM

- Don Heberer: I have you muted right now. I'm going to ask to unmute if you'd like to say hello.
- Participant #07...: Hi. How are you?
- Don Heberer: Good. How are you?
- Participant #07...: I'm doing well, thanks.
- Don Heberer: Great. Awesome. Well, thank you again for participating in this study. I know that I've sent a ton of surveys out and I know it's tough to get people on for a professional development session, especially the summer. So, I wanted to thank you for being part of it.
- Participant #07...: Of course.
- Don Heberer: We might have some other people join on as we go, but I don't think it's going to take the full hour.
- Participant #07...: Okay.
- Don Heberer: So just to let you know, full disclosure, I have your ... Your mic is on if you'd like it to be on, you can mute if you'd like. Your video is off, but I do have to record this for transcription purposes. You will get a copy of the transcript at the end to verify that if you did say anything that it is correct, but it's just part of the study.
- Participant #07...: Okay. No problem.
- Don Heberer: Okay, great. All right, so I'm going to go ahead and get started and if you have any questions, feel free to jump in.
- Participant #07...: Okay.
- Don Heberer: All right. So, this is the professional development session for the research study that I'm conducting here, and the first thing I wanted to kind of go over here is just the history of educational technology integration. So, when you look at education technology integration, there's been a lot of models over the years, various

ways of measuring educational technology implementation. Sometimes it's standards-based where it looks at the standards that have been either put forth from different states and curriculum, or there have been standards developed by different organizations like the International Society of Technology in Education known as ISTE. There have been other standards, the net standards originally that ISTE has now incorporated, there have been a ton of standards over the years.

Don Heberer: There's been shifts to do content-based education technology integration, where it focuses on depending on what content you're teaching, whether you're teaching social studies or you're doing math. You might do different standards as far as that goes. And then there are skills-based ones that focus on certain skills that they're asking students to learn. Some of the popular ones for that are the four Cs for collaboration, critical thinking, creativity, and communication and then there's also ones that are relationship-based. Based on the relationship between the student and the teacher, the student and the students, and also the school as a whole.

Don Heberer: When we're looking at different technology integration models, we have to kind of look at and evaluate them and one of the ways to evaluate them is through the six criteria for guiding questions and evaluating technology integration models. And this one here is Kuhn's model of evaluation, and it looks at a bunch of different ways that the models can be verified. Oops, I went too fast.

Don Heberer: So, the different criteria here are a clarity, is the model sufficiently simple, clear, and easy to understand with no hidden complexities? What about compatibility? Does the model complement or support existing educational technology practices deemed valuable to teachers? The fruitfulness. Does the model elicit fruitful thinking as teachers grapple with problems of technology integration? We also look at a technology role. Does the model treat technology integration as a means for achieving specific pedagogical or other benefits rather than as an end to itself? Is the model sufficiently parsimonious to ignore aspects of technology integration not useful to teachers, but sufficiently comprehensive to guide their practice? And then lastly, the student-focused. Does the model clearly emphasize students and student outcomes?

Don Heberer: So, if you look at this kind of chart here, this is a way to evaluate different models. And we're going to go through a couple of different models here, and then we're going to land on a specific model that we're going to really dive into. All right. So, one of the

models that's very popular, a lot of participants in here have already been familiar with it. A lot of teachers utilize this model or are aware of this model is the SAMR model.

Don Heberer: So, a lot of times, the first level of technology integration would be something like substitution. So, the technologies direct substitute with no functional change. Perfect example of this might be, "Okay, I used to do notes on the whiteboard or the chalkboard and now I have a fancy PowerPoint that showcases on the screen." So, it just substitutes the same type of pedagogical practice and then that is the functionality, they're really the same.

Don Heberer: Augmentation would be a little bit different. The technology acts as a direct substitute but with functional improvement. So, in addition to this would be, instead of the students maybe handwriting an essay or something like that, they would then type it up in a Microsoft Word document, let's just say. And the added functionality of that is not only is it a little bit neater and easier to read, but they can go back and edit and change things that they wouldn't be able to change on either a handwritten thing or even a typewriter thing. I know we don't do typewriter anymore, but that would be an example of an augmented lesson.

Don Heberer: Then modification would be something that allows for significant task redesign. So again, in a similar vein to what I just explained, maybe in this case, we're using Google Docs to write that paper. And because of that, we can share the document back and forth between the students. They can make comments, they can edit and do things like that.

Don Heberer: And then, the last piece here is redefinition, technology allows for the creation of new tasks previously unconceivable. So, a good one for this would be something like that without the technology, it could not be possible. So, something like right now, like Flipgrid is really popular. So, Flipgrid allows students to take videos and then post them and do video responses to teachers. Without that technology, it would be difficult, especially now during COVID, for the students to be able to communicate back and forth with the teachers. That would be an example of that. So, this is the SAMR model.

Participant #07...: Okay.

Don Heberer: Then look at TPACK. TPACK is focused on different ways that the content connects to each other. So, there's technology of pedagogical content. There is technology pedagogical knowledge

and there's technology content knowledge, and there's also pedagogical content knowledge. So, you look at these different areas and where they overlap and you look at when you design a lesson, you're designing it with the content in mind, you're designing with the technology in line, and you're designing with the pedagogy in line, and you really should design it where you're meeting all three of those different areas. So that is the TPACK. That's another popular model.

Don Heberer: Now one of the criticisms of these models are they don't really necessarily have some boundaries. Let's look at SAMR first. There are no boundaries between substitution and augmentation, and with fruitfulness, the distinctions may not be meaningful for practitioners. What does that mean? Well, that means that that doesn't really give you an idea. If it's just redefinition does that really explain how that is changing the lesson? It doesn't really kind of have a clear distinction.

Participant #07...: Oh, okay.

Don Heberer: And then with student focus student activities that are implied at each level, but are not explicit or inherent at each level. So, it's implied, but there's no really distinction between the student interaction and the teacher interaction.

Participant #07...: Okay.

Don Heberer: And then with TPACK, the boundaries are fuzzy, okay? So again, similar to that clarity before, and also if you look at some of these other things, the scope may be too comprehensive for teachers, and it doesn't really give them the context that they need for TPACK.

Participant #07...: Okay.

Don Heberer: So, we'll look at briefly some other models. These are some other popular models, Low T, TIM, TAM, TIP, and RAT. These are some of the other models that the Low T and the heat map model becoming one of the other popular ones, and the problem with a lot of these models or the shortcoming of a lot of these models as you'll see is the student-focused piece. The student-focused piece is missed in a lot of these technology models.

Don Heberer: So, what I'm going to focus on, and this is the purpose of this study, is we're going to be focusing on this new model that's relatively new. In the last couple years and especially in the last two years, it's becoming more and more popular. It is the PICRAT

model. So, we're going to watch a quick little video on the PICRAT model and it's going to explain what this model is, and then we'll look a little bit deeper into it.

Participant #07...:

Okay.

Video:

When new technologies are invented-

Don Heberer:

Actually, I'm going to go full screen if that's easier for us to do. You guys see the screen?

Participant #07...:

Yep.

Don Heberer:

Okay.

Video:

When new technologies are invented, they often provide many new ways of thinking and doing things. For example, how have smartphone has changed the way we-

Don Heberer:

Can you hear it?

Participant #07...:

I can hear it, but nothing is ... I can't see anything changing visually.

Don Heberer:

Oh, okay.

Participant #07...:

It's frozen.

Don Heberer:

How about now?

Video:

When new technologies are invented, they often-

Participant #07...:

No.

Video:

No, it's still not-

Participant #07...:

I was before.

Don Heberer:

Okay, when it was smaller you saw it?

Participant #07...:

Yeah. Yeah. It was fine. It was big enough. I can zoom in a little bit.

Don Heberer:

Okay. So, I'll go back to that then.

Video:

When new-

Participant #07...: Perfect.

Video: ... They often provide many new ways of thinking and doing things. For example, how have smartphones changed the way we live and work or tablets or even the internet? However, one problem we have as humans is that often we can't imagine very well the new possibilities available from new technologies. So instead, we use them just to do the same things we have always done before. Teachers struggle with this too. We often teach the way we were taught and struggle to think of how we could teach better based on the technologies we have that our teachers did not have. Richard Culatta, former director of the Office of Educational Technology for the US Department of Education shared the following concern.

Richard Culatta: Here's the issue. If we are not careful, if we are not super cautious about all the decisions we make, in a very short amount of time, by the time the freshmen that are in this room have graduated we will have a complete digital replica of the traditional practices that are not working today. And we will have everything that we have now, it will just be on a screen instead of on paper and it will be just as ineffective and it will cost a whole lot of money. And we'll be just as stuck as we will not have another ticket to play to be able to make a change.

Video: Our goal is to help you think critically about the technology you'll use in your classroom, and to begin to see the potential technology has to transform and engage students in the learning experience in new ways. To begin, we're going to show you a technology integration framework.

Video: Frameworks are tools we use to begin conversations. In this case, conversations about how we should use technology to improve student learning. Let me introduce the RAT model. The first letter R represents replacement. Replacement can mean the following. One, changes the appearance or dressing of our practices, but not the practice itself. Making digital copies of traditional practices, recycling instruction.

Video: Two, it doesn't affect teaching or learning practices and behaviors. Three, it can still be a useful use of technology because it can increase access. For example, a digital worksheet won't get lost or eaten by your dog, but it doesn't really impact or improve learning.

Video: The A in RAT equals amplifying. In other words, technology improves the efficiency of tasks or introduces new functions to

original tasks. The T in RAT equals transforming. It introduces new activities and learning that are impossible without technology. Take away the technology, take away the learning too.

Video: Next in our PICRAT model is the PIC portion. P equals passive. In other words, students are observers, bystanders in they're learning. The I equals interactive. Students engage in material in an interactive way. They are active learners. The C equals creative. Students are creating materials themselves. They are creative learners instead of passive or active ones. This is the apex of student engagement and students often learn deeper when they have to create something using the content.

Video: BY combining PIC and RAT together, we create a matrix of the many different ways technology can influence teaching and learning. You could use a technology that replaces a face-to-face conversation and where students are passive learners, such as a video lecture, or where they get to interact back through technology such as a video conversation. Or where they get to learn by creating their own videos in a way that completely transforms the way you typically teach.

Video: The PICRAT model is a great tool for helping you to think about your teaching and how you use technology in the classroom. None of the squares on the matrix is necessarily a bad way to teach. Sometimes it's good to be a passive learner, for example, and listen to others, such as in this video. But a good teacher will continually evaluate their practice and think how they can improve.

Video: Using the PICRAT model can help you think about what kinds of ways you could use technology that will help students be more active and creative as learners, and ways that transform your teaching to levels you hadn't considered before.

Video: So, when you hear about a new technology, don't just ask what it can do for you that you already are doing anyway. Think PICRAT and see if there's a way this technology can help you transform your teaching in positive ways.

Don Heberer: Okay. So, one of the things I think that a lot of times happens with technology when your school district might buy technology or having an initiative, you got to make sure that you're supporting the technology and you're not just dropping technology in and expecting it to change things, expecting it to be the silver bullet. I think we've all been there where that's happened in a lot of school

districts and they say, "Oh, we have this great thing." And no one does any PD or no one shows them how to use it.

Don Heberer: So, I think that's really important when you look at these models. So, let's look at the PICRAT model in-depth, and this is actually what this whole study is about. I purposely didn't really mention it too much before because I want her to get reactions that were pure without even talking about PICRAT, but now this is the PD. We're introducing the PICRAT model.

Don Heberer: So, when we look at the first thing, we look at the X-axis her. The teacher's use of the tech, what it does with the traditional practice. So, does it replace the normal activity? So, like we said before now instead of using overhead transparencies, you have a PowerPoint or something like that, or the kids, instead of writing or whatever, now they're maybe typing something. That might even be amplified because you can edit it a little bit easier.

Don Heberer: But you then can see the different ways of that kind of moves along that axis. So, you have the replaces, amplifies, and transforms. So, then you look at the student relationship. You have the way that the student interacts. Is it passive, interactive, or creative? So, the first one, again, is the teacher's use of technology, the pedagogy behind it. And then the other one is the student's relationship and how they're interacting with technology. And you put this on a nine-box matrix called the PICRAT model.

Don Heberer: And again, if we wanted to just look again, the PIC part is passive. Students are observers, bystanders in the learning. Interactive, the students engage in an interactive way. They're active learners, and then creativity, the students are actually creating things themselves. And then the traditional practices, again, replacing the dressings, but not really changing the practice itself. Amplifying is where the technology improves the efficiency of tasks or introduces new functions and transforming is new activities and learning that was not possible without technology. A good way to look at this one is, take away the technology, you take away the learning too.

Don Heberer: So, ways you can figure out, "Well, sometimes what's the difference?" If you look at this flow chart, you can see given a particular classroom uses technology replacement, are the achieved learning activities clearly better than what have been without the technology or with a lower tech solution? If the answer is no, it's a replacement. But if the answer is yes, the activities are clearly better. Then you move over to the next diamond here. And it says, could the activity have reasonably been done without the

technology or a lower tech solution? I.E. Index cards or chalkboards.

Don Heberer: If the activity could have been done without those things, it would be amplification, but if it could not be done, if the only way to do it is with the technology, then you're on the transformation camp. So that's how you determine where you're moving on the RAT part of the matrix. But let's talk about the PIC part of the matrix. So, you look at how the students are interacting with technology. If you look at this first picture here, you notice that the content, the gear here, right?

Participant #07...: Yep.

Don Heberer: [inaudible 00:18:09] going to the teacher and there's no two-way street. If you look at the interactive piece, the students and the teacher have interactivity back and forth. So, the teacher and the student are collaborating, they're going back and forth. And then the creative piece, not only does the teacher and the student go back and forth, but there's a product at the end. There's something that is created and synthesized from that interaction.

Participant #07...: Okay.

Don Heberer: Let's see how that all shakes out. So, I'm going to go through some examples that people here have provided. Some of these may be yours [inaudible 00:18:44] may be [inaudible 00:18:46], but we just wanted to kind of see an application of putting it on the PICRAT matrix. So, here's some that people that have done and I'm not going to necessarily go through all of them, but these are actually participants from actual responses here.

Don Heberer: So, we looked at different things and we applied the PICRAT matrix to these different examples. So Screencastify was one of them. Those were ways to take a normal lesson and turn it into a video. That could be a replacement in some cases but a lot of people who and especially this, they said that they not only ... They were able to record themselves, but also record their screen and that's an amplified way of looking at it because you wouldn't necessarily be able to do both as easily in a classroom setting.

Don Heberer: Now, of course, this disclaimer with all of this stuff is this is all happening during the COVID outbreak. So, a lot of people jumped into some different technologies they may have not have used previously. Edpuzzle, Edpuzzle's a great ... It's a video tool. It lets you take a video and lets you add questions to it and lets the

students watch it again and stop. So, there's definitely an interactive component to that. Whereas, just watching the video might be more of a passive experience.

Don Heberer: And then we have VoiceThread, which is a way to do discussions via video or audio and that's what this teacher used. And that would be more of a creative thing because the students get to create some type of content. They can upload their slides, they can voice them over, they can narrate, or they can even create a video with it. So that has that creative component.

Don Heberer: So, we look at some of these other ones, some people wrote more than others. So obviously, I did the best to apply the PICRAT matrix to this. Google Forms, Google Classroom, Google Meet. Again, we're looking at some of the same things, Google Classroom or Edpuzzle. Doing online research, in some cases, the data analysis from this one was actually interesting, you wouldn't necessarily think that data analysis at the surface value would be necessarily creative and transformative. But if you look at the way that they were able to, in this case, students researched the levels for the selective plants. The plants were bred to different levels and they shared the data and they created a poster and they did a real analysis. Without the technology, without the ability to research that information and the technology to create the posters that would not be possible.

Don Heberer: So, it's definitely a transformation and it's definitely a creative piece because the students are creating something. They're walking away with a product. In this case, it's a poster or a report of what they accomplished. So, again, have a lot of different examples here and you see how they've mapped out on the PICRAT matrix here.

Don Heberer: So Nearpod's another good one that is interactive. The students definitely can be interactive with that and it definitely transforms the learning. Again, just keep mapping these things to the PICRAT. Again, I'm going to go fast here just to show you how we map these different things and we look at how they fall on the PICRAT matrix.

Don Heberer: And then this is kind of the meta map of everything and how everyone who participated, our 12 participants, what they put in here and we see where it falls. A good majority of them fell within the interactive amplifies camp, but we did get a good cross-section. We did get some in every kind of category, which is good and there's no real wrong way to necessarily do this. Just because you have a replacive passive doesn't mean it's a bad activity or a bad

lesson. However, we want to look in technology integration. The whole purpose of using the technology is not just to use it for the sake of using it, right? The sake of using it is to have an additional outcome, a better outcome. Whether it's improving the learning outcome or improving the efficiency, or the engagement, or the student motivation, or anything like that.

Don Heberer: So, we generally find that activities that are further along on the matrix, either higher up on the matrix in the PIC area or further to the right in the RAT area definitely have more value in how the students are learning and stuff. And you look at engagement, and the students are more engaged the further along on the RAT model and PIC part, they're on the matrix. So, the higher engagement that definitely translates to higher learning outcomes and in turn, it could be a higher achievement for the students.

Participant #07...: Okay.

Don Heberer: So just going to do a brief little quiz here just to see where we're at and what you guys think, and our participant number six you're muted. If you'd like to unmute, you're welcome to unmute your mic and participate in this. Please keep your video off for anonymity. So, the PICRAT quiz. So, let's start with this. A teacher uses PowerPoint as part of her lecture, where do we think that might fall on the matrix?

Participant #07...: It's definitely just replacing as far as the teacher, right? And then it's passive.

Don Heberer: Right. So yes, the teacher's just replacing their notes with the PowerPoint and it's passive because the students are not interacting with it. So that would be PR, that would be that for the first one. So, for the second one, students are asked to keep an online journal or blog. Where do you think that one would fall?

Participant #07...: It's definitely creative on the student end.

Participant #12...: Right.

Participant #07...: And [crosstalk 00:25:15].

Participant #12...: [inaudible 00:25:16].

Participant #07...: Yeah.

Don Heberer: I'm sorry, say that again?

Participant #12...: Replacements and creative?

Don Heberer: Yeah. So, I would agree. I would say, yeah, it's creative and its replacements. So yes, you are correct. Let's pick another one. Let's just pick on another random one. Number five. Students write answers to math problems on an interactive whiteboard.

Participant #12...: That's interactive.

Don Heberer: Well, yeah, because it's in the name, right?

Participant #12...: Mm-hmm (affirmative).

Participant #07...: Yeah.

Don Heberer: All right. So then where is it falling on the RAT part of the matrix?

Participant #07...: Just replacing, right?

Don Heberer: Right. So that would be another replacing. All right, so let's do another one here. Let's do number eight. Students make an animated video to tell a story.

Participant #12...: Oh, that's creative and-

Participant #07...: [inaudible 00:26:01]. Probably transforms.

Participant #12...: [inaudible 00:26:04]. Can it be both?

Participant #07...: Yeah.

Don Heberer: Yeah. So, I mean, I'm going off the person who made this model, this is their answer key. They say it's either amplified or transformative, but it's both. It's creative either way. So, it's either CA or CT. It really would depend, I guess, if technically the student could make an animated video in a bunch of different ways, but I would think it's more of transformative but it could actually be amplified as well. All right. Let's do one last one. Let's do number nine. A teacher designs, a WebQuest for students to complete.

Participant #12...: Interactive and it's [inaudible 00:26:56]. So, I would say transform.

Don Heberer: Again. Similar to the other one we're going to accept either interactive, amplified, or interactive transformed.

- Participant #12...: Okay.
- Don Heberer: Again, some of these lines are blurred. I mean, it really depends on some of the implementation, but I feel like sometimes the PIC part is easier to determine than the RAT part.
- Participant #12...: Yeah. I have the same issue. The PIC is easy for me, but the RAT I'm like ...
- Don Heberer: So, all right. So then again, well, how can you, as an educator begin to implement PICRAT? Well, you can use these different tools to help you. So, the RAT piece, if you go with this flow chart, are the achieved learning outcomes clearly better than they would have been without the technology or a lower tech solution? That can help you determine, "All right, replacement." Okay?
- Participant #12...: Mm-hmm (affirmative).
- Don Heberer: So, the answer's no, it's replacement. Obviously, you're using technology. Minimum, you're doing replacement. Okay?
- Participant #12...: Mm-hmm (affirmative).
- Don Heberer: But if the activities are clearly better than they would have been without the technology, then you're at least amplification or transformation. So, the determination between amplification and transformation is, could the activity have reasonably been done without the technology or via a lower tech solution.
- Don Heberer: Reasonably is somewhat subjective and that's where I think we find the issue with sometimes going to amplification or transformation when we're looking at the PICRAT model. Because reasonably for you could be reasonably different for somebody else. So, I think that is the ... And that's why it's the teacher's traditional practice, right? So, you got to think, the traditional practice of a teacher, the pedagogy is kind of what we're looking at.
- Don Heberer: And then, like we said, the student's relationship. It's easier to determine whether something's passive, interactive, or creative. And that's some of the ways that educators can look to potentially implement the technology.
- Don Heberer: So, the last piece, and I'm going to pause here for questions. But the last piece is I'm going to have you guys fill out a post-survey for this PD session, just to kind of see, you know, we measured

some of your thoughts on professional development and technology integration. Now we want to measure some of your thoughts on that as well, but specifically the PICRAT model.

Don Heberer: And then just to let you know what's going to happen after this is similar to how you've submitted your lesson examples and activities that you've done previously. Now you're going to submit three more that you're going to design potentially with PICRAT in mind.

Don Heberer: So, that's what is going to be the last phase of this study is doing this post-survey and then designing new lessons that normally in a situation you would actually implement these lessons, but with COVID and everything else going on it's more of what you would implement in the future.

Don Heberer: So that is what our next steps is. Do we have questions on PICRAT or professional development in general, or anything educational technology-related?

Participant #07...: No, that was pretty straightforward.

Participant #12...: Yeah. That was great.

Don Heberer: At this point, I'm going to stop the recording.

Participant #12...: Okay.

Don Heberer: So, I'm going to hit stop share, and stop recording.

APPENDIX L
Professional Development Session Transcript
Session 02 - June 29, 8:00 PM

- Don Heberer: Okay. Great. So, first off, can you guys see the screen that I'm sharing here?
- All: Yes.
- Don Heberer: First of all, I want to thank everybody for participating in this study. I know this is probably one of the worst times to ask people for anything extra in probably in the history of education or at least in recent times. So, I do thank you all of you guys for participating in the study, filling out my surveys and participating in this workshop today. So, thank you for that.
- Don Heberer: We're probably not going to go the full hour but I definitely wanted to have time just in case. We're just going to go through some brief, a couple of slides from my professional development and then kind of get into the meat of what this study is about. I've purposely kept you guys in the dark a little bit and you kind of probably have a little idea where it's going, but that's kind of the purpose of the study.
- Don Heberer: So, at any point you guys are unmuted so you can ask questions or stop me or anything like that. I will mention it is being recorded because I have to provide a transcript to the university. But before it's published, you'll have the opportunity to review the transcript. And if there's anything you'd like to correct or strike from the record or anything like that, you'll be able to do so.
- Don Heberer: So, let me get started. So, this is a professional development session for my research study. My research study is on teacher perceptions and instructional practice with the PICRAT model. If you don't know the PICRAT model, that's fine. You're going to learn a little bit better right now at this professional development session.
- Don Heberer: So, what I'm going to do is, I'm going to just go through a little bit of slides here just to kind of set the table. The first thing here is just talking a little bit about the history of educational technology integration in particular, the way that we've tried to over the years develop models or standards based to it. So, with technology integration obviously, it's been around since education has existed. Back in the day, technology was a chalkboard, that was new technology at one point.

Don Heberer: Obviously technology, over the years has developed mostly into electronic-based technology, which we've probably come to know and love especially lately this year. And over the years, there's been attempts to try to quantify or measure or evaluate the implementation of educational technology. So, there's been other attempts to go standards-based where organizations have developed certain standards and criteria to meet. Probably some of the most popular ones for that have been ISTE Standards, the International Society of Technology in Education, they used the net standards for a while and now they've been renamed ISTE Standards.

Don Heberer: Other organizations have gone through content-based standards for technology integration. So, in those situations, if you're a social studies teacher, you might have different technology integration standards as someone who is in world languages or math or something like that. There's also been skills-based technology integration models, where they focus specifically on skills that students should learn. One of the most notable of that would be recently the four Cs, which are kind of like the updated version of the three Rs.

Don Heberer: So, the four Cs would be communication, creativity, collaboration, and critical thinking.

Don Heberer: So, the next piece I want to just talk about here is, how we're looking at six criteria for guiding questions for evaluating technology models. So, Khan developed six criteria for evaluating different technology models. And we're going to look at a couple really quick before we dive in to PICRAT. So, the first piece that we want to kind of look at here for criteria is, the clarity piece. So, is the model sufficiently simple, clear and easy to understand with no hidden complexities? So, is it easy to just kind of look at and kind of get it off the bat, so to speak?

Don Heberer: The other piece we wanted to kind of look at is compatibility. So, does the model compliment or support existing educational practices being valuable to teachers? So, not like you're going to change your entire way of teaching, you're not going to throw out everything you know or learn is it's compatible with what already exists for your teaching practice. Then, we look at something called fruitfulness. That is the model, this fruitful thinking as teachers grapple with problems of education, it's knowledge integration.

