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Teachers' Technology Acceptance and Usage Situations and the Evaluation of Web Pedagogic Content Knowledge in Terms of Different Variations and the Determination of the Relationship between These

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Abstract

The goal of this study is to analyze the situations of teachers' technology acceptance and usage (TAU) and web pedagogy content knowledge (WPACK) in terms of different variations and to determine of the relationship between these two. The study group of this research consists of 96 teachers in total having different variations such as different branches, different professional seniorities, different ages and different educational levels they work in. Data collection tools comprising of 3 open-ended questions which are developed and structured by researchers and two different scales measuring technology acceptance and usage and web pedagogical content knowledge are utilized in this study. The scales and structured forms are applied through random sampling with screening model. In the results of the research, teachers' technology acceptance and usage situations, web pedagogical content knowledge situations and their sexes and web 2.0 technologies usage situations don't differ in terms of the dimensions and the entirety of the scales. The following are established according to the results; there are differences among teachers' TAU situations, there aren't any differences among their WPACK in terms of their branches; there aren't any differences among their TAU situations and there are differences among their WPACK situations in terms of their ages; TAU and WPACK situations are not reasonable statistically in terms of their professional seniorities and educational levels they work in. Furthermore, it is also determined that web applications usage durations are not reasonable in terms of their TAU situations but they are reasonable in terms of WPACK. The answers which teachers provided towards open-ended questions are established to be categorized as education, technology, interaction, visuality, source and development. Additionally, it is settled that there is a low correlation between TAU and WPACK situations but it is possible to form a model between them. From the point of view of the findings of this study, it is suggested that knowledge and information regarding technology integration is provided experimentally to teachers in in-service seminars.

Keywords: technology integration, teachers, computer education, WPACK

1. Introduction

The reflections of information and communication technologies to education reshaped the educational system with globalization (Öztürk, 2014). A main factor which is becoming prominent with information in the age of information we are in is the internet. Because internet is the supporting power in accessing any information and obtaining new information. With the development of information and communication technologies (ICT), education environments are reshaped by many teachers and caused them to prepare online lesson materials accessible by students from everywhere (Szeto and Cheng, 2014). Free access to unlimited sources provided by internet, interaction with content and interpersonal interaction opportunity require teachers to use web technologies efficiently in their lessons (Horzum, 2011).

It is established that prospective teachers are in the opinion that; the concept of technology is a particular part of the modern life (Koç, 2013), technology affects the community, it can't develop separately from science (Zorlu & Baykara, 2015), it provides solutions to various problems (Yavuz & Coşkun, 2008), and it assists students in

learning and teachers in teaching (Inoue-Smith, 2014). However it is emphasized that present situation regarding the usage of technology in education falls behind the intended level (Lim & Chai, 2008; Lowther, Inan, Strahl, & Ross, 2008). It is stated that teachers have difficulty in integrating technology with their lessons and use technology in a way of consolidating it on their former habits (traditional teaching strategies) (Kadijevich, 2006; Lim & Khine, 2006; Mayya, 2007; Teo, Chai, Hung, & Lee, 2008; Orlando, 2009). However, this situation includes not only the lack in specific technology usage knowledge, but also the lack in technology-based pedagogical information and knowledge (Hew and Brush, 2007).The successful usage of ICTs by teachers depends on their motivation, knowledge and abilities. Additionally their perception and attitudes towards technologies are important in this respect.

2. Conceptual Framework

Various models are formed and are tried to be explained towards learners' technology acceptance and usage situations (Ursavaş, Şahin, & Mcilroy, 2014). Main variables confronted in technology acceptance models are "perceived benefit, perceived ease of use and intention" (Avcı-Yücel & Gülbahar, 2014). Generally, prospective teachers can't imagine of a life without technology (Biçen & Arnavut, 2015), and define themselves as "digital natives" using visual communication tools more than written materials and conducting their works via technology (Teo, Kabakçı-Yurdakul, & Ursavaş, 2014).

Conceptual perceptions of prospective teachers towards ICTs affect their acceptance and usage situations of ICTs. They stated that they are adequate in using ICTs for educational purposes (Çuhadar & Yücel, 2010),they show positive tendency to technology usage in lessons (Günüç & Kuzu, 2014) and that internet usage is particular for school environment (Şahin & Schreglmann, 2012). Prospective teachers consider internet as an inseparable part of their life both in school environment and outside of it (Yılmaz, 2012) and take advantage of internet for the following purposes; researching (Yavuz-Mumcu & Dönmez-Usta, 2014),downloading data, receiving and sending e-mail, supervising and using databases, website designing for educational purposes, making telephone conversations (Şahin and Schreglmann, 2012), playing games, downloading music and movies (Arabacıoğlu and Dursun, 2015), communicating in social media, on-line purchasing, reading newspaper, determination of destination, transactions of banking and finance (Kaya and Kaya, 2014). Regarding the technology acceptance and usage situations, the following are emphasized; technology acceptance and usage levels between teachers and prospective teachers are reasonable statistically (Teo, 2015), prospective teachers consider themselves adequate in technology (Çetin, Çalışkan, & Menzi, 2012), user-friendliness perception affects the attitudes of prospective teachers towards usage intention and computer utilization while ease of use perception doesn't affect these attitudes (Teo, Ursavaş, & Bahçekapılı (2011), technology acceptance and usage intention in education don't differ in terms of grade level and sex variables (Efe, 2011; Teo, Fan, & Du, 2015), individual learning experiences with technology are limited (Kontkanen, Dillon, Valtonen, Renkola, Vesisenaho, & Vaisanen, 2014) but they affect educational technology usage intentions (Efe, 2011), and knowledge, ability and confidence deficiencies in technology acceptances affect ICT self-efficacy negatively (Bozdoğan & Özen, 2014).

Technology integration in education has been a process influencing the development of technology integration models. This development shows an alteration from technology-oriented models to pedagogy-oriented models. While technology-oriented models aim at teachers' acquisition of technological knowledge and skills, pedagogy-oriented models aim at teachers' associating technology usage information with pedagogic information in the teaching process (Kabakçı-Yurdakul, 2011). One of the pedagogic models regarding technology integration in education is Technological Pedagogical Content Knowledge (TPACK). The pedagogy needed for the efficient technology integration of teachers in this model is an approach emphasizing the association and interaction of technology and content knowledge. This approach at first formed an integrated structure of pedagogic content knowledge (Shulman, 1987) and teaching knowledge by adding pedagogic knowledge to content knowledge of teachers. In the later years, technological pedagogic content knowledge model was formed considering that technology should take its part in these dimensions. Three main knowledge factors exist in this model; content, pedagogy and technology. The other components of the model comprises of 4 other additional elements formed by the combination of these three. These main knowledge elements are pedagogic content knowledge, technological content knowledge and technological pedagogic content knowledge (Koehler and Mishra, 2005; 2008; 2009; Mishra and Koehler, 2006; 2007; Schmidt, Baran, Thompson, Mishra, Koehler and Shin, 2009). As an important knowledge element in this point and forming the midpoint in the interaction of content, pedagogy and technology content elements, TPACK defines the high-level skill knowledge which a teacher should possess for the usage by teachers by associating technological and pedagogic knowledge in the teaching of a specific content area for technology integration in education Technological pedagogical content knowledge is shown in Figure 1(Harris, Mishra and Koehler, 2009; Mishra and Koehler,

2006).

