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PLANNING THEIR FIRST LANGUAGE LESSON: APPLYING
CONSTRUCTIVIST VALUES TO THE DESIGN OF OBJECTIVE TRAINING
FOR PART-TIME TEACHERS AT THE MISSIONARY TRAINING CENTER

by

Chandler Rudd

A selected project submitted to the faculty of

Brigham Young University

Master of Science

Department of Instructional Psychology and Technology

Brigham Young University

June 2009

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BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

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BRIGHAM YOUNG UNIVERSITY

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ABSTRACT

PLANNING THEIR FIRST LANGUAGE LESSON: APPLYING CONSTRUCTIVIST VALUES TO THE DESIGN OF OBJECTIVE TRAINING FOR PART-TIME TEACHERS AT THE MISSIONARY TRAINING CENTER

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Department of Instructional Psychology and Technology

Master of Science

The newly hired teachers at the Missionary Training Center are expected to learn to teach foreign language well enough to prepare students to communicate functionally in that language within 2-3 months. These teachers have very little to no language teaching experience and must tend to the responsibilities of this part-time job while juggling the demands of full-time school work and social lives. This report details the design and development of a prototype training program aimed to initiate young teachers into the culture of methods and tools employed at the MTC by walking them through the process of planning their first language lesson.

The Missionary Training Center has a rich culture of language learning practices. While there are specific expectations related to language teaching espoused by MTC administration, there is also a strong community of language teachers who routinely adapt MTC methods and invent practices to best meet the needs of their students. This project is an attempt to balance the request to develop particular competencies with the need for new teachers to be assimilated into the community of language teachers. This is done by infusing an objective training program with constructivist values, including authentic activity, modeling, representing multiple perspectives, generating, and reflecting.

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Introduction

In our current culture there is an immense proliferation of information related to every subject imaginable. Easy access to information, particularly via electronic means, fundamentally changes the role that instruction and teachers have filled in the past. Instruction or training is no longer a necessary source of new information for students. Training is now positioned to be successful by effectively brokering information and providing a framework wherein that information can be processed and applied in meaningful and relevant ways. At the Missionary Training Center (MTC) in Provo, Utah, where 19–25 year old men and women come to spend 2–3 months learning a second language, there is no shortage of information available to teachers; information in the form of curriculum documents, manuals, grammar books, and peer experiences and stories, are readily on hand. The challenge for a newly hired teacher is to understand the community practices that govern the way in which this information is navigated and used to meet student needs. Unfortunately they have precious little time in which to learn this.

Like most institutions, the Missionary Training Center administration requires that employees be able to demonstrate specific competencies by the end of a given training period. The ability to plan and execute a language lesson in a manner that successfully meets the needs of students is incredibly complex, particularly when the teacher has no background in pedagogy, let alone second language acquisition. The task requires the teacher to be familiar with necessary resources and understand effective methods well enough to apply them in a manner suitable to the intricacies of their specific language and relevant to the circumstances and interest of the students.

The rich history of foreign language instruction at the Missionary Training Center has resulted in communities of language teachers who have developed teaching practices within their language families. These teaching practices have been evolving for many years. Gaining access to these practices and, more importantly, assimilation into the communities that own them is a significant struggle for new teachers given the part-time nature of the job and the relatively high turnover rate for teachers. This report details the design and development of a prototype training system for Spanish language teachers intended to expedite the process of accessing the unique practices of different MTC language communities while

emphasizing the pedagogical approach and curriculum espoused by the organization. The training is designed to be delivered electronically to better suit the time and location constraints of part-time employees who are full-time students. The program applies constructivist values within the confines of an objective training experience by brokering relevant language teaching resources as well as experiences and practices from multiple perspectives to enable the accomplishment of an authentic task: planning their first language lesson. By providing access to the experiences of peers, experts, and students coupled with opportunities to reflect, all within the framework of a motivating task, the training appears to successfully facilitate the development of a needed competency while opening the door to the practices of the language community sooner than it occurs otherwise.