Don Heberer: Obviously, not everything works right away, right? Not everything is just plug and play as they say when you click a button and it just works. So, that's something that we want to look at when we look at educational technology models for integration. Then obviously, we look at the technology role. Does the model treat integration as a means for achieving a specific pedagogical benefit rather than in itself? We're not using technology just to check off a box that we use technology or we're not trying to fit the technology in a situation where it may not make sense.

Don Heberer: The other piece we want to look at is the scope. Does the model, is it kind of wide enough to ignore aspects of technology integration, not just for teachers, but also is it efficient enough to guide them in their practice? So, is it specific enough, but also wide enough to where it can kind of be adaptable? The other part here is, last piece is the student focus. And this is the one I wanted to kind of hone in on, I think, and I think it's potentially the most important.

Don Heberer: Does the model clearly amplify the students and the student outcomes? So, that's what we're going to kind of look at when we look at some of these models, that Khan model of evaluation. So, this is a model that I think many of you are familiar with. It's one of the more popular models, this is called the SAMR model. And it's been around almost about 14 years now. It's the Substitution, Augmentation, Modification and Redefinition model. So, when you're looking at implementing technology, you want to look and see what level in this model what you're at.

Don Heberer: So, a lot of times, the first level of technology integration would be something like substitution. So, the technologies direct substitute with no functional change. Perfect example of this might be, "Okay, I used to do notes on the whiteboard or the chalkboard and now I have a fancy PowerPoint that showcases on the screen." So, it just substitutes the same type of pedagogical practice and then that is the functionality, they're really the same.

Don Heberer: Augmentation would be a little bit different. The technology acts as a direct substitute but with functional improvement. So, in addition to this would be, instead of the students maybe handwriting an essay or something like that, they would then type it up in a Microsoft Word document, let's just say. And the added functionality of that is not only is it a little bit neater and easier to read, but they can go back and edit and change things that they wouldn't be able to change on either a handwritten thing or even a typewriter thing. I know we don't do typewriter anymore, but that would be an example of an augmented lesson.

Don Heberer: Then modification would be something that allows for significant task redesign. So again, in a similar vein to what I just explained, maybe in this case, we're using Google Docs to write that paper. And because of that, we can share the document back and forth between the students. They can make comments, they can edit and do things like that.

Don Heberer: And then, the last piece here is redefinition, technology allows for the creation of new tasks previously unconceivable. So, a good one for this would be something like that without the technology, it could not be possible. So, something like right now, like Flipgrid is really popular. So, Flipgrid allows students to take videos and then post them and do video responses to teachers. Without that technology, it would be difficult, especially now during COVID, for the students to be able to communicate back and forth with the teachers. That would be an example of that.

Don Heberer: So, this is the SAMR model. But there's other models out there too that are popular TPACK is one of them. TPACK, your Venn diagram aficionado, this would be something you might like the way it looks because it does a Venn diagram where it looks at these different context here, the technological pedagogical context. So, it looks at the technological content knowledge context, the technological pedagogical knowledge and the pedagogical content knowledge.

Don Heberer: Well, what does all that mean? Well, if you look at each circle individually, you have technological knowledge, you have pedagogical knowledge and content knowledge. Content knowledge is knowing your content area. Pedagogical knowledge is knowing how to teach or how to effectively communicate that or teach that. And the technology piece is knowing the technology. And you want to look where the three of those really intersect in that middle kind of dark green section. And that's really what the TPACK is. You should be looking at ways that you can overlap all three of these paradigms into one way to implement the technology.

Don Heberer: But there's some issues with these models. So, there's issues with SAMR and again, using Khan's way to evaluate, you look at the clarity of SAMR, the level of boundaries is unclear. Substitution versus argumentation. It's a little difficult to see where one ends and the other one begins. SAMR doesn't really talk about the student focus. It implies it, but it doesn't specifically mention student focus and what the students are doing. It focuses on what

the teacher is doing with the lesson, but it doesn't take in effect the cap, the way the students are using the technology.

Don Heberer: And TPACK, TPACK although it's popular, it has some other issues. The distinctions may not be a period of variable by hierarchy so looking at the pack part of it versus the TPACK part of it, it's a little difficult to see where everything kind of falls. And it may be a little too confusing or too comprehensive for some teachers. So, that's where some of the disadvantages of the TPACK model come into play.

Don Heberer: So, there are other models out there and you may have heard of these before. We're not going to go super deep into them. I just want to reference them. The low T of heat model as depicted here in this picture in the top right corner, you utilize this hierarchy thinking, engaged learning, technology use and authentic connections. The technology integration matrix and the TAM, the TIP and the RAT models are also viable models that people have used within the last decade or so.

Don Heberer: But the problem with these models, as I've been saying is, they don't really focus too much on students. So low T, too many levels are provided on a single access and it's difficult and teachers may not agree where they fall within that model. Similar to the same issue that TPACK has. And then the RAT model, the problem with the standalone RAT model is transformation can be difficult to understand. And then, the student again is implied, but not explicitly mentioned. And that all this history brings us to where we're at now, this new model called the PICRAT model.

Don Heberer: And the PICRAT model basically takes the RAT model and expands upon it in an interesting way. So, at this point, I'm going to just play a video. It's a four-minute video that explains the RAT model. This model has been developed by Royce Kimmons and it's been around about four years now.

Video: When new technologies are invented, they often provide many new ways of thinking and doing things. For example, how have smartphones changed the way we live and work or tablets or even the internet? However, one problem we have as humans is that often we can't imagine very well the new possibilities available from new technologies. So instead, we use them just to do the same things we have always done before. Teachers struggle with this too. We often teach the way we were taught and struggle to think of how we could teach better based on the technologies we have that our teachers did not have.

- Video: Richard Culotta, former Director of the Office of Educational Technology for the US Department of Education shared the following concern.
- Richard Culotta: Here is the issue, if we are not careful, if we are not super cautious about all the decisions we make in a very short amount of time, by the time the freshmen that are in this room have graduated, we will have a complete digital replica of the traditional practices that are not working today. We will have everything that we have now. It will just be on a screen instead of on paper and it will be just as ineffective and it will cost a whole lot of money. It will be just as stuck as we will and not have another ticket to play to be able to make [inaudible 00:14:28].
- Video: Our goal is to help you think critically about the technology you'll use in your classroom. And to begin to see the potential technology has to transform and engage students in the learning experience in new ways. To begin, we're going to show you a technology integration framework.
- Video: Frameworks are tools we use to begin conversations. In this case, conversations about how we should use technology to improve student learning. Let me introduce the RAT model. The first letter R represents replacement. Replacement can mean the following. One, changes the appearance or dressing of our practices but not the practice itself, making digital copies of traditional practices, recycling instruction.
- Video: Two, it doesn't affect teaching or learning practices and behaviors. Three, it can still be a useful use of technology because it can increase access. For example, a digital worksheet won't get lost or eaten by your dog, but it doesn't really impact or improve learning. The A in RAT equals amplifying. In other words, technology improves the efficiency of tasks or introduces new functions to original tasks. The T in RAT equals transforming. It introduces new activities and learning that are impossible without technology. Take away the technology, take away the learning too.
- Video: Next in our PICRAT model is the PIC portion. P equals passive. In other words, students are observers, bystanders in their learning. The I equal interactive. Students engage in material in an interactive way. They are active learners. The C equals creative. Students are creating materials themselves. They are creative learners instead of passive or active ones. This is the apex of student engagement and students often learn deeper when they have to create something using the content.

- Video: By combining PIC and RAT together, we create a matrix of the many different way's technology can influence teaching and learning. You could use a technology that replaces a face-to-face conversation and where students are passive learners, such as a video lecture, or where they get to interact back through technology, which is a video conversation or where they get to learn by creating their own videos in a way that completely transforms the way you typically teach.
- Video: The PICRAT model is a great tool for helping you to think about your teaching and how you use technology in the classroom. None of the squares on the matrix is necessarily a bad way to teach. Sometimes, it's good to be a passive learner, for example, and listen to others such as in this video. But a good teacher will continually evaluate their practice and think how they can improve. Using the PICRAT model can help you think about what kinds of ways you could use technology that will help students be more active and creative as learners and ways that transform your teaching, the levels you hadn't considered before.
- Video: When you hear about a new technology, don't just ask what it can do for you that you already are doing anyway, think PICRAT and see if there's a way this technology can help you transform your teaching in positive ways.
- Don Heberer: So, we take a quicker, a closer look at the PICRAT model. We look at two different axes that they have here. So, we look at the X axis on the bottom there, is the teacher's use of technology and how it relates to traditional practice. So, does it replace the traditional practice? Does it amplify the traditional practice or does it transform the traditional practice? And then, you look at the Y axis the up and down, the student's relationship to the tech. Is the student passive in that interaction? Are they doing in an interactive way or are they being creative?
- Don Heberer: And this is what I think is just really interesting about the PICRAT model. And this is our working definition. So, passive would be in the PIC part of this. Students are the observers, bystanders of learning, like just watching a video. Students could be interactive where they engage the material interactive way, and then creative, where students are actually making them, creating themselves.
- Don Heberer: So, that's how they measure the students. And then, measuring the teachers use is all about the replacement. Again, the replacement piece is it doesn't really change anything, it just uses technology in place of the traditional practice. Amplifying improves the

efficiency or introduces new functions and transforming is something where if you took away the technology, you couldn't do that learning. The learning take away the technology, the learning is taken away too.

Don Heberer: And here's how we determine what, this is a handy dandy flowchart that kind of goes through how this would work. So, if you're trying to figure out the RAT part of the model, you look at a particular classroom use of technology, and it's not just the technology itself, it's kind of how the technology is used. You could use it the technology in a passive way, you can use the same technology in a creative way depending on the technology.

Don Heberer: So, are the achieved learning outcomes of the activity clearly better than they would have been without the technology or a lower tech solution? If you answer no, then it's just a replacement. If the learning outcomes are no better by using technology, we're not using technology, you're going to be in a replacement situation. If you've answered yes, we shift over to the one over here and it says, "Could the activity have reasonably been done without the technology or via a lower tech solution?" Examples, index cards or chalkboard.

Don Heberer: So, the answer is yes, it could have been done reasonably, it's amplification. If it could not be done with a lower tech solution, it's transformation. And one of the keywords there is that reasonably. Reasonably is somewhat subjective depending on how you feel what is reasonable. So, what you think is reasonable might be a little different than what someone else feels are reasonable. And that's why sometimes amplification, transformation, there's a little bit of overlap there, which we'll talk about.

Don Heberer: And then, you look at the PIC part of it, so passive. I think it's easier to determine the PIC of this than the RAT, but the passive is just when the content is the gear in this little picture here. The content is given by the teacher, the students just kind of listen and observe. Where interactive, there's back and forth between the teacher and the student, and then creativity, there's back and forth between the teacher and the student. And then at the end, there's a product so there is some type of tangible thing that's created in the creative piece.

Don Heberer: So, let's look at some examples that we got from our survey and see where they kind of fall on the PICRAT model. And these are actual responses from our survey. We've removed the names. These people have submitted for this study and we've mapped

them to the PICRAT model. So, in this case, there was Screencastify, there was Edpuzzle and there was VoiceThread. Now Screencastify, you may say, well, that's just a video. Why wouldn't that just be a replaces? In this case, the students were listening and using a practice exam with multiple choice so they weren't interacting in this context as well.

Don Heberer: You look at Edpuzzle, If you're not familiar with Edpuzzle, and you like to take any video and have it paused and ask questions, it allows you to add other pieces too. It allows students to follow and answer questions. So, that would be a video that you take and you make interactive. And then VoiceThread, students get to create. They get to create either a video or audio file that would allow them to do their speaking task in this case. Clearly, this was World Languages.

Don Heberer: So, here's some other examples here and some people wrote more than others and we did the best we can to map this to PICRAT. So, in this case, they use Google Forms to take an online quiz. You use Google Classroom to do assignments and Google Meet to teleconference with the students. And obviously, Google Meet would be something that would replace a classroom instruction, it'll be interactive because there's a two-way conversation going on there, it's not just the video. But the students are not really creating anything so therefore, that would fall in the replaces interactive piece.

Don Heberer: And I'm not going to go through all these, I'm just going to show a couple more examples. We can just kind of run through some here. This one is interesting because this one had Flipgrid in there and Flipgrid is a perfect example of something that would be a CT, would be creative transforms. If you're not familiar with Flipgrid again, it's something where you can make a video prompt and send it out to your students and students can then record short little video clip and send it back to you. It's a great way for them to create content and then they can add little stickers and little text boxes and a bunch of different things to it. And then you can share that out with other students. So Flipgrid would be a great example of a CT.

Don Heberer: Again, we're going through some of these. Obviously, if you're doing something with creating video, that would be a good example of a CT like iMovie, YouTube. Let's keep going here. I'm just going to go to the last slide. I'm going to share this with you guys at the end too so you can look at it.

- Participant #02...: Thank you.
- Don Heberer: So, this is kind of the metadata here. This is everybody's responses mapped on the PICRAT model. We did get a good cross section, we did get some type of representation, all the [inaudible 00:24:35] out of 12 participants and of all the responses here. And it did look like we gravitated heavily towards the center which is great. And then, we did have some in the passive replaces section and we had some in the CT section and some in the creative lines and a little bit all over the place. And this is kind of how it mapped out based on the PICRAT model and the evaluation tool to evaluate your technology integration.
- Don Heberer: So, I guess the question is, when you're looking at PICRAT, you can use PICRAT as a planning tool and say, "Listen, I'm looking at how I'm using technology currently." And you could say, "Well, hmm, what tweaks can I make to get into a higher level? Maybe it's interactive right now and I want to make it more creative or maybe it's just an amplification and I want to make it a transformation." You can use that as a planning tool, which is great or almost like a reflective tool. You can kind of see where you're at and then use that to plan going forward.
- Don Heberer: So, it could be an evaluation, it could be a reflection tool, it could be a planning tool. It really could be any way you want to look at it when you're implementing technology and I think that's the flexibility of this model. So, we're going to do a little quiz here. We're not going to go through every single one, but this is the interactive part. So, moving up on the PICRAT model already. If you guys let's look at number one, this is the softball.
- Don Heberer: So, a teacher uses PowerPoint as part of her lecture. What do you think that would fall?
- Participant #02...: Passive.
- Don Heberer: Definitely passive and where would that fall on the RAT part?
- Participant #05...: Just replaces.
- Don Heberer: Right, exactly. All right, let's look at another one. Students play an online role-playing game about John Smith and Pocahontas.
- Participant #05...: Depends whether or not they're actually doing something or just reading.

- Participant #02...: Or the interactive [crosstalk 00:27:35].
- Participant #08...: Are they in teams, are they playing in teams? Are they playing individually? We don't know, it doesn't matter.
- Don Heberer: These are good questions you guys are asking. So yeah, I mean, I think it does matter, right? So, I think let's say they're playing the game, so they're playing an online role-playing game. So, it is like a video game on the computer, let's just say, right? So, what would that be?
- Participant #02...: So, it's definitely interactive.
- Participant #08...: Definitely interactive.
- Don Heberer: Okay. So, we agree it's interactive. Would we think that replaces, amplifies, transforms?
- Participant #05...: Depends what they have to do it, it might just replace it but it might amplify.
- Don Heberer: Right. So, the acceptable answers in this one was either replaces or amplifies. All right. So. Let's just do number eight. Students make an animated video to tell a story.
- Participant #05...: CT.
- Don Heberer: So that's either CA or CT. And that's pretty good. So, let's just do one more. So, number six, let's get some math in there. Students organized geometric shapes and patterns on an iPad.
- Participant #02...: That's interactive on the I part and that would be replacing as well because it's basically something they could do.
- Don Heberer: So yeah, if you physically had pictures of geometric figures, they could do that in person. So, the technology just replaces it because it's on an iPad. Exactly. All right. So, you guys clearly, I think kind of get the gist of this. Just again, how can we, as educators begin to implement PICRAT? And I'm bringing up this chart again. When you're looking at the RAT piece of it, you want to look at this flowchart that's going to help you decide replacement, amplification and transformation. And then obviously, you want to look at, I think it's much easier to determine passive interactive for creativity.
- Participant #02...: Yeah, definitely.

- Don Heberer: It's pretty straight forward but again, you want to make sure passive is just the students are just kind of observing, watching. Interactive, they are involved in some way and creative there, they're actually creating something tangible or some type of product at the end. All right. So, I'm going to pause for any questions that we might have about the PICRAT model or technology integration models as a whole. Do we have any specific questions?
- Participant #08...: I like this model. I like it because it makes you think about how you can really try to take each topic or each piece of what you're trying to teach and kind of bring it to a new level. It's clearer in terms of the instructional purpose.
- Participant #02...: Yeah. I completely agree with that. I think that matrix really shows you okay, it reminds me of like Bloom's taxonomy [crosstalk 00:00:30:38]. It's just like you know how you can kind of hit that higher level learning if you look at this matrix, as opposed to the ones that we looked at earlier.
- Participant #05...: You can see what you need to do more clearly as the teacher. Whereas if you're looking at the SAMR model you can go, "Yep, I should be there," but here you can say, "Oh, if I just move it from passive to active, I'm actually moving over. If I'm moving from the P to I or the I to C," I mean, you can see what your goal needs to be.
- Participant #02...: I think it makes you be really cognizant too of your role and the student's role as well. So, I feel like a lot of those other models were almost more like teacher-centered or teacher-driven and this seems more like it takes into account the role of the student. And I think that's really helpful as well.
- Don Heberer: Okay, great.
- Participant #02...: Everything's done. I like it.
- Don Heberer: So sorry, just to explain the next steps is, this is the professional development intervention. They call it interventions. That's just what they call it in research. So, the next step part I'm going to ask you guys is to fill out a post survey, I'm going to email it to you. It's also in the presentation, which I'm also going to email you. Any follow-up questions similar to that first survey you filled out, just to measure teacher perceptions of technology integration models in particular, the PICRAT model. And then, the next piece is going to ask you similar to how you gave three lesson examples

prior to PICRAT introduction. You're now going to give three lesson examples after PICRAT introduction.

Don Heberer: Now in a perfect world, you would have been able to implement this with your students and actually do real lessons and things like that. This is going to be more as a hypothetical or a planning or how you're going to maybe modify or adapt lessons. And then we could see how measure the difference between the two. So, that's where we're going forward with the study. So right now, I'm going to give you the post survey. And in a couple days, I'm going to give you the survey to fill out to provide those three other examples.

Don Heberer: And then, most of you will be done with that. A couple of people, depending on the results may be asked to do a brief follow-up survey to ask additional questions. So, that's where we're at with this study. I'm going to stop recording right now. Hold on one second.

APPENDIX M
Professional Development Session Transcript
Session 03 – July 1, 6:00 PM

- Don Heberer: All right. Well, thanks for joining us tonight. Thanks for being part of the study, first of all. I know it is probably the worst time in the world to ask any teacher to do anything extra right now, so I do appreciate it. My name's Don, and I'm going to be doing the PD for this research study right now. At this point, you've done your survey, and you've provided some lesson examples or lesson activity examples. Now we're going to do a professional development session. Should be anywhere from a half-hour to 40 minutes. Then, we'll talk about the next steps are.
- Don Heberer: We have another participate in here. We have actually two participants. So, if you guys, you can just say hello to each other.
- Participant #11...: Hello.
- Don Heberer: You can unmute your mics.
- Participant #10...: Hello.
- Participant #11...: Hi.
- Don Heberer: We just kept your names out of this and your video out of it just to protect everyone. It's confidentiality in the study. But I just want to make sure, can you guys see my screen, the presentation? I'm just going to advance the slide just to see if you guys can see it.
- Participant #11...: Yes.
- Don Heberer: Can you see that?
- Participant #11...: Yeah.
- Participant #10...: Yes, we can see it.
- Don Heberer: Okay, perfect. All right. What I'm going to do is I'm going to get started here. This study is measuring teacher perceptions and instructional practice using the PICRAT model. We're going to learn about the PICRAT model in this PD. So, if you don't know the PICRAT model, that's fine. You're not necessarily supposed to. We're going to go over a little bit of the different education technology models and kind of set the stage. Then, we'll go deep into the PICRAT model and we'll look at some examples and then

talk about how you might want to apply the PICRAT when you're doing lesson planning or instruction with your students.

Don Heberer: All right. Some basics here of how education technology has been around since, really, the beginning of education. At one point, using a chalkboard was technology. I know nowadays in our modern mindset we think of technology as electronics, something with electricity. Nowadays, it's a lot of computers or it's software, things like that. But, even 100 years ago, technology was a chalkboard. It was something that was new in education, and it revolutionized for the time instruction.

Don Heberer: Obviously, since then we've advanced in a lot of different ways, and there's been efforts to look at technology and try to measure or evaluate how technology is integrated into curriculum or into the classroom. There've been attempts over the year for standards-based models that try to measure or evaluate educational technology. The most prominent one of those would be the NET standards, now recently renamed the ISTE standards. That's from the International Society of Technology and Education. They've gone with a standards-based approach. Our New York state has gone with a standards-based approach when it comes to content standards, but there are some technology standards infused in those next generation learning standards. There are content-based standards that are for technology. For instance, if you look at ... There are no set standards for just science or just math. It's all under math, science, and technology. So, those are ways you can look at this.

Don Heberer: There's also been a trend to shift towards skill-based standards. So, if you look at something like ... You've heard of the three Rs of education, reading, reading, arithmetic. There's the four Cs of 21st century learning. Those are communication, creativity, collaboration, and critical thinking. There have been ways to focus on skill-based. There also have been some models that focus on relationship-based technology integration. So, what is the relationship between the technology, and the content, and the pedagogy behind it?

Don Heberer: We're going to take a little look at some of these models that have been existing, and then we'll look at the new model, the PICRAT model. By the way, if at any point you have a question, please feel free to just unmute and ask away. This is not something where you have to wait to the end.

- Don Heberer: The next piece we're going to look at here is we're going to look at Kahn's model of six criteria for guiding questions for evaluating technology integration models. There's a ton of models out there, and Kahn came up with a way to evaluate them utilizing six different criteria. The criteria that he came up with was clarity. Is the model simple, clear, and easy to understand with no hidden complexities? Can you just kind of get it by looking at it and evaluating, grappling with for a little bit? It's not overly complicated. Is there compatible? Does it support or complement existing educational practices, deemed valuable teachers? Obviously, if it's going to change your whole pedagogy and how you anyway teach, well, maybe it's not really compatible.
- Don Heberer: You also want to look at the fruitfulness. Does the model elicit fruitful thinking as teachers grapple with problems of technology? Can you get something out of it? Hence the word fruitfulness. Does it bear fruit? Is the investment in using it worth it?
- Don Heberer: The other part you want to look at is the role. You guys still there? [crosstalk 00:05:55].
- Participant #10...: Yes, we're still here.
- Don Heberer: Okay. It went silent for a second so I just want to make sure. The other part is technology role. Does the model treat technology integration as a means for achieving other benefits or is it the end of itself? Often, we look at technology, or sometimes school districts look at technology, and they just throw the technology at the teachers. It's like, "Hey, we have technology. We're expecting you to use technology." But they never provide a way to how they should use the technology, why they should use the technology, and when is the appropriate time to use this technology. There are some technology models that- technology is just a checkbox. Sometimes using the wrong technology in a certain situation is worse than not using any technology at all. So, that's one thing we can look at.
- Don Heberer: Another piece we maybe want to look at is the scope. Does the model sufficiently have any place to ignore the useful of teachers but specifically comprehensive to guide their practice? Can it be scalable? Can it go either really deep or can it be a high-level thing? That's where we look at scope.
- Don Heberer: And this, the last one, is student focus. Does the model clearly emphasize students and their student outcomes? These are the

cards here that we're going to take a look at when we look at certain models.

Don Heberer: The first model I want to take a look at is probably the most popular. It's probably the one that many teachers are familiar with. When we looked at the survey, more people checked off this model that they knew of over any other model. This is the SAMR model. It's been around about 13 years now. It was invented by Dr. Ruben Puentedura. It focuses on four different levels of technology integration. The first two levels are enhancement.

Don Heberer: The first level of enhancement is substitution. The technology acts as a direct substitute with no functional change. It's just a swap. You used to do notes on the chalkboard or the whiteboard. Now you have a fancy PowerPoint that has your notes types with some pictures. That's pretty much a direct substitute.

Don Heberer: Augmentation is the technology act as substitute with functional improvement. Now, maybe your PowerPoint has animations or videos embedded in it. So maybe in that case that might be an augmentation. There is some functional improvement. You might even argue that, hey, your handwriting is not that good to read. Maybe the PowerPoint, the functional improvement is it's typed. It's easier to read. It's a stretch, but maybe.

Don Heberer: Then, you look at the third and fourth levels. Modification is under the transformation umbrella, and so does redefinition. Modification looks at the technology allows for significant task redesign. Let's say an example of that might be you used to have your kids write in a Word document their essay or something like that. Well, now you have something like Google Docs where they can write it. It automatically saves. It timestamps when they make changes. They can go back and forth with revision history. Obviously, in that situation, you have a lot more tools that you may not have before. And you can actually have your students work on their same projects at home, on their phones, on a Chromebook, on any kind of device. So, clearly that has significant task redesign.