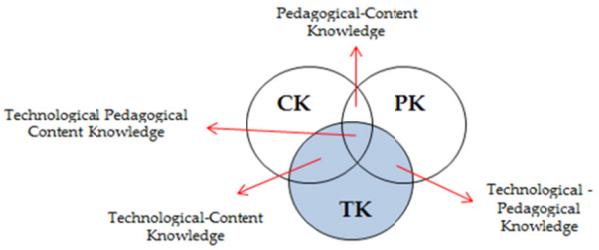

Figure 1. Technological pedagogic content knowledge (Harris, Mishra, & Koehler, 2009; Mishra & Koehler, 2006)

It is stated that technology integration originates from the beliefs, perceptions and comprehensions of individuals (internal obstacles), continuously changing technology, software-hardware and professional inefficacy (external obstacles) (Ryan and Bagley, 2015). It is also stated that the lesson plan preparation skills of prospective teachers for the purpose of technology integration to classroom affect the technology integration self-efficacy (Y. Lee, & J. Lee, 2014).

Due to the inclusion of different technologies in characteristics and usage of internet/web, the need to differently form the technological and content knowledge of Web emerged. Lee and Tsai (2010) and Lee, Tsai, and Chang (2008) defined the web technological pedagogic content knowledge. Its basis was developed basing on the pedagogic content knowledge of Schulman (1987) and on the technological pedagogic content knowledge of Mishra and Koehler (2006). Web pedagogic content knowledge comprises of 4 elements; web knowledge, web content knowledge, web pedagogic knowledge and web pedagogic content knowledge, As shown as Figure 2 (Lee & Tsai, 2010).

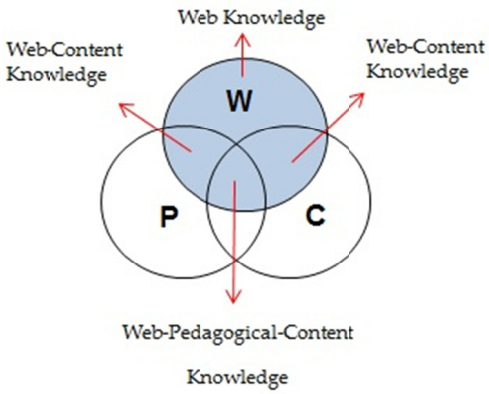

Figure 2. Web pedagogic content knowledge (Lee, Tsai, & Chang, 2008; Lee & Tsai, 2010)

Web pedagogic content knowledge is the integrated knowledge of pedagogic content knowledge and web knowledge which teachers should possess during the teaching of internet (Lee and Tsai, 2010). Web knowledge is defined as the knowledge including the advantages and characteristics of web such as web tools, web based communication-interaction. Content and pedagogic knowledge has the same definition with that of technological pedagogic content knowledge. With the help of web content knowledge, teachers and prospective teachers are aware of the knowledge they will teach and provide the integration of the content to web applications. With the help of web pedagogic knowledge, teachers and prospective teachers are aware of the opportunities and elements of web which they utilize in educational environments. Web pedagogic content knowledge defines the knowledge and ability to teach with web. It is established that prospective teachers consider internet beneficial, they don't do mistakes and don't confront with unexpected difficulties while using the internet (Şahin & Schreglmann, 2012), their self-efficacy levels in educational internet usage are medium-level (Kalay, Balay, Adıgüzel, 2014; Topal & Akgün, 2015), their web pedagogic content knowledge level is high and there is a

positive difference between their web pedagogic content knowledge and internet usage frequencies (Akgün, 2013).

When considering the literature, the fact that there are fewer studies regarding WPACK than of TPACK makes the subject even more important. Furthermore, considering the studies regarding TPACK, while studies which analyze each element of technological pedagogic content knowledge separately are numerous, studies which analyze technological pedagogic content knowledge as a whole are very limited. Analyzing the studies regarding TPACK, despite the fact that teachers' pedagogic, content and pedagogic content knowledge levels are high, it is established that with the addition of the technology knowledge, teachers have lower self-confidence (Archambault & Crippen, 2009) and that in-service and pre-service technology-supported professional development activities of teachers or prospective teachers have big effects on the development of technological knowledge in general (Hofer & Swan, 2008; Guzey & Roehrig, 2009; Richardson, 2009; Wilson & Wright, 2010; Harris & Hofer, 2011).

The goals of this research is to evaluate teachers' technology acceptance and usage situations and web pedagogic content knowledge in terms of different variables and to determine the relationship between these. These goals have not been studied before in the literature. When scanning the literature, it is established that the study group usually comprises of prospective teachers in domestic and foreign studies. From this point of view, this study is envisaged to contribute much to the literature due to its up-to-dateness and to the participation of teachers in this study. It will contribute to the literature by determining the web pedagogic content knowledge levels of teachers and the integration of technology to education. The answers to the following research questions are sought in order to achieve this goal;

1) Do teachers' technology acceptance and usage situations differ in terms of various variables?
2) Do teachers' web pedagogic content knowledge situations differ in terms of various variables?
3) Is there a relationship between the technology acceptance and usage situations and web pedagogic content knowledge situations of teachers?
4) What could be done within the scope of preparation of efficient application and practicing materials by which teachers can improve themselves regarding technological and pedagogic approaches? Which materials can be prepared?
5) What could be done for the development of web pedagogic content knowledge of teachers?

3. Method

3.1 Research Model and Study Group

As the research model, both quantitative and qualitative research models which are used as mixed method are used in this study. For further understanding of research problems, qualitative and quantitative research methods and the collection of various data are of big importance. The purpose of this mixed method is to provide that the analyses of the data collected by this means focus on solving research problems by mixing qualitative and quantitative methods in one research. The aim of the qualitative research is to reveal the researched subject with details realistically. Therefore it is important to analyze the data in detail, directly and with the support of expressions of the study group as far as possible. The aim of the quantitative research is to analyze the appropriateness of asserted theory and the effect of the collected data on learning outcomes (Creswell & Plano-Clark, 2007; Miles & Huberman, 1994; Straus & Corbin, 1998). Among these methods, screening model is used as quantitative research model. The study group of the research consists of 96 teachers in total from different branches working in primary and secondary public schools in Konya province.