Problem

The current demands on part-time language teachers at the MTC coupled with the circumstances of both their private and work lives underscores their need for increased support in language teaching. The Missionary Training Center employs approximately 600 part-time teachers to teach 50 different languages to a constant flow of students in 8–12 week courses. The employees are not professional teachers and typically have little to no knowledge of or experience with helping others learn a second language. Although the MTC curriculum covers much more than second language acquisition it is little wonder that it is in this facet of the job that MTC teachers feel the most anxiety and the greatest need for training and support. Focus groups conducted with MTC teachers in the Fall of 2007 as part of the analysis phase of general curriculum revisions revealed that teachers desire more opportunities to collaborate on lessons and to learn from one another. They want more ideas and examples from their peers illustrating how to successfully teach different concepts. This was evident in comments such as, "I would really love to know what other teachers are doing in the classroom," and, "The most helpful thing would be if I could get more ideas from other teachers." Similar things were said in each of four different focus groups conducted at the time. Follow-up surveys confirmed that language teaching is the area where teachers feel the most acute need for ideas and examples. Of 17 teachers surveyed, 14 indicated that they

would be interested in more opportunities to share ideas with other teachers, and 7 of those chose *language teaching* as the area they would most like to discuss with their peers.

Much of teachers' insecurity about teaching language has a clearly identifiable root cause: they have no experience teaching a second language and the MTC has meager materials to support them in language instruction. Teachers are introduced to and trained on a helpful set of guiding principles for planning and executing language lessons based on solid research in the field of second language acquisition; however they are responsible to create their own language lessons. Often they are left to themselves to work out how those principles apply to their particular needs because the large number of different languages taught at the MTC and the significant distinctions between those languages makes it difficult to provide language-specific support to teachers. In many cases there are only two or three teachers with comparable teaching experience employed at a time for a given language. Though the MTC does provide commercial grammar texts to both learners and teachers, the texts are written to the students, not to the instructors, and they do not present language in contexts that are relevant to the needs and circumstances of the MTC's language learners. MTC administration is not oblivious to this deficiency and has begun work on support materials for teachers to be produced in-house but it will be several years before those materials are completed in each language. In the meantime, more than 6,000 language learners and 1,800 instructors will have passed through the program.

Despite the strong need that teachers feel to collaborate with and learn from peers who speak their language there are a number of circumstances resulting from administrative structure and policies, designed to provide greater flexibility for teachers, which tend to inhibit teacher contact and collaboration. For example, teachers' work schedules are highly customizable according to their needs. This results in every teacher having unique shift start and end times. Because teachers begin and end at different times there is little chance of them coming into contact with each other for conversation and discussion in the workplace. Additionally, work hour limits are strongly enforced and teachers are encouraged to spend as much time as possible in the classroom with the students, making available time for meaningful work-related discussions outside of the classroom a luxury. Collaboration is further

discouraged by the lack of spaces designated for teachers. They are frequently left to chat in hallways and parking lots because there are no spaces for them to meet.

Training coordinators who supervise teachers are willing and eager to help but they too are hindered from giving individual support to teachers regarding language instruction. Each training coordinator may be responsible for 60 teachers and during the Fall semester two-thirds of those teachers may be new. The complexities of merely scheduling times to observe and counsel with up to 40 teachers is a daunting task which means that coordinators seldom have a good picture of how their teachers are teaching language and few opportunities to help them. It is also common for a coordinator to supervise language areas that he or she does not speak. If a teacher does have the chance to counsel with a supervisor about language lessons that supervisor has a limited ability to provide helpful examples or demonstrations if he or she doesn't speak the teacher's language.

On account of budgetary restrictions it is unlikely that the supervisory structure within the Training department at the MTC will change to better meet the needs of teachers. Similarly, policies governing teacher schedules won't likely change because they have the positive effect of allowing teachers to work around their school schedules which helps the MTC reduce turnover. Better language materials are in production and will certainly relieve much of the burden and anxiety teachers feel when they must create language lessons but, as stated above, those materials will not be completed and distributed for a couple of years. Providing for the teachers' need to exchange ideas and receive greater support in preparing language lessons requires exploring and implementing new means by which teachers can learn and collaborate. A viable solution will address the following key problems:

1. Teachers must apply general language instruction principles to their specific language on their own.
2. Teachers have few if any opportunities to see and learn from what others are doing.
3. Teachers lack time to share ideas with peers while at the MTC.
4. Coordinators have limited capacity to address teachers' individual struggles with language teaching.