Don Heberer: The last level is redefinition. Redefinition allows for the creation to do tasks previously inconceivable. This would-be things that you couldn't do before without the technology. Maybe those are Google expedition tours, virtual tours, things like that. This is a very popular model, and it's a pretty good model. That's why it's so popular. This is the SAMR model. But there's some things we're going to talk about the SAMR model that may have some shortcomings.

Don Heberer: This is the second most popular model. This is TPACK. TPACK is one that focuses on technological pedagogical content knowledge. Quite a tongue twister, right? But it looks at three different main areas that divides into four overlapping areas. Let's look at the purple here first. You have technological knowledge. That's understanding the technology. You have then content knowledge, which is understanding the content, your math, your science, your social studies, your ELA, whatever it is. Then, you have the pedagogical knowledge. That's actually the learning piece, learning it or teaching it. You look and see how these overlap, the technological and the pedagogical overlap here. The technological and the content overlap here. Then, there's this sweet spot in the middle. That's the TPACK. That's what you're aiming for, the intersection between technological, pedagogical, and content knowledge. That's what the TPACK model says.

Don Heberer: But, there's some issues with these models. If we look at Kahn's model for evaluating these educational technology models, we find that the clarity for SAMR, the boundaries are unclear between substitution, augmentation. We kind of just said, right? It could be a little subjective what's augmentation and what's substitution. You also can look at the fruitfulness. It might not be meaningful for some practitioners. Who cares if you do augmentation versus substitution? You might not be able to have anything kind of tangible to pull out of that. Then, the student activities are not really there. They're just implied. So, there's no really way to measure student focus.

Don Heberer: Then, TPACK, TPACK is kind of very meta where it's really difficult to ... It doesn't give you any really specifics. It just kind of is a philosophy. It's sometimes too comprehensive for some teachers for their ... seeing how they can apply their own content to it.

Don Heberer: There have been other models and stuff that have developed over the years. The third most popular one is the LoTi HEAT model, which is depicted on the right here. It has a bunch of different strands of how the technology uses. It looks at higher-order thinking, things like Bloom's taxonomy, engaged learning, technology use, and then authentic connections. There's different ways you can kind of go deeper into the middle of the circle.

Don Heberer: But if you look at all these models, they're all kind of lacking the student focus. That's really where the PICRAT model comes in. The PICRAT was first developed in late 2016 and fully published

in 2018. So, it's only not even two years old. So, it's a relatively new model, and it's a fresh look at technology and integration.

Don Heberer: I'm just going to play a quick second of it. I just want to make sure you can hear. So, please confirm you can hear it, and then I'll play the whole video.

Participant #10...: I can hear.

Video : When new technologies are invented-

Participant #11...: I can hear.

Participant #10...: Yeah.

Don Heberer: You guys can hear it? Okay, great.

Participant #10...: Yes, I can.

Don Heberer: You want me to go full screen? Let me see if I can just do that real quick.

Video : They often provide many new ways of thinking and doing things, for example, how have smartphones changed the way we live and work, or tablets, or even the internet. However, one problem we have as humans is that often we can't imagine very well they knew possibilities available from new technologies. So instead, we use them just to do the same things we have always done before.

Video : Teachers struggle with this, too we often teach the way we were taught and struggle to think of how we could teach better based on the technologies we have that our teachers did not have. Richard Culatta, former director of the Office of Educational Technology for the US Department Education shared the following concern.

Richard Culatta...: Here's the issue. If we are not careful, if we are not super cautious about all of the decisions we make, in a very short amount of time, by the time the freshman that are in this room have graduated, we will have a complete digital replica of the traditional practices that are not working today. And we will have everything that we have now. It will just be on a screen instead of on paper, and it will be just as ineffective, and it'll cost a whole lot of money, and we'll be just as stuck as we will and not have another ticket to play to be able to make a change.

- Video : Our goal is to help you think critically about the technology you'll use in your classroom and to begin to see the potential technology has to transform and engage students in the learning experience in new ways. To begin, we're going to show you a technology integration framework. Frameworks are tools we use to begin conversations, in this case conversations about we should use technology to improve student learning.
- Video : Let me introduce the RAT model. The first letter, R, represents replacement. Replacement can mean the following: one, changes the appearance or dressing of our practices but not the practice itself, making digital copies of traditional practices, recycling instruction. Two, it doesn't affect teaching or learning practices and behaviors. Three, can still be a useful use of technology because it can increase access. For example, a digital worksheet won't get lost or eaten by your dog. But, it doesn't really impact or improve learning.
- Video : The A in RAT equals amplifying. In other words, technology improves the efficiency of tasks or introduces new functions to original tasks.
- Video : The T in RAT equals transforming. It introduces new activities and learning that are impossible without technology. Take away the technology, take away the learning, too.
- Video : Next in our PICRAT model is the PIC portion. P equals passive. In other words, students are observers, bystanders in their learning. The I equals interactive. Students engage in material in an interactive way. They are active learners. The C equals creative. Students are creating materials themselves. They are creative learners instead of passive or active ones. This is the apex of student engagement. And students often learn deeper when they have to create something using the content.
- Video : By combining PIC and RAT together, we create a matrix of the many different ways technology can influence teaching and learning. You could use a technology that replaces a face-to-face conversation and where students are passive learners, such as a video lecture, or where they get to interact back through technology, such as a video conversation, or where they get to learn by creating their own videos in a way that completely transforms the way you typically teach.
- Video : The PICRAT model is a great tool for helping you to think about your teaching and how you use technology in the classroom. None

of the squares on the matrix is necessarily a bad way to teach. Sometimes it's good to be a passive learner, for example, and listen to others, such as in this video. But, a good teacher will continually evaluate their practice and think how they can improve.

Video : Using the PICRAT can help you think about what kinds of ways you could use technology that will help students be more active and creative as learners and ways that transform your teaching to levels you hadn't considered before. So when you hear about a new technology, don't just ask what it can do for you that you already are doing anyway. Think PICRAT and see if there's a way this technology can help you transform your teaching in positive ways.

Don Heberer: All right. So, let's take a closer look at PICRAT here. As the video says, there's really two axes here. You can look at the X axis, the RAT axis. That's how some of the teachers use of the technology when it comes to traditional practice. So, the teacher's use of tech replaces the traditional practice. That's without technology. So, replaces what was done before without technology. Does it amplify the traditional practice or does it transform the traditional practice? We'll take a look on how to make that determination where it falls in a minute.

Don Heberer: Then, you look at the Y axis, which is this up and down, the students' relationship to the technology. Is it passive, interactive, or creative? In passive, students are the observers, bystanders of their own learning. So, if there's just a PowerPoint but there's no discussion, something like that, that would be passive. Most of this presentation has been pretty passive at this point. Interactive would be the students engage with the material in an interactive way. They're active learners. Then, there's creativity where they actually create something, materials, and are creative learners rather than interactive or passive ones.

Don Heberer: Then, if you look at the teacher's practice, the replacement changed the appearance of our practices or dressings, but not the practice itself. It can increase access, but does not improve learning. So, if you just take the notes that you've had, and you type them up, and you hand them out to students or you put them in a PowerPoint, that's probably a replacement. Amplifying improves the efficiency of task or introduces new functions to the original task. Then, lastly, transforming new activities or learning the impossible without the technology. The easiest way to know this one is if you took away the technology, you take away the learning as well. There's a handy-dandy flow chart. There's some infographics here that kind of help you understand.

Don Heberer: Let's look at the bottom first, actually. I think determining the student interactivity or the student relationship to the technology is probably easier than determining replacement, amplification, transformation. Passive is obviously if the students are just kind of listening, observing and the content is going to the teacher. Then, interactive is it's flowing back and forth between the students and the teacher. Then, the creative piece is it's between the teacher and the students. Then, there's a creation. There's a tangible product or there's something at the end the students have created.

Don Heberer: If we look at the top here, we look at the way to determine replacement, amplification, and transformation. The first question you have to ask yourself is, are the achieved learning outcomes of the activity clearly better than they would have been without the technology or a lower tech solution? So, if the outcomes aren't better, if it's just a straight up swap, and you're going to say, "No, the outcomes aren't any better. They're the same," it's just replacement. But if the outcomes are better, you're going to scoot on over to the diamond on the right, the second question. Could the activity have reasonably been done without the technology or via a low-tech solution? So, if you could've done your activity using a chalkboard or just index cards or some other low-tech way, then it's only an amplification. But if it was impossible to do that lesson or that activity without the said technology, then you're in the transformation camp. These different ways of looking at this change how you can determine which part of the matrix is it in.

Don Heberer: At this point, I'm going to actually stop and see if we have any questions before we move on to the next piece. So, unmute your mics and ask questions or just say if you're good.

Participant #11...: Where would, if you say online scavenger hunts, and breakout rooms, and stuff like that would be? I would put that in the interactive application part down.

Don Heberer: Yeah. The students are just ... They're going on a computer. They're clicking around, right?

Participant #11...: Yeah.

Don Heberer: Are they creating something at the end with it, completing a worksheet, whether it's digital or paper?

Participant #11...: Certain ones yeah. They have to create something or they have to solve some sort of puzzle of some sort.

- Don Heberer: Okay, so that would, the solving ... But, are they creating? If they're just solving the puzzle that you've created, then that would be interactive. If they're making their own puzzle or they're making something or they're making their own questions, then it would probably be creative.
- Participant #11...: Ah, okay.
- Don Heberer: That's the distinction, right?
- Participant #11...: Okay.
- Don Heberer: If they're just getting involved with something that you've done, then that's interactive. But if they're coming up with their own product where if you could step away and you can look at it and say, "Hey, this didn't exist. I didn't give this to them," and they just fill out and complete it, this they've created on their own, then that's creative matrix, or creative box of the matrix. Did anyone else have a question or do you have another question?
- Participant #11...: No. I think I'm good. I was just wondering. Now, you were saying ... How long has this been around, this particular theory you were saying?
- Don Heberer: So, it started in 2016, and then it was officially published in 2018.
- Participant #11...: Oh, okay. Thank you.
- Don Heberer: So, it's relatively new. We're going to take a look at ... If there's no other questions, it's fine. We can move on. I was going to look at some of the examples that have been provided by the participants. We had 12 participants in this study. I've taken their responses from the first survey, and I've mapped them to PICRAT. We can kind of look at some examples that people have done. We don't have to go through all 12 or 36 of them.
- Don Heberer: This is an example here. This person used Screencastify for listening comprehension, is, I think, believe a world language teacher. They listen to an oral script and use the exam link to multiple choice. So normally, just listening to a video is pretty passive. But in this case, they amplified it because they also answered those questions. So, it's not only just passive and replacement, it's also amplification.
- Don Heberer: Then, we look at something like Edpuzzle. If you're not familiar with Edpuzzle, Edpuzzle allows you to take any video on YouTube

or other websites or even your own videos, and you can pause them and have the kids answer question. You can also track how many times they viewed it and things like that. They can answer multiple choice or true-false questions. We were just going some examples that other people have provided from the study with the ... how we'd map to PICRAT. In this case, we have some here. This was I believe ... This person used Google Classroom and Edpuzzle. As I was saying before, Edpuzzle is a great resource because it lets you take any video, and it lets you add questions to it. So, a passive video could become interactive. Students will be able to take feedback and answer questions or write short responses based on the video. The [inaudible 00:27:05] that amplifies is because you don't always have that opportunity if you would just use a replacement where it's just, "Hey, here's a lecture. Here's a video." Now it amplifies it because it's that extra component.

Don Heberer: Let's look at some of the other examples here. Here's a good one, Nearpod. Nearpod is interesting because Nearpod allows ... It's really a transformation because Nearpod not only takes a presentation like a PowerPoint or something, Google Slides, but it allows those students to answer questions, do matching assignments, to sometimes do virtual tours. There's a ton of things that they can do in there that you couldn't do without the technology. Nearpod has a whole VR thing where you can go to the moon or wherever you want to go. So, that is something that really would be a transformation.

Don Heberer: If we look at this one, this one, this person used Flipgrid. Flipgrid with this who-done-it lesson. This Flipgrid, Flipgrid's a fantastic tool. If you're not using Flipgrid, it's something you might want to check out. Flipgrid allows you to create a video response. I'm sorry, video prompt. Then, your students get to create video responses back. You can do a 30-second response up to a two-, three-minute response. The students get to create their own video. Then, they get to add text on top of it and different flares. Then, you as the teacher can give them comments back or even your own video response. You can share with your other student. So, clearly, it's a transformation and it's a creative thing because the students get to create their videos.

Don Heberer: None of these boxes are bad. It's not like, hey, if you're doing a passive replacement it's not good. No. These are just things you want to ... You want to know where you're falling. And that's the nice thing about this PICRAT matrix. It not only can be used as a planning tool when you're planning your lessons, but I could also

be used kind of in a reflective way. You could say, "Hmm, where am I at with my lessons? Okay, I'm falling in, let's say, a passive replacement. If I do a little tweak here, maybe if I add something, another component, I can move over to the interactive amplifies. Or maybe I can move over just even past the amplifies. Or maybe I can go this way, and maybe I can move towards a creative replacement," or something like that. So, it could be used as a way to see where you're at and kind of tweak your pedagogy.

Don Heberer: So again, I'm not going to go through all these. I'm going to share this presentation with you guys when we're all done. But, this slide here kind of does the meta. This is the metadata here. This is everyone's responses all mapped to one big PICRAT. You see we get a pretty interesting smattering of where everything falls. The meat of it fell kind of in the middle, which is expected. You see that there's some replacement. You see that there's a good amount of amplify, and there's some transformation. It's kind of a pretty good curve where everything kind of fell.

Don Heberer: If you look at this, we have in the middle we have Google Forms Quiz. We have Pear Deck. We have Edpuzzle. Now, some of this stuff you might say, "Hey, Pear Deck and Nearpod are probably the same thing. Why is one in amplifies and one is a transform?" I went by the descriptions of how the people use the technology. Remember, in the beginning we said if you use the tool in a different way, it could be more effective or less effective. I read, basically, the description people provided. Some people might've used one tool in one way, and someone may have used the tool in a different way. So, that's kind of what you have to look at. It's not necessarily the tool itself. It's kind of how you use the tool with your students or as a way to replace or amplify or transform your traditional practice.

Don Heberer: All right. Let's take a little quiz here. Let's see. This is my interactive point. Because I would be doing very bad PICRAT if the whole thing was passive, right? Let's take a couple of these examples and let's see where we can kind of land some of these things. So, if you'd be so kind to unmute your mic. Or if you prefer, you can type in the chat. I went back one here. Let's go and talk about the first one here. The first one is a teacher uses PowerPoint as part of her lecture. Where do we think that might fall on the PICRAT matrix?

Participant #11...: I would say that's a passive and it, I guess, replaces or amplifies. It depends. It replaces the use of the notes.

- Don Heberer: Yeah. I think based on the little information we have; I think we'd have to assume that it would be ... You're absolutely right. A passive and a replacement. If we had more information, maybe they said with animations or with video, then maybe we could say it's an amplification. Great.
- Don Heberer: All right. Let's do another one here. Students write answers to math problems on an interactive whiteboard. That's number five.
- Participant #11...: Write answers to math problems on an interactive whiteboard.
- Participant #10...: I would say maybe it's interactive. But I'm tossed up between passive and amplification because I guess it could amplify because the kids are more involved in it, and it's something that can give them some direct feedback. But I also think it may in a way ... I'm going to go with IA, interactive amplify.
- Don Heberer: Okay.
- Participant #11...: Part of me feels like-
- Don Heberer: Go ahead.
- Participant #11...: ... the interactive whiteboard kind of replaces paper or a blackboard. But, I'm not sure what interaction it is. So, I'm kind of leaning the way the other person is leaning towards the IA in a way.
- Don Heberer: Yeah. I mean, right here I have the answer key. This is actually developed by the person who came up with this model, Royce Kimmons. He puts it down as interactive replace. But I definitely agree with you. It depends on what things are going on with the math problems. Based on what it says there, we know that there's not anything in addition to the math problems. But if there were things where solve it as they go, then obviously that would be some type of amplification. But yeah, that's a good one.
- Don Heberer: All right. Let's look at number nine. I think this is similar to the question we had before, right? A teacher designs a web quest or inquiry-driven online lessons for students to complete on their own time.
- Participant #11...: On their own time. I would definitely say interactive amplifies.
- Don Heberer: So, yeah. I mean, that's correct. It also could be transformation. So, it really depends, I guess, how involved the web quest is. If it's

potentially it's something that might be where it's just text and the same information could be found in other sources ... But again, if its video based or something like that, that would be transformation because it wouldn't be something that you'd be able to do without the technology.

- Don Heberer: All right. Good. I think we have a pretty good grasp. Let's just do one more. Let's do one more. I think we'll just do one more. Number six. Let's see. Students organize geometric shapes and patterns on an iPad. Let's just do one more really quick.
- Participant #10...: Students organize geometric shapes. I would say interactive transformative. And I could be wrong. I would toy between amplification and transformation.
- Don Heberer: So yeah, definitely interactive, right? Students organize shapes and patters on an iPad.
- Participant #11...: Part of me would say almost that this could also be a replacement thing. Because if you think about it, think about all the math manipulatives you have in elementary school, like all the plastic math manipulatives you have. So technically, that could replace those in a way.
- Don Heberer: Yeah. The answer here according to the answer key is interactive replacement. I think similar to your line of thinking is it's just a replacement to those manipulatives.
- Don Heberer: Now they're just digital, and there's no additional functionality that you get out of it. Because remember, when you're looking at ... Hold on. Trying to advance the slide here. When you're looking at the RAT part, are the achieved learning axis clearly better than they would've been without the technology or lower-tech solutions? So, in that case, it's really just the higher tech way of having those manipulatives, right? But you're not adding anything different to that lesson or that activity. So, in that case, it would be interactive, of course, because the kids are touching and moving around, and yadda, yadda, yadda. But, it's just a replacement.
- Participant #11...: Okay.
- Don Heberer: All right? This is really the last slide before the survey is, as an educator, to begin to implement PICRAT, really, you just have to ask yourself these kind of questions. When you're looking at the RAT part of the model, you have these two questions to guide you for replacement, amplification, and transformation. Then, passive,

interactive, and creative. I'm saying that weird. Creative. I think that's a little easier to discern. But again, you remember passive is when the students are just observing. They're not really doing anything. They're just listening, observing, and things like that. Interactive's when they're actually doing something and providing information and being involved. And creative is where they're actually have some type of product or something tangible at the end that they've created.

Don Heberer: This is how you could potentially start to implement PICRAT in your own classrooms and with your own lessons. At this point, this is the last slide. Are there any kind of questions or discussion that we want to have related to this PICRAT model or education technology in general?

Participant #11...: I feel like there's a lot of choices now that was never really available before, especially before quarantine. A lot of things were made free, and now they're kind of like ... There's Edpuzzle. There's Screencastify. There's a bunch of different things. So, sometimes it can be a little overwhelming about what technology should use for specific things.

Don Heberer: Yes, yes. Well, I mean, I think that's kind of where having a model comes into play, right? You could either start by look ... You don't want to ever look at the technology first. You want to look at your content and what you're trying to teach and what your learning outcomes are. When you're looking at your learning outcomes and what you want the students to know and understand, then you can use the PICRAT model to kind of guide you. Well, all right. Well, I want this to be interactive. So, you can look at maybe some technologies that might be interactive to help you achieve those learning outcomes.

Don Heberer: I think sometimes people look at the technology. Hey, I have this great technology. I want to use it. Let me try to find content that matches that. That's kind of the wrong way to look at it. You should always think of the technology as a tool in your tool box to help you and your students reach the learning outcomes that you want.

Participant #11...: Definitely makes sense.

Don Heberer: Any additional questions or comments?

Participant #10...: Now, I like the PICRAT model because it does make you think about the different technologies in a different way. I just want to

try to incorporate as many that make sense into my practice and to just try to, I guess, amplify and transform the learning more so sometimes because I know it can get a little bit mundane if I keep doing the same thing. I appreciated that. The introduction is a new one.

Don Heberer:

Well, excellent. Thank you. I appreciate that. What I'm going to do at this point is I'm going to stop the recording. So, hold on one second. I'm going to stop the share and stop the recording.

APPENDIX N
Professional Development Session Transcript
Session 04 – July 2, 5:00 PM

Don Heberer: All right. Well, welcome. My name is Don Heberer. I'm here for the professional development session, part of the research study that is teacher perception, instructional practice, using the PICRAT model. My mentor is Dr. Anthony Annunziato, from St. John's University. And we're going to take a dive into some professional development here.

Don Heberer: So, the first thing we want to take a look at is the history of educational technology integration. And when you look at educational technology, it really has been around since the beginning of education. If you go back 100, 150 years, the chalkboard at one point was new technology.

Don Heberer: Nowadays we think of technology, we think of electronics we think of computers or something along those lines, but technology is just any new tool that could be used to complete a task and chalkboards at one point were new technology. But over time, especially after post World War II, and especially during the computer revolution of the '70s and up into modern times, technology has kind of been focused more on electronics and things like that.

Don Heberer: Well, when you look at education, you need to look at how we've attempted to measure technology integration, and also evaluate technology integration. And there've been attempts from a lot of different ways, and one way that they look at that is standards-based. So, there's a lot of different standards-based models out there. One of the most popular standards-based model is the ISTI, a model for standards. It used to be the NETS standards, but ISTI, the International Society of Educational Technology, has developed their own standards for teachers, students, administrators, and what they call technology coaches, which are people that help facilitate technology in the classroom with the teachers.

Don Heberer: There's also been movements towards content-based educational technology standards, as well as skill-based standards. More prominently, the skill-based standards, some of them are the 21st century Four Cs of education, which are communication, collaboration, critical thinking, and creativity. There have been

movements to move towards relationship-based standards, where you look at the relationship between the content, the pedagogy and the technology.

Don Heberer: When you're looking at different integration models, one way to evaluate them, was suggested by Khan. Khan came out with six criteria and guiding questions for evaluating technology integration models and these are the six criteria. One is clarity, which is really, is it easy to understand with no hidden complexities? Can you just look at it and get it? The other one here is compatibility. Is it compatible with existing educational practices? Is it something that you can just incorporate it as a teacher, without having to change your entire outlook on education or how you teach effectively? Is it fruitful? Does the model elicit fruitful thinking as teachers grapple with problems? All right, is the juice worth the squeeze? Do you get something out of it by doing it? Is it worth the time and the effort to do? Obviously, you're not going to do something if it's super-duper difficult and it doesn't really pay off in the end as much.

Don Heberer: Then you look obviously at the technology role. Does the model treat the technology as a means for achieving specific pedagogical or other benefits, rather than an end to itself? We're not just using technology just for the sake of using technology, so we've checked off that technology box. No, the technology needs to have a specific role.

Don Heberer: And then the next one is the scope. Okay? Is it something that can be fine-tuned and focused specifically in, or can it be scaled to a larger paradigm? And then lastly, and frankly, my opinion, the most important, does the model emphasize students and student outcomes? A lot of times we focus on what the teacher's doing with the technology, but we really should be focusing on what the students should be doing with the technology, to drive those learning outcomes that we're seeking.

Don Heberer: So, I'm going to go over some popular models. This is the most popular model. This is the SAMR model. It's been around for about 12 to 13 years now. It is substitution, augmentation modification and redefinition. Substitution technology acts as a substitute with no functional change. You're just taking something that you've done the old-fashioned way without technology and now replacing it. Let's say you've written notes on a chalkboard, and now you're doing notes that are typed up in a PowerPoint, or even typed up on a transparency, let's just even say. So that's a direct substitute, no functional change.

Don Heberer: Let's say you take those same notes and now you add video and animations and maybe diagrams and things like that, that you didn't really have the ability to do with the chalkboard. Now you're maybe in the augmentation phase and these are both pillars under the enhancement section.

Don Heberer: If we wanted to modify a lesson that technology allows for significant task redesign. So, let's just say you had your students type up essays or stories or something like that in Microsoft Word but now you're going to switch it over and you're going to use something like Google Docs, and you're going to allow the students to collaborate with each other in real time on the same document. Well, that technology is a modification. It allows for significant task redesign. So now the students can do things that they wouldn't be able to easily do before. Back then they would have to probably... Without that they may have to save the files and only one person can be in at a time but now with something like Google Docs, you can have one file and multiple people in.

Don Heberer: And then lastly, the last stage of the SAMR model is redefinition. Its analogy allows for the creation of new tasks, previously inconceivable. So, something like a virtual field trip using Google Expeditions or Nearpod VR or something like that, where you couldn't really do it without the technology. I mean, I guess if you could go to certain places, it would be an expensive field trip. But with Google VR or Nearpod VR, you can go to places like the moon, which is pretty inconceivable for most, K through 12 students. So that would be a redefinition.

Don Heberer: So, this is a very popular model. We're going to take a look at this in a little, [inaudible 00:07:01]. the second most popular model is the TPACK model. And the TPACK model looks at really three different main circles here. And they divide into technological pedagogical. I'm sorry, technological knowledge, content knowledge and pedagogical knowledge. So that's the TK in purple here, the CK in blue and the PK in yellow.

Don Heberer: And if you look, there's four different areas, they overlap. So, these two overlap in technological pedagogical knowledge, these two overlap and technological content knowledge, and these two overlap with pedagogical content knowledge. So again, just the technological knowledge is the technology understanding technology. The content is understanding the content, math, social studies, science, whatever it is and the pedagogical is understanding the method of learning or the method of teaching.