Table 1. Demographical data of participants

		N	%
Gender	Male	42	43,8
	Female	54	56,3
	Total	96	100,0
Ages	21-30 ages	55	57,3
	31-40 ages	27	28,1
	41-50 ages	10	10,4
	50 and over	4	4,2
	Total	96	100,0
Branches	Classroom Teacher	24	25,0
	Informatics Teacher	3	3,1
	Physical Training Teacher	5	5,2
	Geography Social Sciences Teacher	6	6,3
	Religious Culture and Moral Knowledge Teacher	9	9,4
	Turkish Literature Teacher	11	11,5
	Science Teacher	9	9,4
	English Teacher	9	9,4
	Mathematics Teacher	11	11,5
	Pre-School Teacher	9	9,4
	Total	96	100,0
Professional Level	1-10 years	64	66,7
	11-20 years	19	19,8
	21-30 years	6	6,3
	31-40 years	7	7,3
	Total	96	100,0
School levels	Primary	32	33,3
	Secondary	56	58,3
	High	8	8,3
	Total	96	100,0

As it is clear in Table 1, of 96 teachers in total, 42 (43.8%) are male and 54 (56.3%) are female. The ages of the participants are grouped as follows; 21-30 = 1, 55 persons (57.3%); 31-40 =2, 27 (28.1); 41-50 = 3, 10 persons (10.4); 50 and up = 4, 4 persons (4.2%). As it is clear in Table 1, the distribution of 96 teachers' ages participating in the research is; 1 average 25.6; 2 average =34.40; 3 average =43,6; 4 average = 55,25. There are; 24 Classroom Teachers (25.0%), 3 Informatics Teachers (3.1%), 5 Physical Training Teachers (5.2%), 6 Geography Social Sciences Teachers (6.3%), 9 Religious Culture and Moral Knowledge Teachers (9.4%), 11 Turkish Literature Teachers (11.5%), 9 Sciences Teachers (9.4%), 9 English Teachers (9.4%), 11 Mathematics Teachers (11.5%) and 9 Pre-School Teachers (9.4%).

In terms of professional levels, participants are grouped as follows; 64 persons (66.7%) in 1-10 years, 19 persons (19.8%) in 11-20 years, 6 persons (6.3%) in 21-30 years and 7 persons (7.3%) in 31-40 years. In terms of school levels, there are 32 persons working in primary schools (33.3%), 56 persons in secondary schools (58.3%) and 8 in high schools (8.3%).

3.2 Data Collection Tools

A structured form comprising of two scales and open-ended questions is used in this study.

As data collection tool, the following are used; a personal information form which is developed by researchers and by which the demographical data of study group students is obtained, the form structured for the Web Tpck and technology usage, "Web Pedagogic Content Knowledge Scale" which is developed by Lee, Tsai and Chang (2008) and adapted into Turkish by Horzum (2011) and "Prospective Teachers' Technology Acceptance and Usage Scale" developed by Kabakçı-Yurdakul, Ursavaş, and Becit-İşçitürk (2014).

***In demographical data collection tool*;** demographical data of the participants are determined by asking them their branches, ages, sexes, institutions they're working in, for how long have they been working as teachers, do they use web 2.0 applications efficiently which are produced for educational purposes, for how long do they use

social networks, educational and cooperative web applications.

***Form structured for Web Tpck and technology usage*;** 5 open-ended research questions which are formed by researchers had become a structured form. Revised by 3 specialists and 1 linguist, the form was finalized as 3 open-ended questions.

"Web Pedagogic Content Knowledge Scale"; after formed as 30 articles, the necessary adjustments had been made with the help of a specialist and the scale was finalized as 30 articles and five sub-factors. The first factor is "General Web" consisting seven articles regarding general usage of Web. The second factor is "Communicative Web" comprising of four articles regarding communications or interaction based on Web. The third factor is defined as "Pedagogic Web" consisting five articles regarding web transactions and components used in educational environments. The fourth factor is defined as "Web Pedagogic Content" comprising of eight articles regarding online learning activities including appropriate pedagogic applications and private lessons. The last factor includes six articles regarding the usage of web based learning and is named as "Attitude towards Web Based Learning". This structure of the scale defines the 78.34% of the total variance. Sub-factors and the structure obtained by exploratory factor analysis are tested in terms of verifiable factor analysis and fit indexes. It is established in verifiable factor analysis that t values of 30 articles are reasonable in 0.05 level in five sub-factors.

Fit indexes of the scale

As a result of the analysis, fit indexes are found as follows; $\chi 2$=1106.80 (sd=395, p.=.0000), $\chi 2$/sd=2.80 RMSEA=0.07, RMR=0.08; SRMR=0.10, GFI=0.86, AGFI=0.80, IFI=0.91, CFI=0.91, NFI=0.89 and NNFI=0.91. It is stated that these values verify the structure. The credibility of the scale is observed with Cronbach alfa internal consistency coefficient. As a result of the analysis, it is found 0.96 for the whole of the scale and 0.94, 0.96, 0.94, 0.95 and 0.92 respectively for the factors. These values are interpreted as high credibility values. Furthermore, the internal consistency coefficient of the scale is observed in this study. Cronbach alfa internal consistency coefficient is found to be 0.95 for the whole of the scale. Five likert type scale is classified as; (1) certainly don't agree, (2) don't agree, (3) uncertain, (4) agree and (5) completely agree.

"Prospective Teachers' Technology Acceptance and Usage Scale"; In order to determine the usage and acceptance levels of ICTs, "Prospective Teachers' Technology Acceptance and Usage Scale" which is developed by Kabakçı-Yurdakul, Ursavaş and Becit-İşçitürk (2014) is used. By emphasizing the importance of the development of a scale based on Technology Acceptance and Usage Integrated Model for prospective teachers, Kabakçı-Yurdakul, Ursavaş and Becit-İşçitürk (2014) suggested the usage of the scale they developed in researches of which study group consists of teachers and prospective teachers. Cronbach Alfa is found 0.95 for the whole of scale by writers. Internal consistency coefficient of the factors forming the scale is between 0.85 and 0.92. Furthermore, internal consistency coefficient of the scale is observed in this study. Cronbach alfa internal consistency coefficient is 0,94 for the whole of scale. Five point likert type scale comprises of 23 articles and 7 factors. These factors are named as follows; Performance Expectation Factor (7th, 10th, 20th, 21st and 23rd articles), Effort Expectation Factor (3rd and 4th articles), Facilitating Situations Factor (1st, 11th and 19th articles), Social Effect Factor (5th, 8th and 13th articles), Self-Efficacy Factor (6th, 12th and 14th articles), Attitude Towards Usage Factor (2nd, 9th and 17th articles) and Behavioural Intention Factor (15th, 16th, 18th and 22nd articles). Performance Expectation is defined as the level of expectations of performance increase in individuals' studies using technology; Efforts Expectation is the level of facilitations brought about by the usage of technology; Social Effect is the level of other peoples' considering the usage of technology important; Facilitating Situations are defined as the availability of organizational or technical infrastructure support necessary for the usage of technology. All articles of the scale are positive and don't include articles reversely coded. Five likert type scales are classified as; (1) certainly don't agree, (2) don't agree, (3) uncertain, (4) agree and (5) completely agree. The utmost grade that can be obtained from the scale is 115, while the lowest one is 23. The possible grades that can be obtained from the scale in this study are ranked as follows; 23-45 low level, 46-68 medium level, 60-92 high level and 93-115 very high level.