The training program that was developed to meet the needs described above was designed to assist teachers in creating language lesson plans by walking them through the process, providing examples, and letting them generate a plan using their own content. The module facilitates teacher collaboration by drawing examples from peers and making them accessible for review and use by new teachers. In this manner teachers have support generating lesson plans, and opportunities to share ideas with other teachers. This solution also makes teachers' language lesson plans more visible to training coordinators enabling them to give more efficient and accurate feedback.

Constraints

Preach My Gospel is the primary manual used for instruction at the MTC. It comprises the content that students are to learn while at the MTC. The chapter regarding language learning contains a fairly high-level discussion of key principles to be applied when learning a second language along with simple strategies that students can use to improve the effectiveness of their language study. Although the manual does not speak specifically to language teachers it is expected that all teacher methods and means of training teachers to instruct in a foreign language will align with the principles and strategies laid out in *Preach My Gospel*. While developing the proposed training for new teachers, it was necessary to take steps to ensure that the approach and content are not only compatible with *Preach My Gospel*, but also consistent with its intent and terminology. Any contradictions or conflicts between *Preach My Gospel* and the proposed instruction would severely compromise adoption and implementation of the intervention.

Similarly, it is expected that any newly developed instruction will support the resources and curriculum that are already in place. In other words, the instruction should enable teachers to more effectively use the resources already available to them rather than negating the need for documentation that currently exists by creating substitute resources or undermining the usefulness of current curricular resources.

As there are over 50 languages being taught at the MTC, approaches and methods used in language instruction must strike a balance between consistency across languages, and adaptability to

accommodate those features of each language that are unique. Training for language teachers must seek to achieve the same balance. It was necessary for the instruction to be built around an approach that can be effectively applied to languages of all families while retaining exchangeable elements that would enable the training to reflect variances in instructional strategy resulting from varying linguistic characteristics. Successful achievement of this balance within this training should result in the capability of creating a unique training experience for each language relatively quickly by changing out teacher-generated elements that introduce language-specific adaptations within a consistent framework.

Analysis

The audience for which this training was designed is unique in a number of ways that necessarily influenced the direction of the project design. Additionally, the training needed to fit with other current training resources as well as address the gaps present in the resources it would replace. The following sections provide an analysis of the audience for the project as well as the current training resources.

Audience. The proposed instructional project will be designed to meet the needs of an audience of approximately 300 new language teachers each year. Although the teachers come from all over the world and speak a variety of languages there are several characteristics that are incredibly consistent among them. These characteristics include things such as age, past experience, and student status, in addition to circumstances that are a result of the work environment, such as work hours and responsibilities. The consistency with which these attributes occur among the audience will assist in making significant design decisions early on in the process. Understanding these qualities can also provide insight into teacher experiences and feedback during the testing of prototypes.

All of the language teachers employed here are part-time employees, contributing between 18–20 hours a week to the Missionary Training Center, and 98% of them are full-time students between the ages of 21 and 24. Roughly 4% of MTC teachers are pursuing a degree and future career in teaching while the others have career goals that may have little to no relevance to their MTC teaching job. Consequently we can anticipate that success in schoolwork is a priority to our audience, and in many circumstances it may

trump opportunities or responsibilities at work. Schoolwork consumes a majority of the MTC teachers overall time and is likely the primary contributor of stress and workload for many.

The average tenure for an MTC teacher is about one year. The primary causes for turnover are graduation, school stress, and job opportunities more closely aligned with the individual's desired career path. Such a brief tenure for the above stated reasons would indicate that most employees view their experience at the Missionary Training Center as a temporary opportunity to give back to an institution which they feel was in some way pivotal in their lives. When asked why they applied to teach the MTC, the most common response provided by applicants is some form of this statement: *I had such a wonderful experience here myself that I wanted to return and help others have a similarly great experience.* There is an enormous demand for positions at the MTC as evidence by the approximately 4000 applicants who apply each year for a job, however it is clear that most do not view employment with the MTC as an investment in their future careers. This notion is reinforced by a policy implemented at the MTC that teachers cannot work for longer than 3 years.