Don Heberer: And you see this kind of sweet spot in the middle here, this dark green? This is really where you're supposed to strive for as a teacher. You're supposed to get technological pedagogical content knowledge, all in your lesson. But there's a little problem with that. And if we look at Khan's model, we can see that there's some short fallings for both SAMR and TPACK. For instance, SAMR, the clarity. It's a little unclear where substitution begins or ends and augmentation begins. That could be a little subjective.

Don Heberer: Also, for fruitfulness, levels of distinctions may not be meaningful for practitioners. You may not care if you're doing augmentation versus modification. There's really no added benefit or anything fruitful out of that. And there's no mention of student focus. Yeah, it's implied, but it's not explicit. So, it could be very easy for a teacher to kind of lose the idea of the student focus.

Don Heberer: And then you look at TPACK. TPACK, for a lot of people is kind of just a little too abstract. It's a little difficult to understand where exactly you should be focused. It talks about at a high level, what you should be incorporating, but it doesn't really give a means to specific examples.

Don Heberer: And then we look at some other models. I'll just explain, we have [low team inaudible 00:00:09:25] heat model, probably one of the third, most popular models that incorporates higher order thinking, engaged learning technology use and ethernet connections. And then there's a couple other models too. The problem with a lot of these models is that they don't focus on the students and sometimes they're difficult for teachers to understand. Sometimes there's too many levels. Sometimes there's not enough levels. Sometimes the distinction between the levels is unclear.

Don Heberer: And that's where PICRAT comes in. So PICRAT is a relatively new educational technology integration model. It was first developed by Royce Kimmons in 2016, but it was first published in 2018. So, it's about two years old. So, let's show a quick little video and it's going to explain PICRAT. But before I do, is there any questions? If your mic is muted, you can unmute and ask any questions, if you have any. If not, just say you're good to go.

Participant #01...: Yeah. We're good to go. Thanks.

Don Heberer: Okay. I'm going to hit play. Just want to just let me know if you hear it.

Participant #01...: Okay.

- Don Heberer: It didn't pop up. Hold on. Let me... Give me one second here. Oh, it's because I'm at school. Hang on. I'm going to cut all this out. Don't worry.
- Video: When new technologies are invented, they often provide many new ways of thinking and doing things. For example, how have smartphones changed the way we live and work? Or tablets? Or even the internet? However, one problem we have as humans is that often we can't imagine very well the new possibilities available from new technologies. So instead, we use them just to do the same things we have always done before.
- Video: Teachers struggle with this too. We often teach the way we were taught and struggle to think of how we could teach better, based on the technologies we have, that our teachers did not have. Richard Culotta former director of the Office of Educational Technology for the U.S. Department of Education, shared the following concern.
- Video: Here's the issue. If we are not careful, if we are not super cautious about all the decisions we make in a very short amount of time, by the time the freshmen that are in this room have graduated, we will have a complete digital replica of the traditional practices that are not working today. And we will have everything that we have now. It will just be on a screen instead of on paper and it will be just as ineffective and it will cost a whole lot of money, and we'll be just as stuck as we will, not have another ticket to play, to be able to make a change.
- Video: Our goal is to help you think critically about the technology you'll use in your classroom and to begin to see the potential technology has, to transform and engage students in the learning experience, in new ways.
- Video: To begin, we're going to show you a technology integration framework. Frameworks are tools we use to begin conversations. In this case, conversations about how we should use technology to improve student learning. Let me introduce the RAT model.
- Video: The first letter R represents replacement. Replacement can mean the following: One changes the appearance or dressing of our practices, but not the practice itself, making digital copies of traditional practices, recycling instruction. Two, it doesn't affect teaching or learning practices and behaviors. Three, can still be a useful use of technology because it can increase access. For

example, a digital worksheet won't get lost or eaten by your dog, but it doesn't really impact or improve learning.

Video: The A in RAT equals amplifying. In other words, technology improves the efficiency of tasks or introduces new functions to original tasks. The T in RAT equals transforming. It introduces new activities in learning that are impossible without technology. Take away the technology, take away the learning too.

Video: Next in our PICRAT model is the PIC portion. P equals passive. In other words, students are observers, bystanders in their learning. The I equal interactive. Students engage in material in an interactive way. They are active learners. The C equals creative. Students are creating materials themselves. They are creative learners instead of passive or active ones. This is the apex of student engagement and students often learn deeper when they have to create something by using the content.

Video: By combining PIC and RAT together, we create a matrix of the many different way's technology can influence teaching and learning. You could use a technology that replaces a face-to-face conversation and where students are passive learners, such as a video lecture or where they get to interact back through technology, such as a video conversation, or where they get to learn by creating their own videos, in a way that completely transforms the way you typically teach.

Video: The PICRAT model is a great tool for helping you think about your teaching and how you use technology in the classroom. None of the squares on the matrix is necessarily a bad way to teach. Sometimes it's good to be a passive learner, for example, and listen to others, such as in this video. But a good teacher will continually evaluate their practice and think how they can improve.

Video: Using the PICRAT model can help you think about what kinds of ways you could use technology, that will help students be more active and creative as learners, in ways that transform your teaching to levels you hadn't considered before.

Video: So, when you hear about a new technology, don't just ask what it can do for you that you already are doing anyway, think PICRAT and see if there's a way this technology can help you transform your teaching in positive ways.

Don Heberer: Okay, so let's take look at PICRAT here. So PICRAT, it has two different axes here on the X axis. The teachers' use of knowledge

technology and traditional practice. Does it replace the traditional practice amplify, the traditional practice, or transform it? And then we have the Y axis, the student's relationship to the tech. Is it passive, interactive or creative?

Don Heberer: So, let's look at the student's relationship first and the Y axis. Students are observers, bystanders, and learning. That would be passive. So, for the most of this training here, it's passive because I'm doing the talking. You're just watching or listening. Interactive would be, if there's some type of engagement. Students engage in the material in a direct way. They're active learners. There's a back and forth between the students and the teachers in any way.

Don Heberer: And then creative is the students are actually creating materials. So, there's some type of tangible, digital or tangible resource or something that they've created after they're done. And it could be interactive beforehand and it could be passive, but at the end, there's some type of creative material that they've done.

Don Heberer: The other part is the teachers' use of the technology. So, there's replacement, which is really just change the appearance of the practices or dressings. It doesn't affect any of the learning outcome. It doesn't necessarily improve the learning. It may increase access. It may be able to get to more people, or it may be easier to disseminate the material, but it doesn't increase the learning. But then you have amplifying which the technology improves the efficiency of tasks or introduces new functions to original tasks. And that would be amplification.

Don Heberer: And then lastly, transformation is new activities that are not possible without the technology. So, take away the technology, you would take the way the learning experience. So, this flow chart kind of helps us understand the RAT part. And then the infographics on the bottom help us understand the PIC part.

Don Heberer: So, I'm going to actually do the PIC part first, because I think it's a little easier and a little more straightforward. So, you have passive is when the content is really just coming from the teacher and the students are just kind of watching and not really engaging directly or interactive with the lessons here. Interactive is when the students and the teacher have some type of back and forth, or the technology has some back and forth and the students are actually manipulating things that happen to do with the technology.

Don Heberer: And then lastly, the creative is when it's all said and done, the students have something that they've made, that wasn't there

before, when they're using the technology. And as we know, with student engagement, that usually increases student engagement, increases, learning, and remembering what they've done and recall, and being able to transfer it to two other areas of their lives or their skills.

Don Heberer: Let's look at the RAT part. The RAT part is a little more difficult to discern the difference of, but if you ask these two questions, it definitely helps. So, number one, you're going to ask, for given any particular technology are the achieved learning outcomes better than they would have been without the technology or low-tech solution? So, if you could have done the lesson with a chalkboard or an interactive whiteboard, and you would have achieved the exact same task or outcome, but you used the interactive whiteboard, it would be a replacement. However, if the learning activities were better with that technology, then you slide over to the next question.

Don Heberer: Could the activity have reasonably been done without the technology or a lower tech solution, okay? And if it could have been done, then you might have amplification. Okay? But if, no, it was not possible, then you have transformation. So that kind of helps you. Those two questions, how determine where you are at.

Don Heberer: And we have 12 participants in this study right now. So, what I did is I took your responses from your survey, based on your lesson, examples that you gave me and I mapped it to PICRAT. So, we can take a look at some of these. I'll just go through a couple of them. We'll just pick a random one here. And we'll take a look on how that falls on the PICRAT matrix.

Don Heberer: So, one here is an example of how-to analogies in the classroom, by creating HyperDocs. HyperDocs is kind of like a Google Doc that has... Think of it like a fillable worksheet, but it also could have videos in it. It also could have quizzes and games and things like that. HyperDocs might be an example of an interactive document that transforms learning, right? You couldn't do that with a worksheet. You couldn't do that without the HyperDoc... It's not really technology, but the HyperDoc kind of mentality of creating that. So, it's an interactive and it's a transformation.

Don Heberer: Let's look at something else here, like Flipgrid. Here's a great one. Flipgrid is a tool that allows teachers to create a prompt for students and then students could create, using their phones or their Chromebooks or whatever, video responses back. And students get to then take that video and they add text to it and they could add

emojis and flare and badges and a whole bunch of other stuff that would be a transformation and a creative one, because you can't do that without the technology. It's just not possible. And it's creative because the students are creating content. They're creating videos. They're creating a response. They're adding different things to it. So that's why that's that highest level of the creative transform or the CT level.

Don Heberer: And you look at some of these other ones here. You have this one. This one would be a passive thing. Students use Chromebooks to research a budget and establish financial goals. Okay, we're just using research. That would be something that might be just passive, right? We're just reading material to research. It would be amplification because it's on the computer, where it's not something they were just reading out of a textbook or something like that.

Don Heberer: So, I've mapped all the different responses to kind of a Meta- Chart here and this looks at everyone's responses, in one kind of spot. And if you see, the most majority of the options here are in the interactive amplifiers because you can kind of look and see some of the outliers. You only have a little bit of passive replacement; you only have a little bit of CT and then you have some other things in the corners. This is a pretty good bell curve, if you will, of what people are currently doing in the classroom.

Don Heberer: So, when you're looking at some of this stuff, you might want to look and see, hmm, what am I doing? Where does that fall and PICRAT and what could I do to move it along the PICRAT matrix? Maybe I'm currently in the amplifies section and I'm passive. Hmm. What could I do to make this more interactive and move up here? Or maybe it's still passive, but maybe I want to do something that's transforms. Or maybe I want to move up diagonally, which would be even better.

Don Heberer: So PICRAT could be used not as a planning tool, but it also can be used as a reflective tool, to kind of see where you're at and where you want to get to. And that's kind of one of the powerful things about PICRAT.

Don Heberer: So, we're going to take a moment here and this is my interactive part because I wouldn't want to just be a passive replacement type of person here on this PD session. I wanted to just do a brief little quiz here. So, if you could just unmute your mic, we're going to take a look at one of these or a couple of these examples here. Let's

just look at number one. What do you think that would fall under?
A teacher uses PowerPoint as part of her lecture.

Participant #01...: I would say the PR box.

Don Heberer: So that would be passive and it would be a replacement. And these questions were pulled from Royce Kimmons' website, the person who created the PICRAT model. And yes, you are correct. So according to his answer key you are correct and I would agree with you. Let's take a look at number five. Students write answers to math problems on an interactive whiteboard.

Participant #01...: I would say IR.

Don Heberer: Yep. That would be interactive replacement. Interactive because you're using an interactive whiteboard, so there is some type of interaction with the students there, but it is a replacement to the chalkboard or the whiteboard or whatever it was, right?

Participant #01...: Yeah.

Don Heberer: Let's look at another one here. Let's look at number eight. Students make an animated video to tell a story.

Participant #01...: Well, it's definitely creative and I guess it would either be CA or CT, depending on what they're making a story about, but if they are creating, probably CT, I would say.

Don Heberer: Yep. So, in this case, sometimes it's hard to tell the difference between amplifies and transforms, depending on... We probably need a little bit more information to tell the difference, but CA or CT were several answers for that one. So, I think you kind of have a good grasp of the PICRAT matrix here.

Don Heberer: So, I guess the second to last slide here, how can educators begin to implement PICRAT? So again, look at this flow chart for RAT, it helps you determine the RAT part, the replacement amplification transformation. And then obviously these infographics help you determine passive interactive and creative.

Don Heberer: I feel like passive interactive and creative is pretty much straight forward. The kids aren't doing anything, it's passive. If they are doing something, it's interactive and if they're doing something that they create something at the end, it's creative, but these infographics can kind of help. So, at this point, I would pause for any questions and comments based on the PDs.

- Participant #01...: Well, it was awesome. And I mean, everything that I've learned so far in EdTech, I mean the PICRAT model is great. It really lays it out nicely in a matrix and explains how to, I don't want to use the word amplify, but really, I mean, amplify or transform your already well-made lessons. You don't necessarily have to recreate the wheel, but maybe adding a few things or you could really make a difference in the lesson.
- Don Heberer: Great. So, what's going to happen next is you're going to get a post survey. Let's post a PD survey, just to answer some questions regarding educational technology models in general and your thoughts on PICRAT. And then a couple days later, I'm going to send out another survey that's going to just ask for three lessons or activities. They don't have to be full-fledged lessons, but three activities utilizing education technology, that you would develop after learning about the PICRAT model.
- Don Heberer: So, in a perfect world, I would have actually done observations and we would have done it over the course of a year and I would have seen, maybe some difference, but because of COVID, we're going to just do hypotheticals and planning the lesson, not necessarily actually delivering the lesson. So that's what's going to happen next. And then at that point, depending on the data collection, most people will be done. A couple of people we've selected for some follow up questions in an interview.
- Participant #01...: Okay.
- Don Heberer: All right. So, I'm actually going to stop. Hold on. Stop sharing, and stop the recording.

APPENDIX O
Professional Development Session Transcript
Session 05 – July 6, 10:00 AM

- Don Heberer: Okay. It looks like everybody is on. So, first off, thank you again for participating in this study. I know with everything going on, being the end of the year, being a year where we had a pandemic and teachers were forced to teach remotely, or online for the first time is probably the worst year to ask you to do anything extra. So, I do appreciate taking the time to be part of the study. And I know there's a bunch of surveys and it's a commitment as far as time for the professional development session. So, I do want to express my gratitude for you participating in this study. What am I going to be doing here is I'm going to go be going through a brief professional development presentation here, talking about some of the things that are related to the study and at the end we'll have some time to talk a little bit and then you'll get a follow up survey?
- Don Heberer: The topic that I'm doing for this project for my dissertation for St. John's University is teacher perceptions, instructional practice with the PIC-RAT model of integration. So, if you don't know the PIC-RAT model, that's fine. You're not necessarily supposed to. That's what this professional development session is going to be on. My name is Don Hebert. I'm a doctoral candidate at St. John's University. My mentor is Dr. A. So, I'm going to go get started. Just give me a thumbs up if you can see my screen, or unmute your mic and just say yes or no.
- Participant #03...: I see it.
- Participant #04...: Yes.
- Don Heberer: Okay, great. Perfect. Here we go. All right. So, first things we want to take a look at is really the history of educational technology integration. So, if you think about it, technology in the classroom has always been around. At some point, a chalkboard was new technology for the classroom. The ability to write on a rock with a softer rock was technology at one point. But obviously over time, we look at technology in the classroom more of electronics, in a lot of ways, right? So, when you first think of technology, now you probably think of electronics, or computers, or some form of those, right? But technology has always been around in the classroom. Especially since post world war two, after people started coming back from the war, there was a lot of teachers that were teaching that were not necessarily qualified.

Don Heberer: So, the education system started looking professional development, and started looking at some of the technologies that were starting to bloom after the war. There was a movement towards a way to quantify, or measure, or evaluate some of the technologies that were done, or used in a classroom. There have been ways over the last couple of decades, especially to look at standard-based technology integration. So, if you look at the ISTE standards, or the NET standards, as they were previously called. The international society of technology and education has developed standards for students, teachers, administrators, and what they call coaches, which are technology integration specialists. There've been other models to do content-based technology integration, so you look at science and these are the standards that should be for science. Math and technology, those are all kind of in that steam kind of umbrella.

Don Heberer: They're also been skill-based technology matrix over the years. One of the more popular ones are the four C's of 21st century learning, which would be similar to back in the day, they used to have the three RS writing, reading, and arithmetic. Now we have the four C's, the four C's are communication, collaboration, creativity, and critical thinking. There have been pushes to look at relationship-based integration models. There are ways that you look at the relationship between the technology, the teacher pedagogy, and also the content. We're going to take a look at some of the more popular models really quick, and then we'll dive into the newer PIC-RAT model. So before we look into the models, we have to look at ways that you can potentially evaluate an integration model. Right here is, comes model for six criteria and guiding questions for evaluating technology integration models.

Don Heberer: Here are the six criteria. So the first one here is clarity. Is the model simple, clear, and easy to understand? So I like to say that if you look at it, can you just kind of get it? Can you read the little model and understand everything pretty quickly? The other piece you want to look at is the compatibility. Well, you don't want to reinvent the wheel. You don't want to change your entire teaching strategy and how you've been teaching in order to use this model. Is it compatible with what you're doing, your existing educational practices, and therefore, is it valuable? We look at the next part, fruitfulness. Does it elicit fruitful thinking? So you can grapple with problems of technology integration. Is it something that you can get something out of? Is it something that's going to give you a benefit. Then you want to look at the technology role. Does the model treat technology integration as a means for achieving specific pedagogical or other benefits rather than an end to itself?

Don Heberer: Oftentimes when school districts look to implement new technology, sometimes they just throw the technology in. They give a quick little PD and they move on. Sometimes teachers feel the pressure to use the technology just because their administrator told them to, or the district bought it, so I must use it. Well, you want to look at models that look at the technology as a tool, just another tool in your tool belt. Then you look and see which technology best fits your lesson. Scope, is it something that's scalable? Is it something that you can either use at a very, very specific level? Or can you use it as a high level? And then lastly, and probably in my opinion, the most important, does the model clearly emphasize students and the student outcomes?

Don Heberer: We're going to look at a couple of models here and see how they fit on the focus piece. By the way you guys, I know you're all muted here. If at any point you have a question or a comment, you can feel free to unmute and jump in. We will have time at the end to have questions as well, and comments. All right, so this model is one of the more popular models. This is considered the SAMR model of technology integration by Dr. Ruben Puentedura. This is about now 14 years old, so it's been around a while, but it's pretty popular among a lot of teachers. We're just going to go through it really quickly, just kind of see it as a jumping off point. So when you're looking at technology integration, let's just say you normally had students type up an essay, or something on let's say Microsoft Word. That could honestly be substitution right there, rather than a typewriter, but let's be real. No one uses a typewriter anymore.

Don Heberer: So a substitution would be something like that. An augmentation would be now instead of using Microsoft Word, you're using maybe Google docs. So the augmentation is a direct substitute, but it has functional improvement because Google docs automatically saves. You could also save Word online too, if you use the office 365. But Google docs automatically saves. You have revision history, you have things like that. That definitely has a functional improvement. Then you look at something like modification, would be the next level, and that would be in a transformation cap. So the technology allows for some significant task redesign. So now you can do things that you couldn't do before. So maybe in this case, taking it even a step further, with modification, now, maybe you do collaboration with the Google docs. So now your students can collaborate and maybe they can use it for group projects.

Don Heberer: They can all work on the same Google slides, or something together where you don't have one kid sit in front of the computer

and telling kids what to do. They all can contribute in real time, that would be a modification. Then a redefinition, let's take a look at another lesson. Let's say I'm doing a virtual field trip, might be a redefinition, because redefinition technology allows the creation of new tasks previously inconceivable. A virtual field trip, for instance, maybe you can just go quickly to Paris and take a look, walk the Paris streets. Now, could your students do that? Sure. You could do a scheduled field trip. Plane overseas, the cost of it would be astronomical, obviously. Is it possible? Sure. But it's not really feasible. There's also trips that you can take to the moon. So that's something that's not as feasible.

Don Heberer:

So there's a lot of things that you can do with technology that you couldn't do without it and this would be redefinition in the SAMR model. Another model that's pretty popular is the T-PACK model. So the T-PACK model has three circles of context here. The first one, the purple one, here is the technological knowledge. The blue one here is the content knowledge, and the yellow one is the pedagogical knowledge. So the technological knowledge is obviously using the technology piece. The content is really your subject area, your social studies, your math, your science, your world languages, whatever it is. The pedagogical is really how you're teaching that, or how the students are learning. You see how they overlap in different ways and the middle is really what you're focusing on to try to reach. The three-way overlap between these areas to get to the T-PACK, the technological, pedagogical, content knowledge, and that's really those two models.

Don Heberer:

If we look at [Cuns 00:11:00] evaluation here, we can kind of see some issues here. So for the SAMR model, it's kind of unclear where substitution and augmentation really change. As you saw in my example, they can sometimes overlap. So they may not be meaningful for practitioners. Also, the student focus, the student activities are implied, but there's not really any explicit definition at each level. And the T-PACK is sometimes a little too abstract for a lot of teachers to implement. So it's not really necessarily either compatible, or clear, what you're actually doing. So it's kind of an idea, but it doesn't give you specific guidelines. So those are some of the issues with that. We take a look at, this is another model here. This is the third, most popular model, is the low T, or the HEAT model, which incorporates hierarchal thinking, engaged learning, authentic connections, and technology use.

Don Heberer:

There's different stands here about how the technology is used. One thing that's nice about this, is it could be used as more of an evaluation tool. Whereas some of the other ones are looked at more

of a planning tool. Again, some of the criticisms, or limitations of these is there's too many levels. It's sometimes difficult where teachers may not agree with where they fit on that. And we're going to look at the RAT model in a second, but the RAT model is another model that it's kind of difficult to understand the one piece of it, because it doesn't have the student focus. But, we're going to take a look at something that changes that a little bit. All right, so I'm going to go ahead and play this video. I just want to make sure that everyone can hear it. So hold on here.

Video: When new technologies are invented, they often provide many new ways of thinking and doing things. For example, how have smartphones changed the way we live and work, or tablets, or even the internet? However, one problem we have as humans is that often we can't imagine very well the new possibilities available from new technologies. So instead, we use them just to do the same things we have always done before. Teachers struggle with this too. We often teach the way we were taught and struggle to think of how we could teach better based on the technologies we have, that our teachers did not have. Richard Culotta, former director of the office of educational technology for the US Department of Education shared the following concern.

Dr. Richard Cul...: Here's the issue. If we are not careful, if we are not super cautious about all the decisions we make in a very short amount of time, by the time the freshmen that are in this room have graduated. We will have a complete digital replica of the traditional practices that are not working today. We will have everything that we have now. It will just be on a screen instead of on paper and it will be just as ineffective and it'll cost a whole lot of money. We'll be just as stuck as we will not have another ticket to play to be able to make a change.

Video: Our goal is to help you think critically about the technology you'll use in your classroom. To begin to see the potential technology has to transform and engage students in the learning experience in new ways to begin. To begin, we're going to show you a technology integration framework. Frameworks are tools we use to begin conversations. In this case, conversations about how we should use technology to improve student learning. Let me introduce the RAT model. The first letter R represents replacement. Replacement can mean the following, one, changes the appearance or dressing of our practices, but not the practice itself, making digital copies of traditional practices, recycling instruction. Two, it doesn't affect teaching, or learning practices and behaviors. Three, can still be a useful use of technology because it can increase access. For

example, a digital worksheet won't get lost or eaten by your dog, but it doesn't really impact or improve learning.

Video: The A in RAT equals amplifying. In other words, technology improves the efficiency of tasks or introduces new functions to original tasks. The T in RAT equals transforming. It introduces new activities and learning that are impossible without technology. Take away the technology, take away the learning too. Next in our PIC-RAT model is the PIC portion. P equals passive. In other words, students are observers, bystanders in their learning. The I equals interactive. Students engage in material in an interactive way, they are active learners. The C equals creative. Students are creating materials themselves. They are creative learners, instead of passive or active ones. This is the apex of student engagement and students often they're deeper when they have to create something, using the content. By combining PIC and RAT together, we create a matrix of the many different ways technology can influence teaching and learning.

Video: You could use a technology that replaces a face to face conversation and where students are passive learners, such as a video lecture, or where they get to interact back through technology. Such as a video conversation, or where they get to learn by creating their own videos in a way that completely transforms the way you typically teach. The PIC-RAT model is a great tool for helping you to think about your teaching and how you use technology in the classroom. None of the squares on the matrix is necessarily a bad way to teach. Sometimes it's good to be a passive learner, for example, and listen to others, such as in this video. But a good teacher will continually evaluate their practice and think how they can improve. Using the PIC RAT model can help you think about what kinds of ways you could use technology that will help students be more active and creative as learners, and ways that transform your teaching to levels you hadn't considered before. So when you hear about a new technology, don't just ask what it can do for you that you already are doing anyway, think PIC RAT and see if there's a way this technology can help you transform your teaching in positive ways.

Don Heberer: Okay. So that the PIC RAT matrix by Royce Kimmons who started developing it in 2016 and published it in 2018. So it's relatively about two years old and it's a fresh take on looking at technology integration in the classroom. So let's just review it really quickly, and then we'll look at some examples. So if you look at the X axis, the teachers use the technology. It looks at, if you see that there's a blank in there at the bottom, it says teachers' use of tech blank,

traditional practice. We look at it and we see, all right, does it replace, amplify, or transforms the traditional practice? So again, replacement would really just, I'll just jump ahead real quick. Just to come back. Replace just changed the appearance of the practice or dressings, but does not change the practice itself. It can increase access but does not necessarily improve the learning.