3.3 The Analysis of Data

The data obtained in scope of the research is analyzed using SPSS 21.0 (The Statistical Package for The Social Sciences) package program and all hypotheses are tested in 0.95 credibility level (p = 0.05). As data correspond to the parametric test assumptions (N=96), parametric tests are used in the analysis of data. Within this concept, tests used for each sub-goal are listed below. Demographical data is explained by giving frequencies from descriptive statistics methods. In order to test whether study group reasonably differs in terms of their sexes and web 2.0 technology usage situations, t-test for unrelated samples is used. Furthermore, in order to test whether

the grades obtained by participants from the scale reasonably differ in terms of their branches, professional levels, educational levels they're working in and ages, one-way anova for unrelated samples is used. Simple correlation and pathway analysis techniques are used for the analysis of relationship between technology acceptance and usages and web pedagogic content knowledge of the participants. Content analysis is performed in the qualitative analysis of the research. In content analysis, the answers given by students are classified in categories, themes and codes, the frequencies are determined and the results are interpreted. Additionally, in parallel with intensive codes, samples of students' opinions are added for each question (Yıldırım and Şimşek, 2006).

4. Findings

Table 2 demonstrates the statistical data regarding the sexes of teachers in the study group.

Table 2. Technology Acceptance and Usage Scale (TAUS) results in terms of sexes of the teachers

Test group	Sex	N	$\overline{X}$	Std. Deviation	t	Sd	p
Performance	Male	42	19.2857	3.51502	.483	94	.630
Expectation	Female	54	18.9259	3.70544			
Effort Expectation	Male	42	7.7619	1.30308	-.495	94	.622
	Female	54	7.9074	1.52053			
Facilitating	Male	42	9.7619	2.76573	-1.341	94	.183
Situations	Female	54	10.5185	2.72473			
Social effect	Male	42	10.3333	2.22696	-1.547	94	.125
	Female	54	11.0370	2.19745			
Self-efficacy	Male	42	10.5000	2.55906	-.678	94	.499
	Female	54	10.8704	2.72685			
Attitude Towards	Male	42	11.2143	2.54267	.091	94	.928
Usage	Female	54	11.1667	2.54581			
Behavioural	Male	42	15.3095	2.91747	.918	94	.361
Intention	Female	54	14.6852	3.57573			
Total	Male	42	84.1667	13.52850	-.304	94	.762
	Female	54	85.1111	16.22212			

*P<0.05

Whether teachers' technology acceptance and usage situations differ in terms of their sexes is analyzed. It is established that there isn't a statistical difference in technology acceptance situations in terms of the sexes of the teachers. The following results are achieved; while average grades of males are higher than those of females in performance expectation, social effect, attitude towards usage and behavioural intention factors, average of females are higher than those of males in effort expectation, facilitating situations and self-efficacy factors (Table 2).

Table 3. WPACK results in terms of sexes of teachers

Test group	Sex	N	$\overline{X}$	Std. deviation	t	Sd	p
General Web	Male	42	32.1190	4.45685	-.186	94	.853
	Female	54	32.2778	3.88231			
Communicative	Male	42	15.8095	4.79450	-.478	94	.634
Web	Female	54	16.2407	4.03726			
Pedagogic Web	Male	42	22.3333	3.73948	-.678	94	.500
	Female	54	22.7963	2.95488			
Web Pedagogic	Male	42	34.8333	5.60451	-.267	94	.790
Content	Female	54	35.1296	5.22348			
Attitude Towards	Male	42	26.1667	4.05401	-1.391	94	.168
Web-Based	Female	54	27.2222	3.37955			
Learning							
Total	Male	42	131.2619	18.72140	-.681	94	.498
	Female	54	133.6667	15.85191			

*P<0.05

Whether teachers' web pedagogic content knowledge situations differ in terms of their sexes is analyzed. It is established that there isn't relevance in web pedagogic content knowledge situations in terms of the sexes of the teachers. However, average grade of females is higher than that of males in general web, communicative web, pedagogic web, web pedagogic content and attitude towards web-based learning (Table 3).

Table 4. Variance analysis results in terms of branches of teachers in the total of grades

Dependent Variable	Branch	N	$\overline{X}$	Std. deviation	F	p	LSD (Variances are not homogeneous)
TAUS	Classroom Teacher	24	83.5833	13.34465	2.220	.028*	There is difference (there are differences among Geography. Social Sciences Teachers and Religious Culture and Moral Knowledge. English. Mathematics Teachers and this difference is to the detriment of geography-social sciences teachers
	Informatics Teacher	3	91.6667	19.08752			
	Physical Training Teacher	5	84.4000	18.63599			
	Geography Social Sciences Teacher	6	64.5000	17.73979			
	Religious Culture and Moral Knowledge Teacher	9	91.8889	13.64225			
	Turkish Literature Teacher	11	85.2727	10.09050			
	Science Teacher	9	79.2222	21.37041			
	English Teacher	9	90.8889	7.47403			
	Mathematics Teacher	11	90.1818	13.50421			
	Pre-School Teacher	9	83.6667	12.27803			
	Total	96	84.6979	15.03408			
WPACK Scale	Classroom Teacher	24	15.1667	4.14589	1.309	.244	No difference
	Informatics Teacher	3	15.3333	6.35085			
	Physical Training Teacher	5	14.0000	4.00000			
	Geography Social Sciences Teacher	6	17.1667	2.31661			
	Religious Culture and Moral Knowledge Teacher	9	11.7778	5.93249			
	Turkish Literature Teacher	11	18.3636	2.54058			
	Science Teacher	9	16.1111	4.28499			
	English Teacher	9	17.8889	3.05959			
	Mathematics Teacher	11	17.5455	3.32757			
	Pre-School Teacher	9	16.7778	5.40319			
	Total	96	16.0521	4.36582			

*P<0.05

It is clear in the table that teachers' technology acceptance and usage situations differ in terms of their branches.

Since variances are not homogeneous, the result is achieved by analyzing with LSD test technique. As a consequence, there are differences among Geography-Social Sciences teachers, Religious Culture and Moral Knowledge teachers, English, Mathematics teachers and this difference is to the detriment of Geography-Social Sciences teachers. However, there isn't a reasonable difference in total grades of WPACK Scale statistically (Table 4).