The average teacher will stay about year at the MTC. Of that one year, the first six weeks are considered the training period and the first four months comprise the evaluation period. Following the evaluation period a teacher is considered a fully-trained and capable employee. Despite the existence of a six-week training period, most teachers will begin teaching in the classroom within two weeks and many begin immediately due to the urgent need to fill a vacancy. The expectations for the six-week training period are the same for all teachers regardless of when they begin teaching in the classroom. All teachers must complete a series of training experiences and assignments during that time period. Anecdotal evidence suggests that teachers may feel both helped and hindered if they are simultaneously teaching in the classroom while trying to complete their training. Many assignments can be more easily completed through practical classroom application but the compounded stress of teaching and being trained at the same time can be taxing.

Generally none of the teachers hired by the MTC have any prior experience teaching a foreign language in a formal setting. They do tend to speak the languages they teach with advanced proficiency

or fluency but this does not mean that they are conversant in the mechanics of grammar or instructional strategies for helping others learn them. All teachers share the common experience of having served a proselyting mission for the Church of Jesus Christ of Latter-day Saints. This experience required them to develop basic teaching skills necessary to teach religious doctrine, such as communicating clearly, asking questions, listening, helping others to resolve their concerns, and adapting to meet others' needs.

Although there is certainly room for improvement, those hired to teach at the MTC demonstrate strong proficiency in most of these skills as a prerequisite to employment. Along with the development of fundamental teaching and communication skills, the shared mission experience of MTC teachers typically engenders a strong intrinsic motivation to contribute to the missionary work that is the focus of the MTC. It also creates quick bonds and a strong feeling of camaraderie among the teachers who find that they can often easily relate to one another.

It is important to note that roughly 8% of the MTC's language teachers teach a language that is native to them. While these native-language teachers are an enormous asset because of their fluency, they will generally be less familiar with the mechanics of their language and how to teach it, having never been taught it directly.

The MTC curriculum is designed to be flexible, allowing teachers to make decisions regarding instructional content and approach, in order to best meet the needs of students. Though there is a suggested sequence of content and activities to follow, teachers bear the responsibility to adapt and adjust the syllabus in order to help the students meet key learning objectives. Teachers generally spend about 2-4 hours teaching in the class each day and have about 30 minutes of preparation time. In focus groups conducted with teachers in the October of 2007 in conjunction with curriculum revisions, many teachers indicated that 30 minutes is scarcely enough to make necessary preparations to teach.

In summary, the following key audience characteristics outlined above must influence design and development decisions:

1. Teachers feel an intrinsic motivation and commitment to the purposes of the MTC.
2. Teachers' academic pursuits take priority over job success.

3. The average teacher will spend a year teaching at the MTC and then move on to other, often unrelated, career pursuits.
4. Most teachers have little to no experience teaching a foreign language.
5. Teachers have developed general teaching skills in missionary service and demonstrate competency in those skills during the application process.
6. Six weeks are designated for training but many teachers are already teaching in the classroom during that time.
7. MTC curriculum gives teachers the flexibility and responsibility to make decisions about instructional content and approach.
8. Teachers have 30 minutes to prepare for a 4-hour block of face-time with students.

Current training resources. The current resources available and utilized to train new teachers to help students learn a foreign language consist of both materials and organized experiences. The materials presently in use are the *Preach My Gospel* manual, objectives outlined in the curriculum, and grammar books and dictionaries. There are two training experiences that all new teachers participate in. The first experience is a two-hour long instructor-led training wherein teachers are exposed to the language curriculum and the fundamental values of the MTC approach to language instruction as they are found in *Preach My Gospel*. This includes an emphasis on language performance in a weekly teaching appointment and meaningful study of vocabulary, grammar, and pronunciation in each of the four language skills of speaking, listening, reading, and writing. The second training experience that new teachers participate in is the requirement to observe an experience mentor teaching a language lesson to students, coupled with the opportunity to teach a language lesson while being observed by and receiving feedback from a mentor. The proposed training does not supplant these current resources as they all serve a significant function. Rather, it enables teachers to take better advantage of them by filling in the gaps existing in the current regimen and offsetting the limitations of current resources.