Don Heberer:

So with, or without the technology, the learning is basically the same, but it can maybe increase the access. Then you look at amplifying. The technology improve the efficiency of tasks, or introduces new functions to original tasks. And then lastly, the transforming, it introduces new activities to learning that are impossible without technology. Take away the technology, take away the learning too. So you might recognize these, these are very similar to some of the ones in the SAMR model, but the thing that's nice about PIC RAT is it doesn't just look at the teachers use of technology, like some of the other models. It also looks at the student's piece, and that's that Y axis here. So it looks and sees that the students passive, are they just observers, bystanders, just watching something. Or are they interactive where they're engaging in the material so they're actively learning. Or are they even creative where they're creating materials themselves. So they're creative learners that rather than interactive or passive ones.

Don Heberer:

So when you kind of put this together, you can kind of use this flow chart to determine what level of RAT you're on, and what level of PIC you're on. So, again, let's look at the bottom here first, because I think it's a little easier to determine passive, interactive, or creative. So when it's passive, the students are just observing or watching. The content is coming from really just back and forth between the teacher. The students are just kind of watching it. Whereas interactive, there is interactivity between the content, not only the teacher, but also the students. They're getting some feedback, and they're able to have kind of a voice. Then creative, you also have that interactivity, but at the end, the students have something tangible. A product or something that they've created that wouldn't exist before that lesson was done. So this could be something physical or digital, but there's something that's created at the end.

Don Heberer:

When you look at the RAT piece, the teacher's involvement, you use this flowchart to ask yourself these two questions. First, are the achieved learning objectives of the activity clearly better than they would have been without the technology, or via a low tech solution? If the answer is no, but you're still using the technology, you're going to be at a replacement level. So again, maybe it's you

had overhead transparencies and now they're typed up in a PowerPoint, and they're just easy to read, that would be a replacement. But, if the answer is yes. The outcomes are better with the technology, then you're going to go over here and you're going to say, "All right, could the activity have reasonably been done without technology, or via a low tech solution?"

Don Heberer: Then it's amplification if the answer is yes. If the answer is no, that none of this can be done without the technology, then you're in a transformation. So you can use these questions to determine replacement, amplification and transformation. All right. So let's take a look at some specifics here. We have 12 participants in this study, and each of you submitted your three lessons that you've done this year. Now, somewhere where prior to COVID, some were during COVID. So they definitely varied a little bit. So if we're looking at here, we're not going to go through all of these. There's 36 of these, but we're going to take a look at some of these. So for this person, they did Screencastify for listening comprehension, and they listened to an oral script by using a practice exam link with the multiple choice answers. Okay. So in that case, Screencastify would be passive. You could maybe make an argument that because they use the practice exam and maybe interactive, it's kind of two technologies together.

Don Heberer: So if you're combining both of these, it might be considered interactive. It definitely would be an amplification because you definitely are using a video, things like that. If you look at this ed puzzle, if you're not familiar with ed puzzle, ed puzzle will take any video, whether you've created it, or you found it on YouTube, or other video sites, and ask questions in the middle of the video, which is pretty cool. Then there's voice thread. Voice thread allows students to record a video of themselves, or basically speak and have it recorded. So obviously that would be a creative thing, and it would be something amplified. I don't know if it's a transformation because you probably could do that in person, but the amplification piece is definitely in there and the creative pieces in there.

Don Heberer: All right. So we can go through a couple of these here. I'll just pick a random one and stop. Here's a good one. This one is person use Flipgrid. So Flipgrid is a fantastic, fantastic tool. If you're not using Flipgrid, you definitely should check it out. It's similar to voice thread, it allows you to record, but the thing that makes Flipgrid a little bit more special is you can add text on top of it. You can add emojis, you can add a flare, you can add different pictures, and things like that. It really allows the students to kind of

and their own kind of personality to what they're doing. So not only do they get to record the video and the audio, you can do comments back and forth between the teachers. So that would be not only creative, but that would be maybe a transformation.

Don Heberer: And we can look at some of these other ones that people submitted. Let's keep going here. iMovie would be another example of something that's creative transformation because students create their own video. We'll go to Quizzlet here. Quizzlet, obviously would be an interactive one because they can go back and forth. They get the feedback and it would be an amplification because you definitely have better learning outcomes with using that technology. But necessarily, it wouldn't be a transformation because you could use, potentially, a lower tech solution like those index cards. These are some ways to kind of look through, PIC-RAT.

Don Heberer: Now, I actually took the data and made it like a Metta chart. So this is everyone's submissions on one PIC-RAT matrix. You can see how where we've fallen here. We have a big chunk in the middle here. A lot of people are kind of interactive amplification, but you have some people up in the creative transformation, and you have some people down in the passive replacement. Now, passive replacements, not necessarily bad. Passive sometimes does have its merits. Right now, this presentation's pretty passive, but you can look at the PIC-RAT matrix as either evaluation tool to what you're currently doing, or as a planning tool to say, "All right, here's where my lessons at. What can I do to make it maybe more interactive or creative? Or maybe what can I do to amplify that the traditional practice or transform the traditional practice?" You definitely want to try to get closer to this L right here. This outer, see the top row, or this last column here and the apex here is that creative transform that CT area.

Don Heberer: All right. So here's where I'm going to ask you guys to unmute your mic. We're going to do some practice problems here, so to speak. All right. So let's see, let's do number one and see what we come up with. Well, so where would this fall on the PIC-RAT matrix? So any of you guys feel free to unmute your mic. Let's see, a teacher uses PowerPoint as part of her lecture.

Participant #06...: PR.

Don Heberer: Okay, so we think that's PR?

Participant #03...: Yes

Don Heberer: Everyone agrees PR?

Participant #03...: Yep.

Don Heberer: So, that answer is, according to Royce Kimon's website, and the PIC-RAT matrix, PR is correct. It would just be a replacement, and it's passive. All right. Let's take another one. Let's look at number four. So four students play an online role playing game about John Smith and Pocahontas.

Participant #06...: Definitely interactive.

Don Heberer: Okay, great.

Participant #03...: And I think it's T as well, I don't think they're creating anything here, but you can't really play as John Smith and Pocahontas without some transformation.

Participant #04...: Yeah, that sounds good.

Don Heberer: Yeah. So according to their website, it's only an amplifies, but I agree with you. I would think, maybe if it wasn't online, maybe there's like a role playing game in a box, like a D&D kind of thing. But I agree with you. I think it's a transformation. So, but yeah, according to their website, it's just an amplifies. Okay, what other ones let's take a look at? Let's do number eight. Students make an animated video to tell a story.

Participant #06...: CT, or maybe CA because they could draw it out.

Don Heberer: Yep. So, the correct answer is, we would either accept CA, or CT. So yeah, they guess they could draw out the animation, those flip books or whatever, but I think an animated video would definitely make more sense. So I definitely think it's CT. All right. So I think you guys kind of get a good section of this. Let's just do one more, a teacher designs a WebQuest, or an inquiry driven online lesson for students to complete on their own time. Anyone want to take a crack at that?

Participant #06...: I'm torn between. I don't know. Maybe it's not PA. I landed IA, but I don't think I'm right.

Don Heberer: IA is correct. It's interactive application. They said they'd also accept IT, I guess depending on how interactive it is. So, all right. So I think we have a pretty good idea. What I want to just do is, what can you do as a teacher at this point? Again, I know we went

over this already, but use this flow chart to help determine where you are on RAT. Also use these infographics to determine where you are with the PIC piece, then obviously put it together. So that's some ways that educators can begin to implement PIC-RAT, either as reflection tool, or planning tool, or maybe both. All right. So the last thing that I'm going to ask you guys to do, and I'm going to email you this link. So don't worry about filling it out now, is just kind of do a post survey about the PIC-RAT model and some of your perceptions.

Don Heberer: Then, what I'm going to do in a couple of days is I'm just going to ask you guys to submit three more lesson examples, or activities that you do, and they don't have to be full lessons. Just activities that you've used with technology. Now that you've seen the PIC-RAT model. Obviously in a perfect world, I would've actually come to your classrooms and done these observations, but with COVID-19 we have to shift and it's going to be more of a hypothetical because you're not going to be able to do these with the students, also because it's the summer. You would just write what you would do with your students in the survey. All right. So is there any questions or comments? What do we think of this model?

Participant #03...: I enjoyed the PIC-RAT model a lot. Are we going to get a copy of this presentation so we can actually use it and implement in our class?

Don Heberer: You absolutely will. Yep. You will get a copy of this presentation along with the survey.

Participant #04...: I'm glad that someone asked that, I was going to ask the same thing. If we could get a copy, please.

Don Heberer: Absolutely.

Participant #04...: Thank you.

Participant #06...: Thanks Don.

Don Heberer: All right. Any other questions? I'm going to actually stop the recording at this point.

Participant #03...: No questions.

APPENDIX P
Professional Development Session Transcript
Session 06 – July 10, 10:00 AM

- Don Heberer: Hello.
- Participant #09...: Good morning. How are you?
- Don Heberer: Very good. Good morning. Thanks again for coming on.
- Participant #09...: Thank you for accommodating my crazy schedule.
- Don Heberer: Everything's been crazy I think for the last couple of months. Nothing's normal anymore, right?
- Participant #09...: No, that it's not.
- Don Heberer: All right. So just want to go over a couple of things real quick. So I am recording this session. I'm just recording the audio, so I have to have it transcribed for the purpose of the doctorate. What's going to happen is after I have the recording and the transcript, I'm going to send you the transcript of it so you can review and make sure that everything's accurate. And basically, I'm just going to go through my slides. At some point, I'm going to ask you some questions. You're the only person for this session, so it's just me and you.
- Participant #09...: Thank you.
- Don Heberer: And that's really it.
- Participant #09...: Okay.
- Don Heberer: All right. And again, thank you. I know this is probably the worst time in the world to ask teachers to do anything extra. So I do appreciate you being involved in this study and helping me out.
- Participant #09...: No problem.
- Don Heberer: All right, so can you see my screen? Can you see the presentation?
- Participant #09...: Yes, I can.
- Don Heberer: All right. Great. So I'm going to get started.

- Don Heberer: All right. So this is the professional development session for my dissertation. I'm Don Heberer. I'm a doctoral candidate at St. John's University with my mentor, [Dr. Nunziato, 00:00:23], for the Department of Administration Instructional Leadership. this study is Teacher Perceptions and Instructional Practice using the PICRAT model. And we're going to learn a little bit about educational technology models in this PD session, and then go deep into the PICRAT model.
- Participant #09...: Excellent.
- Don Heberer: All right. So let me try to advance the slide here. Where is it? There we go. Okay. All right. So let's just take a brief look at the history of educational technology integration. Technology integration models have been around a while. In the recent years, they've been adapting to the advent of computers and mobile devices. But if you go all the way back to 100 years ago, educational technology was a chalkboard. At one point that was new technology.
- Don Heberer: We don't look at it that way with our modern perspective. Nowadays when we think about technology, we think about electronics and computers and software and things like that. But at one point, chalkboards were new technology. And if you look at post World War II, when people started coming back from the war, during the war, a lot of people were we're in the classroom that normally wouldn't have been considered qualified for teaching.
- Don Heberer: So there was a big shift with professional development. There was a big shift with technology as we entered the Cold War and the Space race. There was a lot of new technologies that were being developed. And the idea that professional development should accompany the use of these technologies started to gain root. And there's a lot of different standards that were developed, standards-based educational technology models.
- Don Heberer: Prominently, ISTE has been the leader in educational technology models over the last a couple of decades. That's the International Society of Technology and Education has developed standards for teachers, administrators, students, and even technology coaches. There have been pushes to do content-based standards for educational technology, where you look at science, math, and technology, or STEM, as it's been more recently tied to. There's been content-based standards for those for educational technology.

- Don Heberer: There also been pushes for skills-based educational technology integration, where you focus on specific skills. One of the more prominent ones of that in recent times has been the FourCs of 21st century learning, which are communication, collaboration, critical thinking and creativity.
- Don Heberer: And there also been some models that look at relationship-based technology integration, the relationship between the content, the technology, and the pedagogy behind it.
- Don Heberer: So when we're looking at different technology integration models, we can look at ways to evaluate them. And one of the leading ways to evaluate models is Kimmons and Hall's- six criteria in guiding questions for evaluating technology integration models, and you look at these six criteria.
- Don Heberer: So the first one we look at is clarity. Is the model simple, clear, and easy to understand? Can you just kind of get it? It's not too complex. It's something that's easy to understand.
- Don Heberer: Then you look at the compatibility. Does it support existing educational practices that are deemed valuable to teachers? Can you integrate it without having to change your entire way of teaching or what you value as what's important in education? Can it work with your existing way of doing things?
- Don Heberer: The fruitfulness. Does the model elicit fruitful thinking as teachers grapple with the problems of technology integration. Can you get something out of it? Is the juice worth the squeeze, as they say, right? Is it worth the time and the effort to put in.
- Don Heberer: The technology role. So does the model treat the technology integration as a means or for achieving some success? Or is it just an end to itself? Are you using technology just to check off that box? Or, hey, I'm using technology and you feel like you've moved on. Or is it kind of a tool as achieving some other pedagogical or learning outcome? You also can look at the scope. So is it something that can be used in a particular part of a lesson? Could it be used as a part of the whole lesson? Could it be used as a unit? Could it be used as your whole curriculum? Is it something that's scope or scalable?
- Don Heberer: And then lastly, and what I feel potentially is the most important, the student focus. Does the model clearly emphasize student and student outcomes? So are the students being accounted for in the technology integration model?

Don Heberer: So what we're going to do is we're going to look at some of the popular models for technology integration, and then we'll look at a PICRAT. So this is probably one of the most known and most common technology integration model. In fact, in our surveys, this is the one model that teachers seem to know the most about or have heard about. This is called the SAMR model. It works on four different stages in two different clusters of integration. It's been around since 2005 and Dr. Ruben Puentedura came up with it. It looks at technology in these four stages.

Don Heberer: So the first one would be, let's say, if you have students typing up an essay or something like that. Let's just say, let's go back to a typewriter. I know we don't use typewriters anymore, but now instead of a typewriter, now using a word processing program, like Microsoft Word, technology's a direct substitute with no functional change. Now you might want to argue that, hey, with a processor, you can go back and forth. That might be a functional change. So in that case, it could be potentially more than just a substitution. But let's just say for now, it's just a substitution.

Don Heberer: Then you look at something like augmentation. So augmentation would be something where the technology is functional improvement. So maybe instead of using Microsoft Word, where one student is on and writing their own essay, now you have the functional improvement where now on Google Docs or Microsoft Word Online, now you can share the document and students can collaborate on the same document. That would be an augmentation. And those would be under the enhancement category.

Don Heberer: And then you look at the next level would be modifications. So the technology allows for significant task redesign. Well, that could be something where you wouldn't necessarily have the same way you set up a task. Well, maybe now not only are the students collaborating, but maybe now they're making suggestions and edits and there's a revision history in there. And you don't have to have kids go to a computer lab because now you have a set of Chromebooks or whatever it is. You can actually do things in the classroom that was it a little difficult to do.

Don Heberer: And then lastly, the redefinition is the technology allows creation of new tasks or outcomes that are previously inconceivable. So a good example of this would be if you use Google Expeditions or Nearpod VR or something like that, and the kids go on a virtual field trip to, let's say, France or something like that. Yeah, I guess they could hop on a plane and do a field trip, but the cost of that

would be pretty crazy. So it's impossible to do without the technology. All right. So that would be the SAMR model.

Don Heberer: We also have the TPACK model. This is another model that looks at technology integration in a different way. So this one looks at, if you look at these three circles here, let's look at the purple one first. That's the technological knowledge. All right, the knowledge of the technology, understanding technology. Then you look at the content knowledge. That would be your math, your science, your social studies, whatever content area. And then you look at the pedagogical knowledge. How is that being taught and how are the students learning? And you see how these overlap in these three areas here, here, and here. And then in the middle here, this is kind of the apex of everything, where all three of these overlap to get technological, pedagogical, content knowledge, which is considered TPACK.

Don Heberer: So what you want to do is as teacher, if you're using a model like this, is you want to overlap with the technology, the content and how the students are learning are all coming together in a cohesive way. But there's some issues with this. So some of the limitations, or its criticisms, difficulties of SAMR are as even my example. It's sometimes difficult to determine the difference between substitution augmentation. There's not necessarily a clear line. Some distinctions may not be meaningful for practitioners. There may not be necessarily a meaning for you to say, all right, well, I'm going from augmentation to modification. There's nothing really to kind of shoot for. And the student focus is the implied, but it's not inherent in each definition.

Don Heberer: And then if you look at TPACK, TPACK for some teachers is kind of too abstract and it's not really necessarily fruitful because it's very high level. It kind of just gives you kind of guidelines, but it doesn't go specific to what you should necessarily be doing.

Don Heberer: The next model we're going to look at is, and there's a bunch of models here. I just listed some of them on the left. But the other one would be the LoTi HEAT model. And this one incorporates higher order thinking, think like Bloom's taxonomy, engaged learning, authentic connections of technology use. And it looks at the different strands as you should be focusing part of your time on these different outcomes.

Don Heberer: But the issue with all these different models is few of them measure the students' relationships to technology when evaluating the technology integration. And you look at the LoTi model, too

many levels are provided, level dissections are difficult, and the teachers may not agree with the value.

Don Heberer: And what we want to look towards is we want to look towards this newer model that started being developed in 2016 by Royce Kimmons, and was first published in 2018. And this is called the PICRAT model.

Participant #09...: Am I supposed to be hearing something?

Don Heberer: Oh, you don't hear it? Hold on. Let me...

Video Audio: When new technologies are invented, they often provide many new ways of thinking and doing things. For example, how have smartphones changed the way we live in work, or tablets, or even the Internet? However, one problem we have as humans is that often we can't imagine very well the new possibilities available from new technologies. So instead, we use them just to do the same things we have always done before. Teachers struggle with this too. We often teach the way we were taught and struggled to think of how we could teach better based on the technologies we have that our teachers did not have. Richard Culatta, former Director of the Office of Educational Technology for the US Department of Education shared the following concern.

Richard Culatta...: Here's the issue. If we are not careful, if we are not super cautious about all the decisions we make, in a very short amount of time, by the time the freshmen that are in this room have graduated, we will have a complete digital replica of the traditional practices that are not working today. And we will have everything that we have now. It will just be on a screen instead of on paper, and it will be just as ineffective and it'll cost a whole lot of money. It will be just as stuck as we will and not have another ticket to play to be able to make a change.

Video Audio: Our goal is to help you think critically about the technology you'll use in your classroom, and to begin to see the potential technology has to transform and engage students in the learning experience in new ways. To begin, we're going to show you a technology integration framework. Frameworks are tools we use to begin conversations, in this case, conversations about how we should use technology to improve student learning.

Video Audio: Let me introduce the RAT model. The first letter, R, represents replacement. Replacement can mean the following. One. Changes the appearance or dressing of our practices, but not the practice

itself, making digital copies of traditional practices, recycling instruction. Two. It doesn't affect teaching or learning practices and behaviors. Three. Can still be a useful use of technology because it can increase access. For example, a digital worksheet won't get lost or eaten by your dog. But it doesn't really impact or improve learning.

- Video Audio: The A in RAT equals amplifying. In other words, technology improves the efficiency of tasks or introduces new functions to original tasks.
- Video Audio: The T in RAT equals transforming. It introduces new activities in learning that are impossible without technology. Take away the technology, take away the learning too.
- Video Audio: Next in our PICRAT model is the PIC portion. P equals passive. In other words, students are observers, bystanders in they're learning. The I equals interactive. Students engage in material in an interactive way. They are active learners. The C equals creative. Students are creating materials themselves. They are creative learners instead of passive or active ones. This is the apex of student engagement and students often learn deeper when they have to create something using the content.
- Video Audio: By combining PIC and RAT together, we create a matrix of the many different ways technology can influence teaching and learning. You could use a technology that replaces a face-to-face conversation and where students are passive learners, such as a video lecture. Or where they get to interact back through technology, such as a video conversation. Or where they get to learn by creating their own videos in a way that completely transforms the way you typically teach.
- Video Audio: The PICRAT model is a great tool for helping you to think about your teaching and how you use technology in the classroom. None of the squares on the matrix is necessarily a bad way to teach. Sometimes it's good to be a passive learner, for example, and listen to others, such as in this video. But a good teacher will continually evaluate their practice and think how they can improve. Using the PICRAT model can help you think about what kinds of ways you could use technology that will help students be more active and creative as learners, and ways that transform your teaching to levels you hadn't considered before.
- Video Audio: So when you hear about a new technology, don't just ask what it can do for you that you already are doing. Think PICRAT and see

if there's a way this technology can help you transform your teaching in positive ways.

Don Heberer: Okay. So if we look at the PICRAT matrix, we see that it has two axes. It has the X axis. The teacher's use of tech either replaces, amplifies, or transforms traditional practice. And then we have the Y axis. The student's relationship to the tech is either passive, interactive, or creative. And if we look, and I'll go the other way. If we look at the teachers use, replacement just changed the appearance, but doesn't affect the teaching and learning practices and behaviors. It can increase access as of taking notes that you'd normally write on a whiteboard or something like that. And then printing them and having them available would be instead of writing on the chalkboard, now you have it on a PowerPoint or something like that. That can improve access, but may not necessarily improve the learning. Amplifying improves the efficiency of tests or new functions. And then transforming is new activities that are not possible without technology. So again, the way to look at that one is take away the technology, you would also take away the learning too.

Don Heberer: And in this case, we have the student's relationship to the tech. Either they're passive, they're just walking watching or observing. So far, this PD has been pretty passive. Interactive would be the students engage the material in some interactive way, and they're active learners. And then creative is they're creating the materials themselves so they have something tangible at the end.

Don Heberer: And if we look at this, we can look at two different ways to kind of determine the difference between a replacement, application, transformation, and passive, interactive, and creative. I think it's easier to determine passive, interactive, and creative, because passive is just where the students are not really engaging with material. They're just either listening or watching or something like that. Where interactive, there's interaction back and forth between the material or the teacher and the student in some way, or the technology in some way. And then creative is where they have some type of tangible, whether it's digital or physical product that they've created.

Don Heberer: The, the RAT part is a little bit more difficult, but these two questions help us determine the difference. So the first question you ask yourself at up the top here. Are the achieved learning outcomes clearly better than they would have been without the technology or lower tech solution? If the answer is no, you're just doing a replacement. So you're still using technology, which is

fine, but if the outcomes are not really any better, then it's just a replacement. If the outcomes would be better and the answer's yes, you ask the second question. Could the activity have reasonably be done with the technology via lower tech solution, either index cards or chalkboard. Let's use index cards as an example.

Don Heberer: So something like Quizlet. If you're just using the part where it asks you the definition, the answer might be, in that case, yes, it's just an amplification. But if you do something like Quizlet Live, where the students are now interacting and they're all competing and they're doing something like that, then the answer may be no. In that case, it couldn't have been done without the technology, then that could be a transformation. So sometimes it's not necessarily the tool, but it's also how you use the tool. So you can use these two questions to help determine replacement, application, transformation. And sometimes the line's a little blurry between amplification and transformation. It really, again, depends on how you use the tool. All right. So before we go in, is there any questions on PICRAT?

Participant #09...: No. Just so that I'm clear, when I'm looking at technology that I'm using, I'm asking myself these different questions as to whether or not it's simply a replacement, or if it's amplifying and transformative. I want to make sure that I'm targeting all of those things when I select something?

Don Heberer: Exactly. I mean, if you're not sure where it falls in the RAT part of the model, these two questions can kind of help you place it. So again, passive, interactive, creative, I think are a little bit easier just to kind of automatically understand once you're looking at how the students are interacting. But for the RAT piece, these questions do help you understand where it falls, whether it's replacement, amplification, or transformation.

Don Heberer: Okay. So let's look at some of these. So we have 12 participants in this study. And you guys all sent in some potential lessons that you've either done this year, either before or after COVID. So here's some examples that we have here. I'll just pick a random one.

Don Heberer: In this case, this person did HyperDocs. So example how the knowledge used in classrooms created HyperDocs. HyperDocs are a central document that contains links to components and lesson activity. Using this method helps students stay organized in technology and it gives them a clear indication of what needs to be done for each step to complete all aspects. So in this case,

HyperDocs is something has to be done with Google Docs. And you could not do it with a worksheet because they have links and things on them. So that would definitely be a transformation, because you could not do that without the technology. And it's interactive because the students are engaged in technology.

Don Heberer: Now they're not necessarily creating anything. But maybe in the HyperDoc, if you had said, all right, well, now you've done this. Now create a drawing or a poster or something like that, that was in addition to what the material was. Then maybe you could move that into the CT location.

Participant #09...: Okay.

Don Heberer: But in this example, this would be an interactive transformation. Let's look at some other ones here. So another one might be a Flipgrid. So this person worked with Spanish teachers to create a Whodunit lesson. This is writing technology on the four skills. At the end, they use the Flipgrid. They prompted the students with a Flipgrid prompt. Are you familiar with Flipgrid?

Participant #09...: Yes. I tried it in the Spring with my students.

Don Heberer: Okay, great. So you're familiar with it and how you can do a video prompt and then the students can do video responses. They could put little emojis on there and flare and little texts and things like that. So not only the students, obviously, that's not something that's transformation. Students can do that without technology. But it's also creative because the students are not only making their response, but they're actually creating some content after that. So that would be a good example of a CT.