Table 5. Variance analysis results in terms of ages of teachers in the total of grades

Dependent variable	Yaş	N	$\overline{X}$	Std. deviation	F	p	LSD (Variances are not homogeneous)
TAUS	21-30 ages	55	86.4909	14.16944	.827	.482	No difference
	31-40 ages	27	82.8148	15.50939			
	41-50 ages	10	83.2000	19.94325			
	50 and up	4	76.5000	8.81287			
	Total	96	84.6979	15.03408			
WPACK	21-30 ages	55	134.0364	15.20351	3.837	.012*	There is difference. (between 21-30 ages and 50 and up and between 31-40 ages and 50 and up) it is in the favour of the first ones
	31-40 ages	27	134.7037	14.46432			
	41-50 ages	10	129.7000	21.25533			
	50 and up	4	106.2500	30.23657			
	Total	96	132.6146	17.11409			

*P<0.05

It is established that technology acceptance and usage situations of teachers are not different statistically in terms of their ages, they are reasonable in terms of web pedagogic content knowledge. According to WPACK, the difference is in favour of 21-30 ages between 21-30 ages and 50 and up; 31-40 ages between 31-40 ages and 50 and up (Table 5).

Table 6. Variance analysis results in terms of professional levels of teachers in the total of grades

Dependent variable	Level	N	$\overline{X}$	Std. deviation	F	p	LSD (Variances are not homogeneous)
TAUS	1-10 years	64	86.5313	14.17685	1.200	.314	No difference
	11-20 years	19	80.2105	18.24092			
	21-30 years	6	85.6667	17.88482			
	31-40 years	7	79.2857	8.30089			
	Total	96	84.6979	15.03408			
WPACK Scale	1-10 Years	64	132.6250	15.05914	.721	.542	No difference
	11-20 years	19	136.0000	15.82544			
	21-30 years	6	124.6667	25.59427			
	31-40 years	7	130.1429	29.19719			
	Total	96	132.6146	17.11409			

*P<0.05

It is established that technology acceptance and usage situations of teachers are not different statistically in terms of their professional levels, neither are they reasonable in terms of web pedagogic content knowledge (Table 6).

Table 7. Variance analysis results in terms of school levels of teachers they're working in the total of grades

Dependent variable	Educational level	N	$\overline{X}$	Std. deviation	F	p	LSD (Variances are not homogeneous)
TAUS	Primary	32	81.5938	15.92089	1.096	.338	No difference
	Secondary	56	86.5179	13.87213			
	High	8	84.3750	19.03334			
	Total	96	84.6979	15.03408			
WPACK Scale	Primary	32	128.7813	16.35835	1.25	.246	No difference
	Secondary	56	135.0536	17.03304			
	High	8	130.8750	19.80215			
	Total	96	132.6146	17.11409			

It is established that technology acceptance and usage situations of teachers are not different statistically in terms of their educational levels they're serving in, neither are they reasonable in terms of web pedagogic content knowledge (Table 7).

Table 8. Variance analysis results regarding for how long do teachers use web applications (social network, educational and cooperative web technologies) in the total of grades

Dependent variable	Web applications usage durations	N	$\overline{X}$	Std. deviation	F	p	LSD (Variances are not homogeneous)
TAUS	5-10 years	47	82.4255	15.18830	1.047	.376	No difference
	3-5 years	29	88.4483	14.66674			
	1-3 years	16	83.7500	15.33406			
	Less than 1 year	4	88.0000	14.16569			
	total	96	84.6979	15.03408			
WPACK Scale	5-10 years	47	138.2128	11.76202	10.332	.000*	There is difference (between 5-10 years and 1-3 years and less than 1 year. in favour of the 5-10 years).
	3-5 years	29	132.6897	15.54510			
	1-3 years	16	124.3750	20.71030			
	Less than 1 year	4	99.2500	20.40221			
	Total	96	132.6146	17.11409			

It is established that technology acceptance and usage situations are not different statistically regarding for how long do teachers use web applications (social network, educational and cooperative web technologies. However there is a reasonable difference in web pedagogic content knowledge situations. This difference is in favour of those in 5-10 years group between 5-10 years and 1-3 years and less than 1 year (Table 8).

Table 9. Analysis of web 2.0 technologies usage situations of teachers in terms of TAUS

Test group	Efficient Usage situations of Web 2.0 technologies	N	$\overline{X}$	Std. deviation	t	Sd	p
Performance Expectation	Yes	65	19.0769	3.33686	-.070	93	.944
	No	30	19.1333	4.24860			
Effort Expectation	Yes	65	7.8308	1.36438	-.113	93	.910
	No	30	7.8667	1.59164			
Facilitating Situations	Yes	65	10.4615	2.76743	1.417	93	.160
	No	30	9.6000	2.72409			
Social effect	Yes	65	10.8308	2.25395	.600	93	.550
	No	30	10.5333	2.22421			
Self-efficacy	Yes	65	10.8000	2.65283	.452	93	.652
	No	30	10.5333	2.71310			
Attitude Towards Usage	Yes	65	11.2462	2.45606	.259	93	.796
	No	30	11.1000	2.75869			
Behavioural Intention	Yes	65	14.9077	3.32473	-.216	93	.830
	No	30	15.0667	3.36240			

Total	Yes	65	85.1538	14.95225	.394	93	.694
	No	30	83.8333	15.66257			

*P<0.05

As a result, web 2.0 technologies usage situations of teachers are not different statistically in terms of TAUS (Table 9).

Table 10. Analysis of web 2.0 technologies usage situations of teachers in terms of WPACK

Test group	Efficient Usage situations of Web 2.0 technologies	N	$\overline{X}$	Std. deviation	t	Sd	p
General Web	Yes	65	32.7077	3.58261	1.778	93	.079
	No	30	31.1000	5.04702			
Communicative Web	Yes	65	16.5846	4.13405	1.723	93	.088
	No	30	14.9333	4.77012			
Pedagogic Web	Yes	65	22.8000	3.42874	.953	93	.343
	No	30	22.1000	3.08891			
Web Pedagogic Content	Yes	65	35.4615	5.39119	1.319	93	.191
	No	30	33.9000	5.30679			
Attitude Towards Web-Based Learning	Yes	65	26.8615	3.72020	.479	93	.633
	No	30	26.4667	3.76676			
Total	Yes	65	134.4154	16.91790	1.571	93	.120
	No	30	128.5000	17.36773			

*P<0.05

As a result, web 2.0 technologies usage situations of teachers are not different statistically in terms of WPACK. Furthermore, the average grades of web 2.0 technologies usage situations are higher than those of non-usage situations (Table 10).

Table 11. Correlation between the TAU and WPACK situations of teachers

		TAU	WPACK
TAU	PearsonCorrelation	1	.073
	Sig. (2-tailed)		.478
	N	96	96
WPACK	PearsonCorrelation	.073	1
	Sig. (2-tailed)	.478	
	N	96	96

It is established that there is a low correlation between TAU and WPACK situations of teachers (r = 0.073).