Don Heberer: Let's see if we can find another one in here that would... Well, actually let me just go to my middle one. So I compiled everything into one PICRAT model, and this is everyone's responses. Some were the same, but this is an aggregate of everything. So you look and you see that we have a couple passive replacement. This is just using the Promethean board, which is kind of a interactive SMART Board or Whiteboard. Some people did just recorded videos. Some people did iMovie in Flipgrid. But the chunk of what people did was in the interactive and amplify section.

Participant #09...: Okay.

Don Heberer: So this is a good cross section of what people did. Even something like virtual tours, so like a Google Expeditions. That's something

that's passive, in most cases. The students can't really do anything to interact. They just kind of look around. But it's still a transformation because you can't do that without the technology.

Don Heberer: So you can see passive replacement's not necessarily bad. There's plenty of determinations and lessons where you want to do that. But you find that the student engagement increases as you move from column to column between replaces, amplifies, and transforms, or move from row to row with passive, interactive, and creative. And you find that engagement is the highest level with student engagement at the CT level. And student engagement, not always, but more often than not, translates to higher achievement. If students are more engaged, they're more likely to achieve higher and understand better.

Participant #09...: Okay.

Don Heberer: So we can do a brief little kind of a quiz here. This is from Royce Kimmons' website, who created the PICRAT model. And maybe we can go over some examples and see where they would fall on the PICRAT model. So if we look at number one, a teacher uses PowerPoint as part of her lecture. Where do you feel that would fall under the PICRAT model?

Participant #09...: PR?

Don Heberer: That would be PR, yes. It's passive and it's just a replacement. All right. Let's see. Students organize geometric shapes and patterns on an iPad.

Participant #09...: Oh, organize metrics on an iPad. That would be IA?

Don Heberer: Okay. So definitely "I", yup. So interactive because they're using the iPad with technology. That's the relationship to the tech. And I mean, I think it says here it's IR. I guess it's because it's just replacing the manipulatives you might have in a classroom, right, the different in shapes. But I could see it being interactive if maybe there was a feedback loop where it said, if you got to correct automatically, or said if you got it incorrect. So according to the quiz here, just says IR, but I would think it depends if how the iPad program is set up.

Participant #09...: So if I were doing this with my class, and they were doing that specific activity, but we were doing it as whole class and it was modeled on the board what the student did, would that bump it up to IA? Because that's what I was thinking about, as opposed to not

just individual students, but engaging students in conversation as to why it is they did what they did. And using the different vocabulary in order to reinforce it within the lesson.

Don Heberer: I mean, I think that would definitely help. I think the amplifies part of it is something that if the learning outcomes are improved with using the technology. So that's the distinction between replaces, amplifies. Replaces doesn't improve the learning outcomes, but amplification does. So in that case, if you were to model it with a, let's say it's an iPad. So you're using an air server or something like that to mirror your iPad to show the kids. Or you do it on the SMART Board, and then they do it similar to on the iPad, whatever it is. If there's an amplification in there, if there's a way that the learning outcomes are increased, then it would be an amplification.

Participant #09...: Okay.

Don Heberer: If the learning outcomes are the same whether you use this technology or not, then it's a replacement. And then if you couldn't do the learning outcomes in any way without the technology, there's no substitution, there's no way to do it without technology, then it's a transformation.

Participant #09...: Got it.

Don Heberer: So that's really the distinction there. All right. So then let's just do one more. Students make an animated video to tell a story.

Participant #09...: CT.

Don Heberer: Yes. So they're creating something. We would accept in this case CA or CT. Again, it really depends. I guess you could make an animated video in another way. But students make an animated video to tell a story, I agree, I think that's a CT. Because obviously they're creative and then they're transforming, because without the technology, how are they going to make an animated video? So I definitely agree with you. And that's the answer that is on the PICRAT model. All right. Very good.

Don Heberer: So just in kind of summary here, how can educators begin to implement PICRAT? I think you can look at it as not only a planning tool to when you're looking at your lessons and how you might previously use technology versus how you might use it in the future. It definitely could be planning, but it also could be as a reflective tool. It can be, all right, well, how did I use the

technology? You know what? This is only passive. If I do this other thing, kind of like you mentioned, if you add this other component, well, now it can be interactive and then that could increase student engagement. Or maybe it is interactive, and now if I do this other element, now it could be creative. Or it's, hey, this is only the replacement. What can I add to this to make it an amplification? Or what can I take this amplification and make it a transformation?

- Don Heberer: You always want to try to hit higher level of boxes and there's different ways to do it. You can either increase the relationship between the student and the technology or increase how you're changing your instructional practice. And again, these are these ways to help find the answer to that.
- Don Heberer: And that is it. So at this point, we do ask if you have any additional questions on PICRAT and models in general.
- Participant #09...: The slide that you had on before this, is it possible for you to share that so that I can use it while I'm planning for instruction for the Fall?
- Don Heberer: Absolutely. So what I'm going to do at the end of this, I'm going to send you a survey about the PD and education technology integration models. I'm also going to send you another request for three lessons that you would do. Again, in a perfect world, I would have come and observed your classrooms and see what you've done after a period of time. With COVID, obviously, that's not possible. So it's going to be things that you would potentially do in your classroom, not necessarily that you are able to do in your classroom at the moment. But you're going to fill that out, but I'm also going to send you the PowerPoint. So you'll have this whole presentation to look at as well.
- Participant #09...: Okay. Excellent.
- Don Heberer: Do you have any other questions on the PICRAT model or education technology in general?
- Participant #09...: So in the presentation, you mentioned Flipgrid. I think I saw a Nearpod. I saw the HyperDocs. Are there specific recommendations that you have for a special education classroom in order to help amplify and transform instruction?
- Don Heberer: Yeah. Again, I don't have a specific list or anything like that, if that's what you're looking for. I could probably find some

resources to send you, but, I mean, especially it's a little different because you have to understand what the students are able to handle and where their different abilities. It's not necessarily a one size fits all in that kind of situation. So I think understanding your students and knowing what they're able to achieve might be a little different. You could probably find a lot of tools, maybe it's you use the Flipgrid for these students and then the other students maybe use different tool, like a VoiceThread or something like that. I think there's a lot of different tools that you can use for whatever situation, because it's not necessarily about the tool. Sometimes it's about how you use the tool. So to just provide a list of tools would not necessarily be perfect to give you exactly where it falls on PICRAT. But I can give you a list of tools that work well with educational technology, if that would be helpful.

Participant #09...: Yes. Thank you. I'd appreciate it. Right now I use Nearpod in my classroom and I just started using Flipgrid mainly for my students who do not read and write. So I would give them an audio prompt on Flipgrid for them to be able to answer back so that I have something for them. But some of the other things that you mentioned, I'm sorry, I'm now learning these technologies. So I'm just trying to figure out what I could use with my students that would be effective, and as you said, amplify and transform the education that they're receiving.

Don Heberer: Listen, I think with everything going on, one of the silver linings of this whole pandemic is people now are forced to use the technology with the students, whether it's the teachers, whether it's the parents now. I think now they're seeing some of the value. But the video said, we got to be careful that we don't just do replacement. Because if we continue to just replace the same things that we've been doing, replace the pedagogy, just do passive things with technology, we're really just creating a digital copy of what we have now, and that's not going to help the students. We really need to think about using the technology. We have this opportunity to really have the students be creative, to transform the way they learn, and do things that we couldn't do before. So I think that's our responsibility as educators now to make sure we're trying to move in that direction.

Participant #09...: Okay. Thank you.

Don Heberer: All right. I'm going to stop the share and stop the recording.

APPENDIX Q

Semi-structured Interview Questions for Participants

(Only for Participants that that moved more than 1 point on the PICRAT Matrix)

1. Describe your relationship with technology in your personal life? Were you always interested in technology?

This is designed to be a question to relax the participant in the interview process.

2. Describe when and why you began using educational technology in the classroom?

Prompt: Have you always used it? When did it change for you?

3. What are your favorite educational technology tools?

Prompt: Why are these your favorite tools? What can you do with them? Why is that important to you?

4. Prior to this study, what professional development have you received on educational technology integration as a whole?

Prompt: Were these in-service? Workshops? Conferences? Graduate/Undergraduate classes?

5. Prior to the professional development session that I provided and you attend, what other professional development have you received on educational technology integration models and matrices

Prompt: Which ones? Was it a district plan or in general?

6. What were your thoughts on educational technology professional development and integration models?

Prompt: Why did you feel this way?

7. Were you familiar with the PICRAT model prior to this study?

Prompt: How did you hear about it?

8. What were your initial thoughts on the PICRAT matrix when you were introduced to it in the professional development session?

Prompt: Were they positive? Negative? Neutral?

9. In what ways did you change or modify your instructional practice after the introduction of the PICRAT model.

Prompt: What specific changes? Provide an example of how you would have done a lesson prior compared to how you did it after the PICRAT matrix.

10. To what extent do you feel your attitudes have changed toward educational technology integration after exposure to the PICRAT matrix?

Prompt: None? Positive, Negative, Explain

11. To what extent do you feel your attitudes have changed toward educational technology integration models after exposure to the PICRAT matrix?

Prompt: None? Positive, Negative, Explain

12. How did you account for students' interaction with the technology prior to the PICRAT matrix when designing lessons?

Prompt: provide specific examples.

13. How did you account for students' interaction with the technology after the introduction to the PICRAT matrix when designing lessons?

Prompt: provide specific examples

14. Would you recommend the PICRAT matrix to other colleagues and teachers?

Prompt: Why or why not

15. Do you see the PICRAT matrix as a reflective tool or a planning tool?

Prompt: Why or why not

APPENDIX R
Interview with coding for Participant #11 of Island Acres

August 9, 11:00 AM

Interviewer:	So what's going to happen is I'm going to just ask you a couple of questions based on the study.	SOCIAL MEDIA ELECTRONIC PAYMENTS VIDEO CALLS ORGANIZATION TECHNOLOGY MAKES THINGS EASIER
Participant #11:	Okay.	
Interviewer:	Are you ready? Are you ready?	
Participant #11:	Yeah, ready.	
Interviewer:	Okay. Great. All right, so first question. Describe your relationship with technology in your personal life.	
Participant #11:	In my personal life I feel like I use technology quite a bit because I tutor online. I do Zoom calls online with family members, I use FaceTime, I use Venmo, I use all the electronic payment stuff. I use a lot of social media.	
Participant #11:	So, I honestly use technology to make my life just a little bit easier in and of itself. I use it... It's hard to avoid at this point. I feel like you kind of have to use it. I really rely on Gmail and my Google Calendar and things to keep me organized, Like tasks and things like that to keep me organized on a daily basis. So, yeah.	
Interviewer:	Were you always interested in technology?	
Participant #11:	Yes, I was. I was always interested in technology. We were one of the last kids on the block to get a computer when I was growing up, but I really	

	<p>did like technology. The only part of technology that I didn't love is when I was in [REDACTED]. Well, it's not [REDACTED]. It was actually [REDACTED], it's part of the [REDACTED] system. That is really, really difficult. The technology that they use for composition and things like that, if you never took AP music theory, that technology's a little difficult. But everything else I did I really, really liked.</p>	<p>LEARNING</p> <p>PROFESSIONAL DEVELOPMENT</p>
<p>Interviewer:</p>	<p>Okay, great.</p>	
<p>Participant #11:</p>	<p>Yeah.</p>	<p>TAKING COMPUTER COURSES</p>
<p>Interviewer:</p>	<p>Describe when and why you began using educational technology in the classroom.</p>	
<p>Participant #11:</p>	<p>Well, it was a requirement in my bachelor's to take an educational technology course. I had already taken the time to learn a lot of the things because of just my job and things like that in general in college.</p>	<p>PROFESSIONAL DEVELOPMENT</p>
<p>Participant #11:</p>	<p>I did not take a computer course in high school just because I was a triple arts major, so they actually X out that requirement for you in the high school I went to in [REDACTED]. So because I took Photo III, Honors Band, Honors Choir, they Xed out one of the requirements for you. And I already didn't have a lunch period so there was no room in the scheduling.</p>	<p>GOOGLE CLASSROOM</p>
<p>Participant #11:</p>	<p>So some of the stuff I had to learn during the educational technology course there. But of course, things have totally grown since my bachelor's degree on this type of deal. But that's where PD comes in. So I</p>	

	take three or four PD classes a summer.	PARENT AND STUDENT COMMUNICATION
Interviewer:	Great. That's great.	
Participant #11:	Yeah.	
Interviewer:	What are your favorite educational technology tools?	
Participant #11:	So Google Classroom I really, really like. I feel that even when we go back to school physically in person, whenever that may be in the future type of deal, however that may look, I feel like I will always use that especially when kids are absent or...	ONLINE CURRICULUM
Participant #11:	I do like that Google has that translation key now because I work in a district where not every parent speaks English, but they might send you an email. And unfortunately, I love the district translators, but they do have a lot of translation work to do. So that enables my life to make it a little bit easier. So that specific tool, I love. Especially for my kids that they're still learning English. So sometimes they revert back to typing in Creole or Spanish, especially during the Google Classroom thing and it's like you didn't really understand what they were meant to say. That sort of thing. So it's something that happens a lot when you're speaking to them, but they do it now when they're writing too instead.	VIDEOS
Participant #11:	I really, really do like... I use Castle Learning. I use PostClever with my... There is a bunch of reading things we use for school. I do really, really like the Screencastify, Nearpod, and all of those educational tools as well. There	PROFESSIONAL DEVELOPMENT

	is some YouTube channels I follow for some specific ideas, specific Google Chrome extensions. Like my kids like to see my technology all the time and my Google Chrome extensions. So that's something that they really like to do.	PROFESSIONAL DEVELOPMENT
Interviewer:	Great. Prior to any... I think you touched upon this but maybe you could elaborate.	
Participant #11:	Okay.	
Interviewer:	Prior to [crosstalk 00:05:50] what professional development had you received on educational technology software?	PROFESSIONAL DEVELOPMENT
Participant #11:	So-	
Interviewer:	[crosstalk 00:05:54] Whether that be service, workshops, conferences.	
Participant #11:	Yeah. So originally, now that I work for the school district that I work for, they offer 25 credits for free towards pretty much your next pay raise. Literally each class is one credit. It's 15 hours, which is great, so I've done everything from learning about Google Classroom, Google Docs was a separate class. There was a whole big class on... There's a more advanced class you can take. I took Photoshop this past-time which was really great. And it's offered for free and you can use it towards your state hours, you can use it towards really learning things that you might want to do for your classroom [crosstalk 00:06:49]	PROFESSIONAL DEVELOPMENT
Interviewer:	[crosstalk 00:06:48]	
Participant #11:	I'm sorry?	

Interviewer:	The district offers this?	PROFESSIONAL DEVELOPMENT
Participant #11:	Yep. The district offers it. Pretty much they do offer professional development, of course, during the year. But there's a lot of classes you can take as an individual that you can sign up for pretty much in My Learning Plan. That if you feel like, "Oh, this is lacking", a lot of times they'll do helpful technology tools classes as well. So those are really helpful. But I've done pretty much all the Google classes and all that stuff. I've done the Photoshop. I've done stuff with Canva, as well.	
Interviewer:	Okay.	PROFESSIONAL DEVELOPMENT
Participant #11:	So, yeah.	
Interviewer:	Are the instructors people, teachers from your district? Or are they outside people, or?	RELIABILITY OF INTERNET
Participant #11:	Yeah, for the most part yes they are. So sometimes, like the PD during the year is sometimes offered through Boses. That it's a Bose certified technology person that's normally very great. We normally have three or four that the Union Deal usually deals with that they did online seminars especially for during the quarantine. That they were trying really hard to help us with the technology piece, which was nice.	COMMUNICATION
Participant #11:	But the ones during the summer, the 15 hour ones, that sort of thing, they were normally taught by technology teachers within the district. The Photoshop one was done by the Art Teacher type of deal that was in the district. The librarians normally also	

	<p>do teach classes as well with the more advanced Google classes as well. So they're really great. So most of the time they were either from my particular high school, or there has been incidents where it's somebody from the middle school or whatever. But they're, most of the time, in district.</p>	<p>STUDENT TECHNOLOGY SKILLS</p>
<p>Interviewer:</p>	<p>Great. Prior to the professional development session that I provided part of the study and you attended, what other professional development have you received specifically on educational technology integration models and/or matrixes?</p>	
<p>Participant #11:</p>	<p>So that's the point where I feel like is... Without the individual classes that I took on my own, I felt like some of that instruction would have been lacking. Because I was always very big into incorporating technology, however my district, the technology is a little outdated. We're still using some technology that it's still not super reliable. So I think now because of the pandemic we're not going to be using some of the things, we're upgrading a lot of our things which is nice. So I was always afraid to do integrating and my whole lesson be based on a technology model type of deal. Because I was always scared, "What if the internet goes down?"</p>	<p>COMMUNICATION</p>
<p>Participant #11:</p>	<p>Because there's been points where Power School would go down for two days. There would be times where I couldn't take attendance, physical attendance, on my computer. A lot of the kids would be like, "Oh, can you email my guidance counselor?" And it's like I would have to whip out my</p>	<p>FEAR OF PROFESSIONAL DEVELOPMENT</p>

	<p>phone because you can't access the computer, that sort of thing. You can't access the computer network, pretty much.</p>	
Interviewer:	Okay.	
Participant #11:	<p>So that's kind of my fear about it where I feel like I would've done, like when I was in [REDACTED], I did a lot more of breakout rooms and a lot more creativity stuff. But now I'm a little nervous because, first of all, my class is... Some of them are not as Independent as others, that's for sure. It depends on what class I'm teaching because I am a Special Ed teacher. Some of my kids don't read very well, and that's an issue with the typing and the computer things.</p>	PROFESSIONAL DEVELOPMENT
Participant #11:	<p>But yeah, so it depends. So it's hard because I wanted to do more integration but sometimes technology really wasn't incorporating type deal.</p>	
Interviewer:	<p>But as for your district, they didn't provide any specific model that the district subscribes to?</p>	
Participant #11:	No.	
Interviewer:	Okay.	
Participant #11:	<p>No. I mean, now I think it's mandatory that people have a Google Classroom and update it a certain amount. But before all of those things those were all optional. I had them and I would put the notes, and I would put up my syllabus, and I would put up reminders for the parents. Like the parents would get a weekly summary if they wanted a weekly summary of how their child</p>	

	was doing. That sort of thing. But that was things that I did on my own.	
Interviewer:	Got it.	
Participant #11:	Yeah.	
Interviewer:	What are your thoughts on educational technology professional development and integration models?	TECHNOLOGY TO MAKE THINGS EASIER
Participant #11:	Honestly I feel like technology professional development is probably one of what people think is the scariest type of things. I feel like especially helping some of the older teachers out in my department, if they ever sit there and it's like, "Oh, you're going to a tech workshop", and everybody's like, "No!" I actually happen to like it. I feel like it's helpful. It might take a little bit to setup. But normally I felt like, especially in my district, the instructor were very patient in helping you setup the whole process, whatever you were learning.	INCREASING USABILITY
Participant #11:	And it was something that you could one or two hours by yourself, you would be all setup for our own classes and you would be fine, type of deal. But honestly I feel like it's one of the more important professional developments you can have nowadays. Besides very subject specific things type of deal in special Ed. A lot of times we get a lot of things on BIPs, and behavioral things, and [inaudible 00:12:45], and things like that. Those are really helpful but I feel like the educational technology things are very, very helpful. And I feel like they get sometimes bad rep because everybody's like, "I don't	STUDENT CENTERED LEARNING

	want to learn something new", type of deal.	STUDENT DIGITAL CITIZENSHIP
Interviewer:	Okay, great. So the next couple questions are going to be talking specifically to the PICRAT model.	
Participant #11:	Okay.	
Interviewer:	So were you familiar with the PICRAT model prior to this study?	
Participant #11:	No, I wasn't. I had heard of it but I had not intensively studied it. I had heard that there's different levels of integration through the PICRAT model.	TECHNOLOGY AS A COLLABORATION TOOL
Interviewer:	Do you know where you'd heard about it?	
Participant #11:	I believe I heard about it, I try to read a certain amount of educational books and studies a summer, so I think I read it online somewhere, to be honest with you.	
Interviewer:	Okay. That's great. What were your initial thoughts on the PICRAT matrix when you were introduced to it during the professional development session?	
Participant #11:	To be honest I felt like it was a more organized way of viewing how involved technology wise you were, and it was... I felt like your PD, it was a specific emphasis on, "Okay, you have the standards, you have what you want to teach. What technology can you integrate into this to make this a little bit easier?" But it also places a lot of emphasis on the students should be much more involved. It shouldn't be as passive. Everyone nowadays does a	POSITIVE VIEW OF PICRAT

	<p>PowerPoint, everyone nowadays does a Google Doc or something like that. It really says, "This is taking it to the next level and it helps you"... It's more of an organized way of looking at it, in a way. That it's just easily explained.</p>	
<p>Interviewer:</p>	<p>Okay, great. In what ways did you change or modify your instructional practice after the introduction of the PICRAT model? So how did you change the lesson design that you provided after learning about the PICRAT model?</p>	
<p>Participant #11:</p>	<p>I feel like... So I haven't gone back to school yet, so we obviously did this during the summer. I have started to redo a couple of things to make it a little bit more student-centered with the technology. Especially incorporating much more collaboration with them, that this is something that they really do need to learn as a job skill as well, to be a little bit more collaborative. In general, everyone needs to learn that.</p>	<p>PICRAT AS BOTH REFLECTIVE AND PLANNING</p>
<p>Participant #11:</p>	<p>So what I started to do is I've started to do a lot more online knowledge units, in a way, if that makes sense. I always had units about plagiarism, and units about identifying certain information, but this time I actually was identifying good information online. Like that whole fake news thing because that's such a big deal now. What I started to do is I started to make a lot of more games and things like that. I started to make it that the kids need to do some group projects to almost trick each other. Like, "Oh, do you think this is a reputable quote? Do you think that</p>	

<p>Participant #11:</p>	<p>this a reputable site just looking at it?" Type of deal.</p> <p>Trying to tell them just because it looks pretty does not mean that the information might be correct, type of deal. Just because it came from Facebook doesn't mean it's totally correct. But to be honest with you it's a lot more... Now that unit is much more collaborative, and it's much more them working together. And I did find out, because I got my email saying, "This is what you're going to be teaching", that I will have 15 kids in an English Nine academy class, which is like a 15:1 class for Special Ed. So it's nice because I'll actually have the amount of kids that I want for breakout rooms, for much more creative online collaboration.</p>	<p>USE OF RUBRICS</p> <p>USE OF TECHNOLOGY</p> <p>TECHNOLOGY MAKING EASIER</p>
<p>Interviewer:</p>	<p>And these changes that you've made have been a direct result of introduction to the PD?</p>	
<p>Participant #11:</p>	<p>Yes.</p>	
<p>Interviewer:</p>	<p>Okay, great. To what extent you feel your attitudes have changed towards educational technology integration after exposure to the PICRAT matrix? Have there been none? Is it positive, negative? And can you explain?</p>	<p>INCREASING ENGAGEMENT</p> <p>MAKING THINGS EASIER</p>
<p>Participant #11:</p>	<p>I would say positive. I never thought educational technology was a burden type of deal, or learning about it was ever a burden. I always really liked to learn about it. I was always interested in it. I've had friends that go to [REDACTED] for the additional extension, the certification extension in educational technology, that they've talked about a lot of things</p>	

	that they've learned. But I would say that it made me examine my own teaching style and say maybe with the pandemic, and with our district really investing more in technology, this is a great time to really review this and become a little bit more creative, and require that the kids become more collaborative through technology practices.	POSITIVE VIEW OF PICRAT
Interviewer:	Great. To what extent do you feel your attitudes have changed towards educational technology models after the exposure to the PICRAT model?	REPLACEMENT TECHNOLOGY
Participant #11:	I would say definitely for the positive.	
Interviewer:	Okay, great. So the first question we just asked before was technology integration, this one's talking about the model [crosstalk 00:18:27]	
Participant #11:	The model. I would say the model is the most helpful because it really made me sit there and think twice of literally you could print out something from your PowerPoint, and literally just put it in your lesson plan binder and be like, "What level would this be on?" Is this passive? Is this more integration? Is this more are the kids being more collaborative? Is this more of a creative style type of deal?	TECHNOLOGY COLLABORATION
Participant #11:	So I think that it really is a better lesson planning tool.	
Interviewer:	Now, do you see the PICRAT Matrix more as a planning tool or a reflecting tool?	
Participant #11:	I feel like it could be both. I personally plan to use it a little bit	

	<p>more as a planning tool. I mean, it could definitely be a reflection about if I go back and that technology did not work for that class, I could sit there and say, "Oh, how can I adjust this?" And still have a bunch of student participation, and still have a bunch of student integration of collaboration in a way. And open that dialogue type of deal. Even though maybe that one technology piece didn't work with my district technology. Like, "Okay, great. The next time I teach this, what else can I use to still be in the more creative and the more collaborative sphere?"</p>	
<p>Interviewer:</p>	<p>Great. Okay. So how did you account for students' interaction with technology prior to using the PICRAT Matrix? So prior to the PD how did you account for students' interaction with technology use in the classroom?</p>	<p>PICRAT INSPIRES INCREASE IN TECHNOLOGY LEVEL</p>
<p>Participant #11:</p>	<p>A lot of times I have a little but of a rubric, especially when they're working in Google Docs together, that they have to edit a certain amount of each other's work, they have to fill out, especially with group work, anonymous surveys of how they felt like their group was working type of deal. Now I feel like it's a little bit more organic and it's not as forced, if you would say. That sort of thing. I feel like it definitely puts more of an onus on them and more onus on them to be much more involved in what they're learning, and ask specific questions, which I feel like is really good. Because a lot of times, especially within Special Ed, they sometimes are a little self-conscious about asking the questions.</p>	<p>PICRAT INSPIRES INCREASE IN TECHNOLOGY LEVEL</p>

Participant #11:	Part of Special Ed is advocacy, self-advocacy and sitting there saying, "I don't understand this." Now it's a little bit easier to know, "Do they actually understand this or not?"	TECHNOLOGY CAN INCREASE ENGAGEMENT
Interviewer:	Okay, great. You actually answered that question and my next question, so we're going to move on.	
Participant #11:	Oh okay. Great.	
Interviewer:	Would you recommend the PICRAT model or matrix to other colleagues and teachers? Why or why not?	
Participant #11:	Most definitely. I think that it's something that would be very, very beneficial because I think people say, "Oh, I'm integrating technology because I'm using PowerPoint." Well, really there's so much more that you're able to do. "Oh, I'm using Castle Learning", but there's so much more that you're really able to do. Yes, I'm a big fan of Kahoot, and doing a Jeopardy, and all those things, but there's just so much more that you're able to do.	
Participant #11:	These kids are now able to create their review questions collaboratively type of deal to try to, I guess, stump each other, that sort of thing. I think it brings it to the next level in a way. I definitely think that my district could use this as a really good PD model, and a way to really... An expectation to move it forward. Especially if we're really, really investing in personal devices for all of these children.	PICRAT IN LESSON DESIGN
Interviewer:	All right. So another question, and this is not on my sheet but I'm just	PICRAT AS A PLANNING TOOL

	curious, if given the opportunity to teach PD for your district would you consider teaching the PICRAT model or-	
Participant #11:	Yes. Yeah, definitely. Yeah, I would definitely teaching it because I feel like everyone's like, "Oh, I use technology. I actually do this and everything." But it's like, "Do you really?" I feel like PowerPoint has replaced writing on the blackboard. It's no offense, I understand like, "Oh yeah, you can embed a video." Okay, that's great. But the kids are still sitting there passively listening.	
Interviewer:	Right.	
Participant #11:	So part of me really sits there and says, "If you're looking for that collaboration, if you're really looking for the kids to get the next level of knowledge, and if you're really looking to get that next observation, that highly effective observation, this is really what you should be doing."	IMPORTANCE OF SKILLS
Interviewer:	Great. All right. So I have some additional questions.	
Participant #11:	Okay.	
Interviewer:	These questions relate to your responses pre and post PD.	
Participant #11:	Sure.	
Interviewer:	So if we look at your instructional practice, the lessons that you had given prior to the PD rated on the PICRAT matrix for passive amplifies, interactive replacement, and passive transforms. Those are the three that you had given before the PD, and then the ones after were creative	

	transforms, creative amplifies, and interactive amplifies.	
Participant #11:	Yes.	
Interviewer:	Which was a huge increase in moving along the PICRAT matrix. So if you look at the PICRAT matrix, obviously the first box there is that passive replacement.	
Participant #11:	Yeah.	PROFESSIONAL DEVELOPMENT
Interviewer:	That top box all the way on the diagonal is that creative transforms. So you shifted a significant amount in designing your lessons.	
Participant #11:	Yeah.	
Interviewer:	How would you make account for that change and that shift?	
Participant #11:	I think that just because it's just so much more of an organized way of looking at it, and sitting there saying, "Well, there really shouldn't be any passive learning going on", in a way. The kids needs to be much more involved in their own learning style. I think that during the quarantine it was really very much a challenge to keep everyone involved, still learning the information, but still showing up and really, really participating.	PROFESSIONAL DEVELOPMENT
Participant #11:	And I think that being transformed to amplifies instead of replacing it. I mean, yes, of course I'm still going to use Google Slides and things like that because honestly I really don't like writing on the board because I do have joint issues. I can't really write on the board effectively. My kids realize that my handwriting is not great anymore. So most of my things	EQUITY OF ACCESS

	were typed to begin with, type of deal.	
Participant #11:	But I have to say, okay, I would try to do passive interactive normally. Sometimes it would be passive replaces type of deal if it was something that was very, very topic heavy, especially in history. But now that I realize so much more is out there, and now that my district has made so much more technology improvements because they realize they need to, there's no reason not to be in the more creative, and interactive, and transformative, and amplified categories. If that makes sense.	EQUITY OF ACCESS
Interviewer:	Okay. Great. I also noticed in looking at the data there was a shift in your thought process due to some of the statements that you were asked to agree or disagree. So on the [inaudible 00:26:32] scale you had the ability to be neutral, and then you had the ability to agree, or strongly agree, or disagree, or strongly disagree.	EQUITY OF ACCESS
Participant #11:	Yes.	
Interviewer:	And there was some shift in the statements but there was a significant shift in the question regarding your ability to, when you plan, you plan for academics. Or you feel when lesson planning you design the lesson around academic content or New York State standards first. Originally you had responded, prior to the PD, disagree, and then post PD you responded, "Agree." Can you account for the shift in your reaction to the statements?	

Participant #11:	A little bit because I feel like once in a while there is this push to use a specific technology because we just bought it, because, "Well, you just took this." And you're not really designing the lesson around what it should be designed on which is what... We're reapplying as a school for character education, that should be brought up. There is, of course, the New York State standards which of course are an ever-changing type of deal. They never really stay the same going from every couple of years type of deal, because now we're Xing out common core.	PROFESSIONAL DEVELOPMENT
Participant #11:	And of course the academic piece, the topics that you're teaching, and what you really want your kids to learn. But I felt like because my district had spent the money and really... I was always like, "Okay, well what topic can I teach using this technology?" And it really should be the other way around. Because I think I just folded to the pressure, if that makes sense.	FEAR OF TECHNOLOGY REPLACING TEACHERS
Interviewer:	Yep.	
Participant #11:	So, yeah.	
Interviewer:	Okay. Also noticed that when asked the question, "What you felt was the most important when designing a lesson", in the pre-survey you wrote character education?	LACK OF PERSONAL INTERACTION
Participant #11:	Yes.	
Interviewer:	But in the post-survey then you said skills. [crosstalk 00:28:42]	
Participant #11:	To be honest, I think partially, yes, I think that you do need to teach	

	<p>character, of course, at all times. But I think character and skills can be incorporated in both type of deal. And working collaboratively on a scale automatically puts you in the zone of, "You have to have good character to be working together and to be working collaboratively as a group." So I feel like it automatically gets thrown in there. Whether or not that was your original goal, honestly I feel like it does get thrown into the skills and being collaborative. That automatically means you have to have good character, and you need to listen to each other, and you need to find a way to work with something that possibly you don't necessarily like.</p>	<p>SKILLS FOR STUDENTS</p>
<p>Participant #11:</p>	<p>It's kind of like this life skill of, "You are not going to like every single person you work with. Here's a practice." Because not every kid likes each other in a class. It happens. It unfortunately happens, type of deal.</p>	<p>IMPORTANCE OF SOCIAL SKILLS</p>
<p>Interviewer:</p>	<p>Yeah. Absolutely. All right. So one other question here, you had mentioned that your district is now invested more in technology, and it seems like there's a lot more focus on professional development. That being said, even though they've made these strides to provide more support for technology, what else do you think you need? What would help you bring you to the next level with technology integration? So what other resources, is it support, is it more PD, is it more technology? Or is it something else that might help bring you to the next level and provide more support for you?</p>	<p>LACK OF SOCIAL INTERACTION</p>

<p>Participant #11:</p>	<p>I think more PD. I would always love the opportunity for more PD because I feel like there's always something more to learn. I would really like to learn a little bit more about Nearpod and Screencastify things and really try to use them in my classroom. Because unfortunately I wasn't in my classroom I was in this room, type of deal. That sort of thing. And unfortunately, due to personal circumstances of the kids during quarantine, a lesson taught with Nearpod or Screencastify and things like that might have not gotten the same interaction, or the same reaction, as it would be in the classroom type of deal.</p>	<p>PROFESSIONAL DEVELOPMENT</p> <p>PICRAT AS A PLANNING TOOL</p> <p>TECHNOLOGY AS A PLANNING TOOL AND A REFLECTIVE TOOL</p>
<p>Participant #11:</p>	<p>So I really do, I would like more PD. I do feel like internet access is a huge equity issue and a huge equality equalizer among all of my kids. It was unbelievable how many kids I saw that didn't have access to the internet. And personally I'm going through the Google level run searches by myself. The district approved it. They said, "Yes, this will count as hours. Yes this will count as a pay increase. Go right ahead." It's great that certain aspects worked offline. That's awesome. Because I don't think certain teachers really frankly know that, that there's certain aspects that have the capability of working offline.</p>	<p>PICRAT AS A PLANNING TOOL</p>
<p>Participant #11:</p>	<p>And honestly a lot of my kids, they use their phones, they just don't have computers. They might have tablet but they a lot of times don't have a desktop or maybe they're sharing one laptop with four or five siblings. So being able to use a lot of this on the</p>	

	<p>phone, I think, is a big deal. Maybe having PDs about what the kids physically see on their phone when doing this is very helpful. Like what is the kid's view of this?</p>	
<p>Participant #11:</p>	<p>Because I'm only seeing things from the teacher side. And if this was in the classroom I could walk over to a computer and just look and be like, "What's the student view of this?" Even Power School I always ask them, "What's your student view? Can you see what I just put in after you update? Can you see that?" Type of deal. But without being together it's difficult. Sometimes my kids will send screenshots to me if I ask, which is really helpful. If they know how to do that they'll do that for me. If I ask, "Oh, can you show me what you're seeing?" They'll send me a Google screenshot through Remind, which is really helpful.</p>	
<p>Participant #11:</p>	<p>But to be honest I really think more PD. I do think more investing in technology is key. Some districts do give out personal laptops to teachers. My district does not. My district doesn't have the money to do that. We also all have to share, we don't have our own classrooms. I was in a million classrooms last year. So it is difficult finding workplace, being able to access the internet, because a lot of times you're kicked off. So there is times that I'm like, "Okay, I have to do these IPs at home during"... Or I have to do this PowerPoint or this Google slide thing at home because I can't do it at school.</p>	
<p>Participant #11:</p>	<p>But there's always the fear of, "Will this work at school that I put all this</p>	

	time in at home? Will this actually be able to be projected at school?" Type of deal.	
Interviewer:	Right. So actually another question that's spun off that is you spoke about the quarantine, the COVID outbreak, this is all taking place during our quarantine. And now we're looking to go back to school. It looks like the governor approved everyone's plan and schools are slated to reopen.	
Participant #11:	Yeah.	
Interviewer:	How do you feel what technology integration's role? Whether it's your attitude towards or your structural practice, how do you think that's different in a COVID-19 environment versus how things were before quarantine?	
Participant #11:	I always thought it was necessary to have these things in place to have technology review dates, to have the notes where the kids can see them, to have all of these things. But now I realized how there are so many additional more tricks to Google Classroom. There's so much more than just that little surface thing. Honestly I'm thinking to myself, "You know what, I really need to create more Google websites that the kids can go back and look at things in order to study for the Regents." Thank God the Regents were canceled this year. Thank God.	
Interviewer:	Right. Right.	
Participant #11:	Because there was a time where I was like, "Oh", I was like, "This is going to be bad news bears." [inaudible 00:35:15] But to be honest with you I	

	<p>feel like this is necessary. This is very necessary. I feel like we're not at the cusp where I don't think... Can I be replaced? No, I don't think I can be replaced by a robot or that sort of thing. After seven and a half years of education I sure hope I'm not replaced by a robot type of situation. Four certifications later you would hope not.</p>
Participant #11:	<p>But the reality is that I did see a couple of things that were negative about all the technology. That the kids told me that they missed coming to school, that they missed the personal interaction, and that they really, really missed certain things. And some of the kids that I never thought would ask for additional work and things to read actually asked me because they were bored. I never thought that that would happen. But to be honest with you I think it's necessary. It's an overwhelming necessary thing that you have to adjust to.</p>
Participant #11:	<p>You're a teacher, you have to adjust to your kids are looking at you to be the one constant.</p>
Interviewer:	<p>Right.</p>
Participant #11:	<p>And you know what, I will be the one constant. Whether it will be virtual. Like you know what? You need to step up to the plate. You need to be virtual. My district did not require live teaching at all, but I was teaching live pretty much every day because that's what my special education kids needed. Of course I did, as long as it didn't highlight certain disabilities, some of my autistic kids really [inaudible 00:36:47] a lot. I didn't</p>

	<p>record those classes but I always did additional YouTube things, I always did an additional reporting for kids that weren't able to make the specific live class time. I always did additional recordings for them because I felt like it's not their fault that they're sharing a computer with four siblings. It's not their fault that their parents are in the hospital that they had to take an additional job type of deal</p>
Participant #11:	<p>They should have access to the same things. I was, a lot of times, I would hear a ping during the night. They were doing my work at 2:00 in the morning type of deal, because that's when they were able to do it. And you know what, many of my kids really, really liked the online for two weeks and then they were like, "I would really like to come back now."</p>
Interviewer:	<p>Right. Right.</p>
Participant #11:	<p>I mean, I get it. School is very much a social thing too. I understand that, and I understand that it's very hard when a teacher is like, "Here, just do this assignment", and they're like, "What?" Type of deal. There needs to be much more rules about teaching virtually in my personal opinion. There should be more live instruction, there should be much more extra help where the kids can reach out sort of thing.</p>
Interviewer:	<p>Okay. Great. So at this point, if there's any additional thoughts or anything else you'd like to state that you haven't stated, and it's fine if you don't have any additional thoughts, but if there's anything else you'd like</p>

	to say this is your opportunity to state it for the purpose of the study.	
Participant #11:	I really think that the PICRAT model would actually be a really good piece to start off the year, professional development wise. This would be a great convocation type of PD in a way, and really, really building upon... [inaudible 00:38:45] really building upon, "Okay, well how can we integrate this a little bit more with some of the lessons that you already have?" Type of deal. How we can integrate this a little bit more?	
Participant #11:	And honestly not have the pressure, "Oh you have this new technology and you must use it." I feel like it's much more of a straightforward way of, "Here's different technology pieces that you can use towards the topics and the things that you really need to teach." I think especially some of the older teachers get very overwhelmed and their lessons are not as effective as they would normally be because they were forced to use new technology that really wasn't good for the original topics to begin with. There's certain things, or certain subjects, that this app, this particular application or whatever, is great for. Some of them I don't use at all, type of deal, because I'm not a math teacher or I'm not a science teacher this year. I just happened to not be placed in those as a special ed teacher.	
Participant #11:	So that certainly is something. But I definitely think that this is something that should be included at the beginning of the year, and to try and really look back every professional development day or every... How did	

	<p>you use PICRAT? How did you... Let's do a little bit of a discussion. How did you move the technology maybe to the next spots? Okay, I understand it might be a little intimidating to go from passive replace to transform creative type of deal. That's very, very difficult to do in one fell swoop.</p>	
Participant #11:	But to gradually go up, that would be amazing.	
Interviewer:	Okay. Great. So at this point I'm going to stop the recording.	
Participant #11:	okay.	

APPENDIX S
Interview with Coding for Participant #02 of Sunset Grove

August 11, 8:00 PM

<p>Interviewer: See, I think we're recording now.</p> <p>Participant #02: Okay.</p> <p>Interviewer: All right. Awesome. Thank you for being part of this study. I'm going to start asking you some questions and just please answer the questions openly and honestly. All right. The first question I have for you is, can you describe your relationship with technology in your personal life? Were you always interested in technology?</p> <p>Participant #02: Yes, I would say I was definitely always interested in technology. I don't know if I consider myself a digital native, right? That's the terminology that's used, because I mean, technology came out when I was ... I remember getting my first cell phone when I was 16. I mean, we used to play Oregon Trail when we were younger. But I mean, in college I used technology a lot, but personally, just to stay connected to one another, my family lives in England so we depend on technology to communicate with one another to keep in contact. It's definitely an ever present part of my life. I use it to ... I know you talked about personally. I use it my professional life as well in terms of creating professional learning networks, getting resources, so obviously on the professional level, but then also personal stuff, like mom tips and things like that that</p>	<p>PLAYING COMPUTER GAMES</p> <p>PROFESSIONAL DEVELOPMENT</p> <p>PERSONAL COMMUNICATION</p>
---	---

<p>Interviewer:</p>	<p>I use, but I think it's a great way to connect to people.</p>	<p>USE OF TECHNOLOGY</p>
<p>Participant #02:</p>	<p>Excellent. Thank you. The next question, describe when and why you began using educational technology in the classroom.</p> <p>I began using educational technology, I would say my first leave replacement that I ever had. My previous experiences had been in classrooms that didn't have technology or what we think ... I mean, I don't know if I've ever had transparency as a form of technology, but not the technology that we think of. I was able to use a smart board for that leave replacement and it really started to peak my interest. And I mean, I was trying to get a teaching job on Long Island, so it's a very saturated field. I'm in social studies, so as a way to diversify or set myself apart from others to get more information about technology, how to use it, and then I just wanted to make the content more interesting for the students, more engagement. I remember sitting in classes and just writing down notes and it was so boring. I just thought it was a different way to get higher level thinking out of students as well.</p>	<p>INCREASED ENGAGEMENT</p> <p>GOOGLE DRIVE</p> <p>ORGANIZATION</p> <p>G SUITE</p>
<p>Interviewer:</p>	<p>Okay, great. What are your favorite educational technology tools?</p>	<p>VIDEO TOOLS</p>
<p>Participant #02:</p>	<p>My favorite? I just love ... I mean, Google Drive, I guess you can't ... I'm just a very type A person. I love organization and professional life. I just like that it's very easy for the students to follow and there's just so many diverse ways that you can utilize the suite to create collaborative</p>	

	<p>relationships among students, create connections in the community. And then it's also a great way for you to scaffold lessons. For people that ... I teach 12th grade where we don't have ICT anymore, so I have special ed students and then I have all the AP students and I have kids that just tested out of bilingual. I really need to diversify my instruction, so having the G suite, Google Drive suite available to me helps.</p>	<p>STUDENT CHOICE AND VOICE</p> <p>CREATIVITY</p>
<p>Participant #02:</p>	<p>I mean, Remind, I've used. Flipgrid was really great when I was doing genius hour because it allowed collaboration amongst students. They were able to interact with one another outside of the classroom and it also taught them professionalism, how to present themselves to other people and respond with positive feedback, constructive criticism with one another. It was kind of like an out of the box way to get what I wanted out of the assignment.</p>	<p>STUDENT CHOICE AND VOICE</p>
<p>Interviewer:</p>	<p>Can you explain your genius hour?</p>	
<p>Participant #02:</p>	<p>For genius hour, I had my seniors basically pick a passion project, something that they wanted to do. I devoted one day a week for them to do this. The catch was, it had to be either government or economics related, so because for 12th grade they have to take participation in government or economics, so basically they could start their own business. They could ... What the kids really wanted to do is create a bike lane on a [local road in the community] because all the kids ride their bikes and there's so much traffic and they just thought it would be a great thing. They had to basically</p>	<p>CREATIVITY</p> <p>COMMUNITY BASED</p>

	figure out how to make their dream a reality.	
Participant #02:	I had a lot of kids that started businesses. I had some kids that didn't get that ... The bike lane was never put on [the local road in the community], but technology helped me facilitate that because basically, each kid was driven by ... It was an individual project and I would collaborate with them. They'd collaborate with others. But really they had to take the initiative.	SOCIAL MEDIA
Participant #02:	We used Flipgrids every week. Every week they had to do a Flipgrid and tell me what they did that week, what they're working on. They had to comments on each other's Flipgrids. They used technology to research their ideas, to communicate with experts in the field. They each had to get a mentor. A lot of times they had to do that through technology. Something like this, they would do. I mean, they weren't using Zoom. They would use Skype, FaceTime.	PROFESSIONAL DEVELOPMENT
Participant #02:	They would do that, and then they had to present their ideas. They had to publish it to the community. yeah, it was a great project and we used a lot of technology, and not everyone uses the same technology either. Some kids utilized different things, whatever really helped them with their project.	PROFESSIONAL DEVELOPMENT
Interviewer:	That sounds really involved. It sounds like you [crosstalk 00:05:39]-	
Participant #02:	It was a lot of work, yeah.	
Interviewer:	Yeah. All right, so then the next question is prior to this study, what	STUDENT FOCUS

	<p>professional development have you received on education technology as a whole? It could be [inaudible 00:00:05:49], workshops, conferences, graduate, undergraduate classes.</p>	<p>PROFESSIONAL DEVELOPMENT</p>
<p>Participant #02:</p>	<p>I've taken the [UNIVERSITY] professional development courses. I've taken for the advanced certificate in educational technology. I was Google certified. It has since lapsed since I had my kids. I got to go back for it, but I was Google certified for a while. I did some Remind stuff, some Class Dojo stuff. I used to be a Class Dojo mentor, a Remind superstar, whatever they called it. I did a lot of conferences on Long Island. [TECHNOLOGY CONFERENCES], I went to. I participate ... A lot of Twitter chats and stuff like that I did, the teacher center, [REDACTED] I take the lifelong learner thing to the ninth degree. I do enjoy learning about all this stuff so I try to take advantage when I can.</p>	<p>PROFESSIONAL DEVELOPMENT</p> <p>INCREASE LEARNING, SKILLS, ENGAGEMENT</p>
<p>Interviewer:</p>	<p>That's great that you're so connected to all those different avenues and digital flows.</p>	
<p>Participant #02:</p>	<p>And my colleagues are really good. Over this break, we had staff facilitate professional development. I don't really use Castle Learning. I went to a Castle Learning PD that one of my colleagues did. There was an EdPuzzle one, an Nearpod one. It's just good to get a taste of what options are out there, especially now in this [crosstalk 00:07:10] living environment.</p>	
<p>Interviewer:</p>	<p>Yeah. Prior to the professional development session that I gave for</p>	

<p>Participant #02:</p>	<p>part of the study, what other professional development have you received specifically on educational technology integration models and matrices?</p> <p>I believe it was part of my [UNIVERSITY] classes I took. I had that there, but I really liked the new model that you were showing us because I thought it was so much more clear and concise as to how I can create my lessons. It really put to the center the teacher focus or the end game for the teacher, I should say, and the student as well. It showed how the student level of engagement was so explicitly stated on it. It was really helpful. Going forward with lessons, it's going to be a game changer, I think.</p>	<p>PICRAT IS SIMPLE</p> <p>MULTIPLE LEVELS</p> <p>VALUABLE</p>
<p>Interviewer:</p>	<p>Great. Did your district provide any ... Is there any kind of model that they prescribed that they say is the best that you should follow or do they let it open [crosstalk 00:08:13]-</p>	<p>MORE AWARE</p>
<p>Participant #02:</p>	<p>No, they don't really have it all. Basically, there's a couple of us that really like technology, so basically they just ask us to facilitate professional development, but they don't have a type of model. They don't have an ideology around it. They're basically like, "Just whatever works, whatever you want to do, just do it," which is good and bad, because people can use it however they see fit. But I think your matrix was really good because a lot of times people just use technology in place of something else. Instead of a worksheet, they'll just do a Google Doc and that's not what you want. I mean, well, it's good in some ...</p>	<p>PICRAT AS A PLANNING TOOL</p> <p>PICRAT AS A PLANNING AND REFLECTIVE TOOL</p>

	<p>Sometimes you can have that, but you really want that higher level learning. I think the matrix that you presented to us makes it easier to make lessons that would engage children that way, students that way.</p>	
Interviewer:	<p>Okay. Thank you. Speaking of that matrix, were you familiar with the PICRAT matrix prior to this study?</p>	
Participant #02:	<p>No, I was not.</p>	
Interviewer:	<p>Okay. And then what were your initial thoughts on the PICRAT matrix when you were introduced to it in the development session? You kind of touched upon this already, but talk to me about your initial reaction from the PICRAT matrix.</p>	
Participant #02:	<p>I just thought it was so much better because it just simplified all the other models and laid it out so simply. I feel like I'm repeating myself a little bit.</p>	
Interviewer:	<p>It's okay.</p>	
Participant #02:	<p>It just makes so much more sense. Instead of all the other ones where it's like some of them are the circle or the different levels, this box is just so easy. It reminds me kind of like the simplification of Bloom's taxonomy. This is the lower level, this is the mid-level, and this is the higher level and these are the ways that you can do that. And I think it's just easily translatable for anyone. I teach social studies. A math teacher could pick that up and be like, "Okay, this is something I can use in math." An elementary school teacher could say, "Okay, this is what I can use to guide my lesson creation for elementary</p>	<p>PICRAT AS A PLANNING TOOL</p> <p>PICRAT AS A PLANNING TOOL</p>