Table 12. Relational model between TAU and WPACK situations of teachers

MODEL	R	R Square	Adjusted R Square	Std. Error	F	Sig.	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
regression	.073[a]	.005	-.005	17.15864	.507	.478[a]	B	Beta		
Constant							125.551		12.466	.000
WPIB							.083	.073	.712	.478

A relational model can be formed between TAU and WPACK situations of teachers. It is clear that there is a separate but relational structure between TAU and WPACK situations of teachers (R2 = 0,05).

5. Findings of the Qualitative Part of the Research

Table 13 includes the categorized codes formed for the answers given in response to the following question;

"The usage of web pedagogic content knowledge by teachers in teaching process is accepted as the increase of quality and activity in the student generation being raised. Therefore, for a qualitative and international education in the community, web, technology, pedagogy and content knowledge can be handled as a whole and the educational system can be re-structured accordingly. Within this concept, in order that teachers can use technology efficiently and productively in their lessons, learning environments including how to use it should be provided with appropriate pedagogic approach. It is possible to have teachers prepare efficient application and practicing materials regarding technology and new pedagogic approaches. In your opinion, what can be done within this scope?"

Table 13. Technological learning environments offered to teachers

Category	Theme	Code	Frequency
Education	Lesson (e)	Optional Lessons	8
		Distant Learning	5
		Web pedagogy	9
	Course (e)	Obligatory education, lesson	18
		Seminar, conference	21
		In-service education	10
		Applied education	15
		Courses	12
		Guide preparation	1
		Sample learning methods	4
	Source (e)	Education of technological tools	14
		Training by specialists	7
		Internship application	4
	Total (e)		128
Technology	Environment (t)	Technological classes	7
		Animation, game preparation	9
		Website of the classroom	5
		Computer laboratory	2
	Content (t)	Presentation-video	18
		Efficient tablet, smartboard usage	25
		Technology usage should increase	3
		Materials preparation	27
		Web thematic materials	3
		Projects	2
		Simulation	2
	Internet (t)	Awareness of internet	5
		Internet usage	5
		Homeworks by web	2
	Computer usage rules (t)		3
	Following technology, improving the self (t)		16
	Total (t)		134
Interaction	Student (I)	Asking questions	1
		Awareness of internet	5
		Guidance to students	2
		Active participation	1
		Motivation increase	2
	Material (I)	Interactive programs	6
		Visuality, attraction	10
	Total (I)		27

Three categories are formed by coding the answers regarding what can be done in respect of technological learning environments offered to teachers; Education, Technology and Interaction. Themes and codes are established by classifying data in categories.

The codes in Lesson theme of Education category show that Obligatory education, lesson, n=18 is the most dense answer. Other opinions of teachers are as follows respectively; optional lessons n=8, distant learning n=5, Web pedagogy n=9; codes in the Course theme are as follows according to the density; Seminar, conference n=21, In-service training n=10, Applied education n=15, Courses n=12; codes in the Source theme are as follows respectively; Education of technological tools n=14, Guidance preparation n=1, Sample teaching methods n=4, Education by specialists n=7; and Internship application n=4. The total of Education category is n=128.

The codes in Environment theme of Technology category are as follows respectively; Material preparation n=27, Technological classes n=7, Animation, game preparation n=9, website of the classroom n=5, Computer laboratory n=2; Codes in the Content theme; Presentation-video n=18, Efficient tablet, smartboard usage n=25, Technology usage should increase n=3, Web thematic materials n=3, Projects n=2, Simulation n=2; codes in Internet theme are as follows; Awareness of internet n=5, Internet usage n=5, Homeworks by web n=2; Computer usage rules n=3; Following technology, improving the self n=16. Technology category is n=134 in total.

Codes in the Student theme of Interaction category are as follows respectively; Awareness of internet n=5, Guidance to students n=2, Asking questions n=1, Active participation n=1, Motivation increase n=2; codes in Material theme are as follows respectively; Visuality, attraction n=10 and Interactive programs n=6. Interaction category is n=27 in total.

Some of the answers given to the same question are as follows:

“Lessons can proceed based on visual procedure. Thus the desired educational level can be achieved by students by reaching them by all their perceptions with slides, photographs, videos and voices etc.” (K23)

“Trainings of technological tools, computers and smartboard usage can be provided. Cartooning on smartboard training can be provided.” (K30)

“Materials addressing to several senses should be developed. The development process of the child should be taken into consideration. Clear expressions should be used. There should be materials and presentations summarizing the subject.” (K144)

Table 14 includes the categorized codes regarding answers given in response to the following second question; *“It is possible to have teachers prepare efficient application and practicing materials regarding technology and new pedagogic approaches. In your opinion, which materials can be prepared?”*

Table 14. Materials that teachers will apply

Category	Theme	Code	Frequency
Technology	Material (T)	Easily preparible	7
		Presentation, animation, game	42
		Technological tool and designs	10
		Web thematic materials	7
		Having website done	3
		Material appropriate for level	25
		Computer-supported material	13
		Educational thematic sites	2
		Educational toys	4
		Materials of feedback	4
	Technological tools (T)	Usage of projection, smartboard	7
		Tablet usage	3
	New technologies (T)	Cloud technology etc.	4
	Total (T)		131
Visuality	Material (V)	Interactive softwares	6
		Visual, attracting material	38
		Substantial materials	6
		Knowledge caricatures, concept maps	2
		Mock-ups, 3d materials	7
		Functional, participating	7
		Clear, basic material	4
		Simulation, video	10

Source		Entertaining, educative materyal	8
	Total (V)		88
	Assignment (S)	Consolidation with homeworks	2
		Project, seminar, internship	3
		Having research done	2
	Lesson (S)	ICT and pedagogy importance	7
		Obligatory lesson	2
		Activities developing cognitive, affective, psychomotor skills	1
		Incentive to prepare material	2
	Environment (S)	Up-to-date source	3
		Student communities	1
		Virtual classes	1
		Micro teaching	1
		School-student-family cooperation	3
	Appropriateness (S)	Appropriate to multiple intelligence theory	3
		Materials appropriate for purpose	7
	Total (S)		38

Three categories are formed by coding the answers regarding the preparation of materials to be applied by the teachers; Technology, Visuality and Source. Themes and codes are established by classifying data in categories.

The codes in Material theme of Technology category are as follows respectively; Game n=42, Easily preparable n=7, Presentation, animation, Technological tool and designs n=10, Web thematic materials n=7, Website preparation n=3, Material appropriate for level n=25, Computer-supported material n=13, Education thematic sites n=2, Educational toys n=4, Materials of feedback n=4; codes in the Technological tools theme are as follows according to the density; Usage of projection and smartboard n=7, Tablet usage n=3; sub-theme Cloud technology is n=4 in the New technologies theme. The total of Technology category is n=131.