	<p>school." It really transcends all grade levels, so I think it was really valuable.</p>	
<p>Interviewer:</p>	<p>Great. In what ways did you modify your instructional practice after the introduction of the PICRAT model?</p>	<p>CREATIVITY</p>
<p>Participant #02:</p>	<p>I think it just made me more cognizant of kind of how I was developing those lessons. Was I using a Google Doc instead of a worksheet? Was I really getting that top box? I think it made me more cognizant of my lessons. I feel like it helped me figure out what tools I could use to get to that level, to get that higher order thinking from my students.</p>	<p>ENGAGEMENT</p>
<p>Interviewer:</p>	<p>Okay. Next is, to what extent do you figure attitudes have changed towards educational technology integration as a whole after the exposure of the PICRAT matrix?</p>	<p>PICRAT AS A PLANNING TOOL</p>
<p>Participant #02:</p>	<p>I think it just made me more excited, honestly, because it makes it ... Again, it just simplifies the process and now it gives me better ideas. Okay, now I know the terminology to get to that box, if that makes sense. And I think it's kind of like a challenge for me. How do I get them best to that higher level thinking with all the different educational technology that I can use? I think it simplifies it. It makes me excited to use it.</p>	
<p>Interviewer:</p>	<p>Okay, great. And so that was the technology integration piece. What about overall models? To what extent do you feel your attitudes have changed to educational technology models after the exposure to the pickup?</p>	

Participant #02:	Sorry. Can you just repeat that one more time? My microphone cut out.	MORE PRESSURE WITH COVID / ONLINE LEARNING
Interviewer:	No, that's fine. The last question about technology integration. This question is about the models and it says to what extent do you feel your attitudes have changed towards educational technology integration models after the exposure to PICRAT?	
Participant #02:	Using the actual chart kind of [crosstalk 00:12:08]?	ADJUSTING TO ONLINE LEARNING
Interviewer:	Yeah. I mean, if you had other models that you were familiar with before, have you changed your opinion on models? Has it stayed the same?	
Participant #02:	I think I never gave too much thought to the models before, honestly, because they were kind of clunky. They just didn't make sense for me. I'm like, "Okay, this is kind of what my game plan is. This is what I want to do for this lesson." The PICRAT model, again, it's just a great reference to have whenever you're planning. It just simplifies the whole thing. And again, I like the teacher component that it has, but the student component really helps as well. I like that it basically takes into account both of those perspectives. It's a lot better.	
Interviewer:	Okay, great. How did you account for students' interaction with technology prior to the PICRAT matrix when designing lessons?	
Participant #02:	A lot of the time I would just use informal assessment, walking around	

	<p>and seeing what kids struggled, what kids didn't, use a Google form, stuff like that. But I think after using the PICRAT model, which I feel like this is probably your next question though, using that technology that you get the higher level thinking with the Flipgrids and stuff. You can see it happen. You can see what that assessment is and you can see their engagement level with it. I think the PICRAT model, when you're hitting those top boxes, it speaks for itself because they're able to engage with that technology in such a creative or collaborative way as opposed to me having to walk around and watch student engagement on their screens.</p>	
<p>Interviewer:</p>	<p>Okay. You're answering my next question already. The next question is, would you recommend the PICRAT matrix to other colleagues and or teachers?</p>	<p>STUDENT SKILLS</p>
<p>Participant #02:</p>	<p>Yes. I think I'm going to print it out and I think I'm the laminate it and put it on my desk because I think it'll be great. And I'll have everyone else that we can put it on our Chromebooks. That's what we can do.</p>	
<p>Interviewer:</p>	<p>One of the things that was interesting in some of your responses, there was a shift in some of your responses to some statements prior compared to after and I just want to talk to you about those. For one you were asked, do you feel pressure to use technology in every lesson? And you were given the choice to strongly agree, agree, neutral, disagree, or strongly disagree. Originally you had responded with strongly disagree and after the PD responded with disagree. Can you [crosstalk 00:16:23]-</p>	<p>CRITICAL THINKING</p>

Participant #02:	My first one was strongly disagree and then I moved to disagree? Is that what you said?	
Interviewer:	Correct. Yep.	
Participant #02:	I think it might've just been because of remote learning. Now I'm like, "Oh, okay. Now I think they're going to put more pressure on us to do a lot more technology." I mean, I use technology anyway. I don't really feel pressure at my school to do anything a certain way. They're pretty much like if you get your job done, that's great. I just like to use the technology and they just let me use it. I feel like that's probably why I put strongly disagree first. And then now that we're moving more towards the remote model, I mean, obviously you have to have the technology now, which I was so grateful for. I felt so prepared for this. Meanwhile, there's teachers in my school that were still using the chalkboard and that never set up a Google Drive account.	PICRAT AS A REFLECTIVE TOOL
Interviewer:	Yeah, it sounds like you might have been more prepared than most of your colleagues.	PICRAT AS A PLANNING TOOL
Participant #02:	Oh my God, yeah. Thank God.	
Interviewer:	All right. The next part was, again, another statement. When lesson planning, you design the lesson around the academic content/New York standards first. You originally responded strongly agree. After the PD, you changed it to agree.	
Participant #02:	I think that's just ... I don't know if it's during ... Is it okay if I keep saying the remote learning. Is that okay?	PICRAT AS A PLANNING TOOL

Interviewer:	Yeah. Everything you say is fine.	PICRAT AS REFLECTIVE TOOL
Participant #02:	Okay. Okay. During the remote learning, I feel like it made me realize, obviously the standards are really important, but just more almost like a whole child approach to it. I just want to make sure that the kids enjoy the material, actually like it. I think I felt more pressure to design my stuff like that while I was physically in school because you can always have an administrator come in and stuff like that, or parent pushback, like, "Is this really what you should be learning?" Now I feel like I had more control over how I engage my students. If they really liked something and they were engaging with something during the 15 weeks of online learning, I went with it because I wanted that engagement there. I wanted the kids to really like what they're doing, enjoy it and come back every week and learn. I have seniors. Most of them, it was a semester long course. They were going to pass regardless. Even if they did zero work, they were going to pass because of remote learning, so I wanted to make sure-	SIMPLE TO USE PICRAT AS A PLANNING TOOL PICRAT AS A REFLECTIVE TOOL
Interviewer:	You only had them what, for four weeks or something like that, four [crosstalk 00:00:18:53]?	
Participant #02:	Sorry? Yeah. I only had them for a couple ... yeah. I just came back from maternity leave in January.	
Interviewer:	Oh my goodness.	
Participant #02:	It was just, yeah. I had them for a little bit and then ... But it just, it made me ... There's some stuff I	

	<p>didn't cover that were in my standard, some stuff that I over-covered, but just what the kids enjoyed and for seniors as well, I want to prepare them for life. I teach the government classes and there was so much going on obviously during that time period that I just wanted to make sure that they were well-informed citizens, that they could, regardless of how they felt, that they could make educated decisions based on all the information and be critical thinkers.</p>	
<p>Interviewer:</p>	<p>Got it. All right. And then the other piece from your statements, one of the questions was when designing a lesson, you felt it's most important that students learn. You changed it from character for the pre-survey to skills after the PD.</p>	
<p>Participant #02:</p>	<p>Yeah. I think ... I'm trying to think of what ... I think I really did change it. Again, I think the remote learning thing, too, because I think too, everything goes on ... It's hard to teach character and you want to be able to instill certain values, but you can't always do that. I can't instill my value set on students. I think just the skill to be a critical thinker, so even if they're presented with differing information to be like, "Okay, I can look at this and I can gauge whether this is truthful or not, there's bias," and there's a lot of different ways that you could do that with technology, a lot of great websites that students use. I think skill was better just to make them more prepared for the world I felt at that point.</p>	
<p>Interviewer:</p>	<p>Okay, great. And then the other questions are going to be regarding the lessons that you submitted.</p>	

Participant #02:	Okay.	
Interviewer:	Before the professional development, you had submitted three activities that were evaluated with the PICRAT model. They fell on interactive amplifies, creative amplifies, and then passive amplifies. And then after the PD, your lessons were creative transforms, creative amplifies, and creative transforms, which was a big jump in overall. And I just wanted to know what might account for that.	
Participant #02:	I think that PICRAT model helped. It helped me figure out the lessons and helped me figure out how best to get that higher level thinking. Before, again, I think it was just kind of that lower level thinking, the amplifying that you were saying. It's kind of like using a Google Doc instead of a worksheet. And now that I had that model in my head, it made me more cognizant of trying to get those top levels of those boxes. I think it really helped me facilitate better lessons. It helped me facilitate higher level of engagement with students and just made me more aware of my own practices, because sometimes we just get into a routine and we just do the same thing. I think it made me more aware of what I was trying to do.	
Interviewer:	Great. All right. Just a couple more questions and then we're wrapping this up. Do you see the PICRAT model being more of a planning tool or a reflective tool or something else?	
Participant #02:	I think it would be both, honestly. I think it helped me plan, but I think obviously as a teacher, you always need to reflect, I think. They use a	

	<p>Danielson's rubric to critique us. I think this would be a good add on if a teacher's using technology to, again, just be more reflective. You saw the difference in my lessons from before the PD to after. That inclusion of that PICRAT model helped guide my lesson planning and then my reflection as well. I think I would use it on both ends to do it. It's very comprehensive.</p>	
<p>Interviewer:</p>	<p>All right. Great. And then, so a bonus question that really wasn't part of my study, but it came that way because of everything. Is there anything you'd like to share about the COVID outbreak that you feel might be relevant for people to know when participating in this study?</p>	
<p>Participant #02:</p>	<p>I mean, I just think that the PICRAT model would be more ... Everyone should start using it now because it just helps where you're relying so much on technology to just make sure that we're still trying to get that higher level thinking in our students, that we're making these creative lessons, that we're transforming. It's difficult, especially I know people start off this ... especially all the teachers start off at different levels of comfort with technology. So I think using this PICRAT model would help inform instruction for this upcoming year, because I feel like we'll probably go remote again at one point, but just too, we're going to go remote on certain days anyway. I think it would just really help inform instruction. I think it would be a really useful tool. It was really helpful for me, So I'm definitely going to use it.</p>	

Interviewer:	Great. And then if there's any additional comments that you'd like to say, anything else you'd like to share that you felt it wasn't covered in this interview?	
Participant #02:	I just think it was great. I loved it. I liked the model and I plan to use it in the future. I'm so glad to be included.	
Interviewer:	All right, great. At this point, I'm going to stop the recording. Thank you.	

REFERENCES

- Ammons, M. (1964). Purpose and Program: How Does Commitment Today Differ from That in Other Periods. *Educational Leadership*.
- Battelle for Kids. (2019). Framework for 21st century learning. Framework for 21st Century Learning.
http://static.battelleforkids.org/documents/p21/P21_Framework_Brief.pdf
- Bauerlein, M. (2008). The dumbest generation: How the digital age stupefies young Americans and jeopardizes our future (or, don't trust anyone under 30). Jeremy P. Tarcher/Penguin.
- Benade, L. (2015). Teachers' critical reflective practice in the context of twenty-first century learning. *Open Review of Educational Research*, 2(1), 42–54.
doi:10.1080/23265507.2014.998159
- Blumenfeld, P. (1992). Classroom learning and motivation: Clarifying and expanding goal theory. *Journal of Educational Psychology*, 84(3), 272-281.
- Carlson, E. U. (2014). Teaching with technology: "It's just a tool."
<https://www.learntechlib.org/p/145602/>
- Cherner, T., & Mitchell, C. (2020). Deconstructing edtech frameworks based on their creators, features, and usefulness. *Learning, Media and Technology*, 1-26.
10.1080/17439884.2020.1773852.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage Publications, Inc.
- Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Pearson/Merrill Prentice Hall.
- Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal*, 38(4), 813-834.
- Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Harvard University Press.
- Cuban, L. (2004). *Teachers and machines: The classroom use of technology since 1920*. Teachers College Press.
- Cuban, S., & Cuban, L. (2007). *Partners in literacy: Schools and libraries building communities through technology*. Teachers College Press.

- Cummings, S., Bridgman, T., & Brown, K. G. (2016). Unfreezing change as three steps: Rethinking Kurt Lewin's legacy for change management. *Human Relations*, 69(1), 33–60. <https://doi.org/10.1177/0018726715577707>
- Dewey, J. (1934). "Individual psychology and education (1934)." The Philosophical Society of England, 26 Aug. 2000. <https://www.the-philosopher.co.uk/2016/08/individual-psychology-and-education-1934.html>
- Dunleavy, M., Dexter, S., & Heinecke, W. (2007). What added value does a 1:1 student to laptop ratio bring to technology-supported teaching and learning? *Journal of Computer Assisted Learning*, 23(5),
- Dwyer, D. (1990). The Evolution of Teachers' Instructional Beliefs and Practices in High-Access-to-Technology Classrooms.
- Engle, R. (2001). The mythos of educational technology. *Bulletin of Science Technology Society*, 21(2), 87-94.
- Ertmer, P. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research & Development*, 53(4), 25-39.
- Ertmer, P. A., & Hruskocy, C. (1999). Impacts of a university-elementary school partnership designed to support technology integration. *Educational Technology Research and Development*, 47(1), 81–96.
- Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, 59, 423-435. doi:[10.1016/j.compedu.2012.02.001](https://doi.org/10.1016/j.compedu.2012.02.001)
- Ertmer, P. A., & Simons, K. D. (2006). Jumping the PBL implementation hurdle: Supporting the efforts of K–12 teachers. *Interdisciplinary Journal of Problem-Based Learning*, 1(1). doi:[10.7771/1541-5015.1005](https://doi.org/10.7771/1541-5015.1005)
- Ferraro, J. (2000, October). Reflective practice and professional development. <http://www.ericdigests.org/2001-3/reflective.htm>
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109.
- Friedman, T. (2006). *The world is flat: A brief history of the twenty-first century* (3rd ed.). Farrar, Straus, and Giroux.
- Friedman, T. L. (2016). *Thank you for being late: An optimist's guide to thriving in the age of accelerations*. Farrar, Straus and Giroux.

- Fullan, M. The future of educational change: system thinkers in action. *J Educ Change* 7, 113–122 (2006). <https://doi.org/10.1007/s10833-006-9003-9>
- Garthwait, A., & Weller, H. (2005). A year in the life: Two seventh grade teachers implement one-to-one computing. *Journal of Research on Technology in Education*, 37.
- Goldstein, D. (2020, March 13). Coronavirus is shutting schools. Is America ready for virtual learning? <https://www.nytimes.com/2020/03/13/us/virtual-learning-challenges.html>
- Garet, M., Birman, B., Porter, A., Desimone, L., Herman, R., & American Institutes for Research. (1999). Designing effective professional development: Lessons from the Eisenhower program [and] technical appendices. <https://files.eric.ed.gov/fulltext/ED442634.pdf>
- Greenbank, P. (2003). The role of values in educational research: The case for reflexivity. *British Educational Research Journal*, 29(6).
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Sage Publications. www.uncg.edu/hdf/facultystaff/Tudge/Guba%20&%20Lincoln%201994.pdf
- Guskey, T. (2002). Professional development and teacher change. *Teachers and Teaching*, 8, 381-391. 10.1080/135406002100000512
- Guskey, T. (2014). Planning professional learning. <http://www.ascd.org/publications/educational-leadership/may14/vol71/num08/Planning-Professional-Learning.aspx>
- International Society for Technology in Education (ISTE). (2019). 14 essential conditions. <https://www.iste.org/standards/essential-conditions>
- Hamilton, E., Rosenberg, J., & Akcaoglu, M. (2016). The substitution augmentation modification redefinition (SAMR) model: A critical review and suggestions for its use. *TechTrends*, 60(5), 433-441.
- Heflin, H., Shewmaker, J., & Nguyen, J. (2017). Impact of mobile technology on student attitudes, engagement, and learning. *Computers & Education*, 107, 91-99.
- Henrie, C., Halverson, L., & Graham, C. (2015). Measuring student engagement in technology-mediated learning: A review. *Computers & Education*, 90, 36-53.

- Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, 55, 223–252.
- House, E. (1979). Technology versus craft: A ten-year perspective on innovation. In P. H. Taylor (Ed.) *New directions in curriculum studies*, (pp. 137-151). Falmer Press.
- Holmes, A. E. (2004). *Envisioning, understanding, and encouraging technology integration: Case studies examining professional development and technology integration*. (Order No. 3125968) [Doctoral dissertation, SUNY Albany]. ProQuest Dissertations and Theses Global.
- Huffman, S. (2018). The digital divide revisited: What is next? *Education*, 138(3), 239–246.
- Hughes, J. (2005). The role of teacher knowledge and learning experiences in forming technology-integrated pedagogy. *Journal of Technology and Teacher Education*, 13(2), 277-302. Society for Information Technology & Teacher Education. <https://www.learntechlib.org/p/26105>.
- Hughes, J. E., Thomas, R., & Scharber, C. (2006, March). Assessing technology integration: The RAT – replacement, amplification, and transformation – framework.
- Kent, T., & McNergney, R. (1999). *Will technology really change education?: From blackboard to web*. Corwin Press.
- Kimmons, R. (2016a, April 29). PICRAT for effective technology integration in teaching. <https://www.youtube.com/watch?v=bfvuG620Bto>
- Kimmons, R. (2018). Technology integration: Effectively integrating technology in educational settings. In A. Ottenbreit-Leftwich & R. Kimmons, *The K-12 educational technology handbook*, website. EdTech Books. https://edtechbooks.org/k12handbook/technology_integration
- Kimmons, R., Graham, C., & West, R. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education*, 20(1), 176-198.
- Kimmons, R., & Hall, C. (2016b). Emerging technology integration models. In G. Veletsianos (Ed.), *Emergence and innovation in digital learning: Foundations and applications* (pp. 51-64). Athabasca University Press.
- Kimmons, R., & Hall, C. (2017). How useful are our models? Pre-service and practicing teacher evaluations of technology integration models. *TechTrends*, 62, 29-36. doi:10.1007/s11528-017-0227-8

- King Jr., M. L. (1948). “The Purpose of Education.” The Martin Luther King, Jr., Research and Education Institute, 29 Oct. 2019.
<https://kinginstitute.stanford.edu/king-papers/documents/purpose-education>
- Kopcha, T. (2012). Teachers' perceptions of the barriers to technology integration and practices with technology under situated professional development. *Computers & Education*, 59(4), 1109-1121.
- Krathwohl, D. R. (2002). “A revision of Bloom’s taxonomy: An overview.” *Theory into Practice* 41(4), 212–218.
- Kuhn, T. S. (2013). Objectivity, value judgment, and theory choice. In A. Bird & J. Ladyman (Eds.), *Arguing about science* (pp. 74–86). Routledge.
- Larrivee, B. (2000). Transforming teacher practice: Becoming the critically reflective teacher. *Reflective Practice*, 1, 293–307. doi:10.1080/14623940020025561
- Lewin, K. (1947). *Field theory in social science*. New York: Harper & Row.
- Lowther, D., Ross, S., & Morrison, G. (2006). When each one has one: The influences on teaching strategies and student achievement of using laptops in the classroom. *Educational Technology Research and Development*, 51(3), 23-44.
- Lieberman, A., & Miller, L. (1992). Professional development of teachers. In M. C. Alkin (Ed.), *Encyclopedia of educational research* (Vol.3, pp. 1045-1053). Macmillan Library Reference.
- Marr, J. P. (2011). Technology professional developer conceptions and misconceptions of knowledge required for the Educational Technology Specialist certification, and 120 their use of the elements of effective professional development. [Doctoral dissertation, Dowling College]. ProQuest Dissertations & Theses Full Text: The Humanities and Social Sciences Collection.
- Mehlinger, H., & Powers, S. (2002). *Technology & teacher education: A guide for educators and policymakers*. Houghton Mifflin.
- Mills, S., & Tincher, R. (2003). Be the technology: A developmental model for evaluating technology integration. *Journal of Research on Technology in Education*, 35(3), 382.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications, Inc.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>

- Monahan, T. (2005). Just another tool? IT pedagogy and the commodification of education. *Urban Review*, 36, 271–292. <https://doi.org/10.1007/s11256-004-2084-y>
- Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. *Psychological Science*, 25(6), 1159–1168. <https://doi.org/10.1177/0956797614524581>
- NEA. (2017). Preparing 21st Century Students for a Global Society: A Guide to the Four Cs. Retrieved February 19, 17, from <http://www.nea.org/assets/docs/A-Guide-to-Four-Cs.pdf>
- National Research Council. (2012). Education for life and work: Developing transferable knowledge and skills in the 21st Century. The National Academies Press. <https://doi.org/10.17226/13398>
- NYSED Data Site. (n.d.). <https://data.nysed.gov/>
- Ottenbreit-Leftwich, A., Glazewski, K., Newby, T., & Ertmer, P. (2010). Teacher value beliefs associated with using technology: Addressing professional and student needs. *Computers & Education*, 55(3), 1321-1335.
- Owen, A., Farsail, S., Knezek, G., & Christensen, R. (2005-2006). Teaching in the one-to-one classroom. *Learning & Leading with Technology*, 33(4), 12-16.
- Pfaffe, L. D. (2017). Using the SAMR model as a framework for evaluating mLearning activities and supporting a transformation of learning. (Order No. 10668955). ProQuest Dissertations & Theses Global.
- Popkewitz, Thomas. (2018). Reform and Making Human Kinds: The Double Gestures of Inclusion and Exclusion in the Practice of Schooling. 10.1007/978-3-319-61971-2_8.
- Puentedura, R. (2006). Transformation, technology, and education in the state of Maine. <http://hippasus.com/blog/archives/18>
- Puentedura, R. (2013). SAMR: Moving from enhancement to transformation. <http://hippasus.com/blog/archives/95>
- Puentedura, R. R. (2013). SAMR—Beyond augmentation: Methods for reaching modification and redefinition. http://www.hippasus.com/rrpweblog/archives/2013/08/26/SAMR_BeyondAugmentation.pdf

- Richtel, M. (2011, October 26). A Silicon Valley school that doesn't compute. The New York Times. <http://www.goldenbridgesschool.org/uploads/1/9/5/4/19541249/at-waldorf-school-in-silicon-valley-technology-can-wait-nytimes.pdf>
- Reid, A. (2004). Towards a culture of inquiry in DECS. http://www.earlyyears literacy.sa.edu.au/files/links/link_58027.pdf
- Reiser, R. A., & ETR&D. (2001). 49:53. <https://doi.org/10.1007/BF02504506>
- Rodgers, C. (2002). Seeing student learning: Teacher change and the role of reflection. *Voices Inside Schools*. Harvard Educational Review, 72(2), 230-253.
- Romrell, D., Kidder, L., & Wood, E. (2014). The SAMR model as a framework for evaluating learning. *Online Learning*, 18(2), 1-15. doi: <http://dx.doi.org/10.24059/olj.v18i2.435>
- Saldaña, J. (2013). *The coding manual for qualitative researchers*. SAGE Publications.
- Saettler, P. (1990). *The evolution of American educational technology*. IAP - Information Age Publishing, Inc. Kindle Edition.
- Sandholtz, J., Ringstaff, C., & Dwyer, D. (1993). Teaching in high-tech environments: Classroom management revisited. First-fourth year findings. (Apple classrooms of tomorrow report no. 10). <https://images.apple.com/euro/pdfs/acotlibrary/rpt10.pdf>
- Saavedra, A., & Opfer, V. (2012). Learning 21st-Century skills requires 21st-Century teaching. *Phi Delta Kappan*, 94(2), 8-13.
- Schindler, L. A., Burkholder, G. J., Morad, O. A. et al (2017). Computer-based technology and student engagement: A critical review of the literature. *International Journal of Educational Technology in Higher Education*, 14, 25. <https://doi.org/10.1186/s41239-017-0063-0>
- Schön, D. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.
- Taylor, L., & Parsons, J. (2011). Improving Student Engagement. *Current Issues in Education*, 14, 1-32. <http://cie.asu.edu/ojs/index.php/cieatasu/article/viewFile/745/162>
- TEDxBeaconStreet. (2013, January 10). Richard Culatta: Reimagining learning [Video file]. https://www.youtube.com/watch?v=PLXsUgL_wpc
- Thieman, G. Y. (2008). Using technology as a tool for learning and developing 21st century citizenship skills: An examination of the NETS and technology use by preservice teachers with their K-12 students. *Contemporary Issues in Technology*

and Teacher Education [Online serial], 8(4). <https://citejournal.org/volume-8/issue-4-08/social-studies/using-technology-as-a-tool-for-learning-and-developing-21st-century-citizenship-skills-an-examination-of-the-nets-and-technology-use-by-preservice-teachers-with-their-k-12-students>

Turner, D. J. (2019). The Impact of Technology Professional Development on Teachers' Proficiency for Using Technology Resources (Order No. 22616629). Available from ProQuest Dissertations & Theses Global. (2305027802). <http://proxy.library.stonybrook.edu/login?url=https://www-proquest-com.proxy.library.stonybrook.edu/docview/2305027802?accountid=14172>

United States Department of Education. (2017a). Use of technology in teaching and learning. <https://www.ed.gov/oii-news/use-technology-teaching-and-learning>

Wagner, T. (2008). The global achievement gap: Why even our best schools don't teach the new survival skills our children need--and what we can do about it. Basic Books.

Wagner, T., & Dintersmith, T. (2016). Most likely to succeed: Preparing our kids for the innovation era. Scribner.

Zucker, A. (2008). Transforming schools with technology: How smart use of digital tools helps achieve six key educational goals. Massachusetts: Harvard Education Press.

Vita

Name: Donald H. Heberer Jr.

Baccalaureate Degree: Bachelor of Arts
Stony Brook University
History / Education
May, 2007

Master Degree: Master of Science
Stony Brook University
Technological Systems Management
May, 2009

Certificates: Advanced Graduate Certificate
Stony Brook University
Educational Computing
May, 2009

Advanced Graduate Certificate
Stony Brook University
Educational Leadership
May, 2015