The codes in Material theme of Visuality category are as follows respectively; Attracting material n=38, Interactive softwares n=6, Visual, substantial materials n=6, Knowledge caricatures, concept maps n=2, Mock-ups, 3d materials n=7, Functional, participating n=7, Clear, basic materials n=4, Simulation, video n=10 and Entertaining, educative material n=8. Visuality category is n=88 in total.

Codes in the Assignment theme of Source category are as follows respectively; ICT and pedagogy importance n=7, Consolidation with homeworks n=2, Project, seminar, internship n=3, Having research done n=2; codes in Lesson theme are as follows respectively; Up-do-date source n=3 , Obligatory lesson n=2, Activities developing cognitive, affective, psychomotor skills n=1, Incentive to prepare material n=2; codes in Environment theme are as follows respectively; School-student-family cooperation n=3, Student communities n=1, Virtual classes n=1, Micro education n=1; codes in Appropriateness theme are as follows respectively; Materials appropriate for purpose n=7 and Appropriate for multiple intelligence theory n=3. Source category is n=38 in total.

Some of the answers given on the application to be made of materials prepared for teachers are as follows:

“First of all materials must be appropriate to the development of the child’s age. The material should generally be substantial and the child should understand it easily. Materials specific for children should be attractive.” (K22)

“It should be appropriate to the age group. It should be attractive.” (K52)

“Entertaining and also educative, user-friendly and visual materials can be prepared.” (K94)

Table 15 includes the answers given to the following third question; *“Finally, what can be done for the development of web pedagogic content knowledge of teachers”*

Table 15. Development of web pedagogic content knowledge of teachers

Category	Theme	Code	Frequency
Education	Lesson (E)	Web literacy training	6
		Addition as a Lesson	12
		Increase of pedagogic lessons	4
		Web design lessons	5
		Coding	4
		Necessary programs should be taught	7
		Web-supported pedagogic education	8
		Mandatory informatics lesson	5
	Supporting education(E)	In-service training	16
		Seminar, course and conference	68
		Distant learning	3
		Importance of internship should increase	6
		Applied education	8
	Content(E)	Increase the quality of the education	2
		Performing Examinations	4
		Having presentations, lesson plans prepared	3
		Social media should be used in education	1
		Formation shouldn't be granted	1
	Total(E)		163
Technology	Usage (T)	Computer usage command	4
		Conscious computer usage	9
		Technology usage should increase, integration with it	9
		Ease of use, incentive	2
		Usage of smartboards	2
		Efficient usage of technology	4
	Content (T)	Educative software, computer-supported education	10
		Cloud technology	1
		Pursuit of New developments	3
	Total (T)		44
Development	Content (D)	Education model appropriate for individuals and needs	2
		Entertaining, attractive activities	5
		Development levels, individual differences	2
		Visuality, video	4
	Research (D)	Taking advantage of internet and specialists	14
		Following articles, texts, videos	9
		Research, syntheses, evaluation	6
		Awareness-raising, specialising	8
		Area study, educational sites	8
		Creative thinking	2
		Its importance and necessity should be emphasized	2
		Willingness of the teachers	4
	Total (D)		66

Three categories are formed by coding the answers regarding the development of web pedagogic content knowledge of teachers; Education, Technology and Development. Themes and codes are established by classifying data in categories.

The codes in Lesson theme of Education category are as follows respectively; Addition as a lesson n=12, Web

literacy training n=6, Increase in pedagogic lessons n=4, Web design lessons n=5, Coding n=4, Necessary programs should be taught n=7, Web-supported pedagogic education n=8, Mandatory informatics lesson n=5; codes in the Supporting education theme are as follows according to the density; In-service training n=16, Seminars, courses, conference n=68, Distant learning n=3, Importance of internship n=6, Applied education n=8; codes in the Content theme are as follows respectively; Performing examinations n=4, Increasing the quality of education n=2, Having presentation and lesson plans prepared n=3, Social media should be used in education n=1; the theme of Formation shouldn' be granted is determined as n=1. The total of Education category is n=163.

The codes in Usage theme of Technology category are as follows respectively; Technology usage should increase, integration with it n=9, Conscious internet usage n=9, Computer usage command n=4, Ease of use, incentive n=2, Use of smartboards n=2, Efficient technology usage n=4; codes in the Content theme are as follows; Educative software, computer-supported education n=10, Pursuit of new developments n=3, Cloud technology n=1. Technology category is n=44 in total.

The codes in the Content theme in Development category are as follows respectively; Entertaining, attractive activities n=5, Education model appropriate for individuals, needs n=2, Development levels, individual differences n=2, Visuality, video n=4; codes in the Research theme are as follows; Taking advantage of internet and specialists n=14, Following articles, texts, videos n=9, Research, syntheses, evaluation n=6, Awareness, specialising n=8, Area study, education sites n=8; Creative thinking theme n=2; Its importance and necessity should be emphasized theme n=2; Willingness of teachers theme n=4. Development category is n=66 in total.

Some of the answers given on the development of web pedagogic content knowledge of teachers are as follows:

"Classes with technological equipments should be formed for pedagogic education, in-service trainings, meetings, seminars and teachers." (K20)

"We should be more integrated with technological tools." (K27)

"Web design courses should be delivered and design basics should be taught." (K78)

"Things that can be done for the development of web pedagogic content knowledge can be expressed via courses." (K165).

6. Discussion, Conclusion and Suggestions

As a result of the findings of the research, it is established that teachers' WPACK and TAU are not reasonable statistically. It is also determined in similar studies that technology acceptance and usage intentions of teachers in education don't differ in terms of their sexes (Efe, 2011; Teo, Fan, & Du, 2015), the internet self-efficacy beliefs of prospective teachers don't show a reasonable difference in terms of their sexes except the factor of internet usage durations (Bayrakçı, Tozkoparan, & Durmuş, 2014).

Technology acceptance and usage situations differ in terms of the branches of teachers, however web pedagogic content knowledge situations don't show the same difference in terms of the same variable. Contrary to this situation, it is stated in a similar study that there is a reasonable correlation between the technological acceptance and usage levels of teachers and those of prospective teachers (Teo, 2015); and that prospective teachers consider themselves as adequate in technology (Çetin, Çalışkan, & Menzi, 2011).

From the findings of the research, technology acceptance and usage situations don't differ in terms of the ages of teachers, however web pedagogic content knowledge situations differ in terms of the same variable. Furthermore, the difference between technological acceptance and usage situations and web pedagogic content knowledge in terms of their professional levels and school levels they are working in, is not reasonable statistically. Technology acceptance and usage situations don't differ in terms of the web applications usage durations of teachers, however web pedagogic content knowledge situations differ in terms of the same variable. In similar studies of which study groups comprise of prospective teachers, it is stated that their self-efficacy levels in educational internet usage are medium-level (Kalay, Balay, & Adıgüzel, 2014; Topal & Akgün, 2015), their web pedagogic content knowledge level is high and there is a positive difference between their web pedagogic content knowledge and internet usage frequencies (Akgün, 2013). It is determined that web 2.0 technologies usage situations of teachers are not reasonable in terms of TAU situations and WPACK situations.

When considering answers given by teachers to open-ended questions, "*what can they do regarding efficient application and practising materials by which they can improve themselves in technological and new pedagogic approaches"* is interrogated. The answers are categorized into three. They stated their opinions about "*Optional lessons, Distant learning, Web pedagogy, Mandatory education, lessons, Seminars, conferences, in-service trainings, applied education, Courses, Guidance preparation, Sample teaching methods, Technological tools*

training, education by specialists, Internship application" in the category of Education; "*Technological classrooms, Animation, game preparation, Website of the classroom, Computer laboratory, Presentation-video, Efficient use of tablet and smartboard, technology usage should increase, preparation of materials, Web thematic materials, Projects, Simulation, Awareness of internet, Internet usage, Homeworks by web*" in the category of Technology; "*Asking questions, awareness of internet, guidance to students, active participation, motivation increase, interactive programs, visuality, attraction*" in the category of Interaction. In similar studies, it is established that prospective teachers think they are adequate in using ICTs for educational purposes (Çuhadar & Yücel, 2010), they show positive tendency to technology usage in lessons (Günüç & Kuzu, 2014), they have positive opinions towards internet-based educational environments (Uzun, 2013) and their online learning motivations are high-level (Çakır & Horzum, 2015). Moreover, it is stated that augmented reality applications in which digital objects are offered together with real objects, increase the knowledge about the subject, teachers' academic success in 3d visual environments are higher (Cho, Yim, & Paik, 2015), it is difficult to prepare educative animation and to apply it to all subjects (Seçkin-Kapucu, Eren, & Yurtseven-Avcı, 2014). They also reshaped the education environment of technology, education besides affecting the type and nature of the material used in the course of the evaluation process and the results dimension. They state that distant learners have positive attitudes towards e-evaluation methods originated from the combination of assessment and evaluation and ICTs (Bahar, 2014). They confirmed that knowledge that Turkish teachers possess regarding graphic and presentations writing is lower than those of Bosnia-Herzogevinan teachers. Besides, Turkish prospective teachers define themselves as individuals using visual communicative tools rather than written texts (Çukurbaşı & İşman, 2014) and are in the opinion that interactive e-books address to more than one sense (Özer and Türe, 2015); conformably, there are similar statements as this in this study. In addition to these, the protection of personal data and rights in virtual platforms should be guaranteed by law. Teachers should be aware of the safe usage of ICTs (Seppälä, Alamäki, 2003; Tondeur, Van Braak, & Valcke, 2007; Ayvacı, Bakırcı, & Başak, 2014). In parallel with this situation, teachers' opinions are as follows;

"Lessons can proceed based on visuality..." (K23)

"Trainings of technological tools, computers and smartboard usage can be provided. Cartooning on smartboard training can be provided." (K30)

When considering answers given by teachers to open-ended questions, "*how we can prepare efficient application and practising materials regarding technology and new pedagogic approaches"* is interrogated. The answers are categorized into three. They stated their opinions about; *"Easily preparable, Presentation, Animation, Technological tool and designs, Web thematic materials, having website prepared, material appropriate to level, computer-supported material, Education thematic sites, educative toys, materials of feedback, projection, smartboard usage, tablet usage, Cloud technology etc."* in the category of technology; "*interactive softwares, Visual, attractive materials, substantial materials, knowledge caricatures, concept maps, Mock-ups, 3d materials, functional, participating, clear, basic material, simulation, video, entertaining and educative material"* in the category of visuality; "*consolidation with homeworks, project, seminars, internship, researching, ICT and pedagogy importance, mandatory lesson, activities developing cognitive, affective, psychomotor skills, incentive to prepare materials, up-to-date source, student communities, virtual classes, micro education, school-student-family cooperation, appropriate to multiple intelligence theory, material appropriate to purpose"* in the category of source. The answers given by teachers to the first question resemble with these answers given in response to the third question. It is stated that prospective teachers developing computer-supported teaching material have positive opinions towards computer-supported learning (Ayvaz-Reis, Kırbalar and Özsoy-Güneş, 2010). In parallel with these results, teacher opinions are as follows;

"First of all materials must be appropriate to the development of the child's age..." (K22)

"Entertaining and also educative, user-friendly and visual materials can be prepared." (K94)

Teachers are asked "What can be done for the development of web pedagogic content knowledge". The answers are categorized in three; Education, Technology and Development. They stated their opinion on; "*Web literacy training, addition as a lesson, increase of pedagogic lessons, web design lessons, coding, necessary programs should be taught, web-supported pedagogic education, mandatory informatics lessons, in-service training, seminars, courses, conferences, distant learning, importance of internship should increase, applied education, increasing the quality of the education, performing examinations, having presentations and lesson plans prepared, social media should be used in education, formation shouldn't be granted"* in the category of education; "computer usage command, conscious internet usage, technology usage should increase, integration with it, ease of use, incentive, smartboards should be used, efficient technology usage, educative software,

computer-supported education, Cloud technology, pursuit of new development" in the category of technology; *"education model appropriate for individuals and needs, entertaining, attractive activities, development levels, individual differences, visuality, video, taking advantage of internet and specialists, following articles, texts, videos, research, syntheses, evaluation, awareness, specialising, area study, educational sites, creative thinking, its importance and necessity should be emphasized, willingness of the teachers"* in the category of Development. It is stated in similar studies that the skills of teachers to prepare lesson plans for integration purposes of technology to classes affect their technology integration self-efficacy (Lee and Lee, 2014) and their web pedagogic content knowledge level is high (Akgün, 2013). Moreover, despite the fact that teachers' pedagogic, content and pedagogic content knowledge levels are high, it is established that with the addition of the technology knowledge, teachers have lower self-confidence (Archambault and Crippen, 2009) and that in-service and pre-service technology-supported professional development activities of teachers or prospective teachers have big effects on the development of technological knowledge in general(Hofer and Swan, 2008; Guzey and Roehrig, 2009; Richardson, 2009; Wilson and Wright, 2010; Harrisand Hofer, 2011). There is a relationship between TAU and WPACK of teachers in this study. A model can be formed between TAU and WPACK situations (Table 12). There is a low, positive correlation between TAUS dimensions and WPACK Scale dimensions (Table 11). In order to improve web content knowledge of teachers, it is suggested that they participate in in-service trainings and distant education seminars or they receive lessons and activities before their professional life while they're still students. From the point of view of this study's findings; technological acceptance and usage situations scale and web pedagogic content knowledge scale can be designed as a form experimental study rather than in screening model. Knowledge and skills of teachers can be increased by determining the deficiencies in development and change processes, by eliminating these deficiencies, and by making educational plans comprehensively.

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