The primary limitations of the current training resources are the neglect to focus on practical and contextualized application of principles, a general lack of thoroughness, and the failure to control

examples and models for effectiveness and relevance. Both the *Preach My Gospel* manual and the grammar books provided to teachers and students suffer as aids to language teachers because they do not put language learning into a completely meaningful context. The grammar books are all commercially produced and therefore do not address language use in situations that are relevant to students at the MTC who will be using language primarily to teach religious doctrine and principles. The burden of contextualizing grammar and vocabulary in practical examples and activities is left to the teacher. The *Preach My Gospel* manual exhibits a similar, but opposite, limitation. It discusses language use in a way that is relevant to the usage needs of students; however it is unable to represent the rich lexical and grammatical distinctions of individual languages. The curriculum documents attempt to orchestrate the combined use of these two resources by aligning relevant language tasks with weekly teaching appointments. The teaching appointments are to be used as instructional targets by which to plot language instruction throughout the week. Unfortunately teachers, particularly those who are new, have understandable difficulty navigating the complimentary offerings of each of these resources to provide practical and meaningful language instruction in the classroom. Training for new language teachers must emphasize the effective and efficient use of these resources to help them know what to do when they are in the classroom.

The instructor-led training that all new language teachers are required to attend struggles with the same limitations that the *Preach My Gospel* manual does as a language resource. In the instructor-led trainings new teachers of all different languages come together for an orientation to the foundational principles and approaches to language learning that the MTC espouses. Because the audience comprises teachers of all languages it is impossible to address language specific issues and applications in that setting. Consequently, the training proceeds as a generalized discussion and leaves teachers with a number of questions about how to adapt principles to their particular needs. To compensate for this shortcoming teachers are required to both observe and be observed by an experienced mentor who teaches the same language. This is intended to provide the new teacher with a clearer vision of how to apply MTC language methods in a practical manner. New teachers agree that this experience is valuable;

however, because of scheduling difficulties, few of them do it more than once. One observation of a single teacher is simply insufficient in supporting a new teacher's needs and growth. Training for new teachers must provide the opportunity for them to observe and examine application of MTC language teaching principles to their specific languages in authentic and practical ways.

If a training resource for new language teachers can successfully fill in the gaps describe above it will be poised to heighten the meaning and usefulness of the materials and experiences already in place. This requires the training to include in-context examples of pedagogical principles applied to specific languages. In order to provide a thorough learning opportunity for new teachers there must be a number of examples for teachers to examine.

Purpose

The completed instructional project was designed to accomplish the following objectives:

1. MTC teachers compose simple language lessons. The project prepares MTC teachers to make decisions about the objective and content of individual language lessons and formulate lesson content and activities. Teachers have successfully prepared a lesson when they do the following:
 - a. Formulate meaningful lesson objectives. The teacher is able to identify an upcoming event requiring target language competency and performance and select vocabulary and grammar concepts relevant to that event and the students' needs.
 - b. Organize illustrative examples in the target language. The teacher writes simple phrases and complete sentences that demonstrate grammatical patterns using relevant vocabulary within the context of tasks necessary for students to perform in upcoming activities. Sentences are simple and organized in such a way as to allow students to identify patterns of speech and follow those patterns to generate their own sentences.
 - c. Devise practice activities that encourage communication. The teacher organizes and prepares to facilitate practice activities that require students to use the target language to express, interpret, and negotiate meaning between one another in small groups. Practice activities are designed within the context of the specified upcoming event.

- d. Plan support strategies. The teacher anticipates and prepares necessary questions, reflection and discussion time, and enhancements to the language examples that direct students' focus, support them in their efforts to discover and understand grammatical patterns and rules.
2. MTC teachers review language lessons created by their peers. A growing, searchable database catalogues and makes available numerous examples of language lessons created by other MTC teachers. These examples are accessible to new teachers for review. Utilizing these examples, MTC teachers are able to do the following:
 - a. Analyze the ways in which practical examples apply the principles of creating lesson plans. The teacher sees strategies of principles for creating objectives, examples, and practice activities exemplified in practical examples designed by their peers and used in a classroom settings. These examples serve as springboards for the teacher to create lesson elements that meet the needs of his or her students.
 - b. Experiment with ideas from peers. The teachers are able to try out in the classroom those lesson elements that are submitted by their peers. The project enables teachers to contribute comments to their peers' ideas. Such comments could include their experience trying out the lesson or adaptations they made to the lesson.
 - c. Reduce preparation time. The ability to search for and review lessons previously developed by peers should reduce the amount of preparation time required by a teacher to create language lesson plan. Teachers are able to begin with proven ideas and build off of or adapt them rather than having to always build a lesson from nothing.
 3. MTC administration utilizes an increased capacity to assist teachers with language instruction. Providing MTC teachers with the ability to create and share language lesson plans also makes their competency in language instruction more visible to supervisors sooner, enabling supervisors to do the following:

- a. Evaluate a teacher's ability to prepare a language lesson. Supervisors are able to review the lessons or lesson elements submitted by their teachers. In so doing, a supervisor is able to determine from the evidence that teacher's strengths and areas where the teacher needs more support, as they pertain to preparing language lessons.
- b. Communicate with teachers about their language lessons. Supervisors are able to comment on their teachers' lessons publicly within the database, or privately via email. This results in more frequent and specific feedback to teachers regarding their lesson plans.
- c. Contribute their own lesson ideas for use by teachers. Supervisors also have a venue where they can submit their own lesson ideas for review and use by the teachers.

Design

The strategy for the initial design was rooted in the literature of the field of instructional design and appropriated several key values from the perspective of constructivist theory. The content for the initial design was derived from the *Preach My Gospel* manual and established MTC practices and values. The project design evolved through the course of prototyping and formative evaluation. The initial strategy, content, and the changes that resulted from the prototyping process are outlined below.

Strategy and Relevant Literature

Traditionally, Instructional Systems Design is a practical method which utilizes an approach to designing learning environments and systems that emphasizes clearly defined learning outcomes, breakdown of large tasks into constituent parts, appropriate sequencing of learning events to maximize efficiency and learner growth, and assessments that are aligned with objectives and accurately determine whether the outlined outcomes are met (Lebow, 1993). There is a strong association between ISD and training processes because of the clearly defined performance objectives and need for efficiency and accountability that are associated with training. The problem outlined above is in essence a training problem. The organization employing these part-time teachers has specific expectations regarding what competencies the teachers develop and what they achieve with their students in the classroom. Because

the teacher population in question consists of part-time employees with a fairly brief tenure, teachers need to be able to perform to the organization's expectations in a brief amount of time. Base-level performance competency has a higher priority to the institution as well as to the teachers, who will not be pursuing careers as such, over long-term education and identity formation. The characteristics of this situation and the needs of the teachers along with the institution initially suggest that a traditional ISD approach to developing training materials would be most appropriate. However, there are several factors in this situation that would be best addressed by appropriating constructivist values into this instructional problem.

One such factor is the existence of a community of practice and the need for the new teacher to be admitted into this community. There are approximately 600 part-time language teachers working at the Missionary Training Center at BYU towards very similar goals and drawing upon the same tools to reach those goals. This community has existed for over 30 years and has a strong culture, including professional vocabulary, values, and practices, into which the new teacher is introduced. The constructivist philosophy acknowledges that knowledge is embedded in and inseparable from the practices of a community (Brown, Collins, & Duguid, 1989), and that one of the key goals of learning is to become a practitioner within that community (Wenger, 1998). In other words, the learner must learn to do what expert practitioners do. This effectively describes the plight of the new hire, who must become a language teacher and be conversant in the values, language, and practices of that group of people. This view also emphasizes the importance of the transfer of learning from an educational setting into application in the target performance environment by blurring or removing the boundaries between the two (Wenger, 1998).

Another factor inherent in the situation of a new MTC language teacher is complexity. Preparing and teaching a language lesson to students requires the teacher to navigate numerous constraints, pressures, and skill-sets. Not only do new teachers need to be familiar with the practices of preparing an instructionally sound language lesson but they must take into consideration the unique characteristics of the target language, the specific needs of the students, priority relative to other elements of the

curriculum, and balance all these things with the pressures that exist for them outside of the workplace, such as full-time school and relationships. Management of these facets of performance in order to produce an effective language lesson is a complex task that is likely impossible to reduce to simple procedure. Constructivist philosophy embraces complexity in practice and promotes such approaches as situating learning and drawing upon multiple perspectives and knowledge representations to help learners deal with complexity (Savery & Duffy, 1995).

The proposed instructional solution will employ a strategy that seeks to lie somewhere along the continuum between objectivist instruction and constructivist learning by adopting several constructivist values in the form of practical applications to instructional design. Jonassen (1991) asserts that Instructional Systems Design must retain some of its objectivism in order to remain pragmatic, but that it can also reassess its views about learning and knowledge in light of constructivist values. He further expresses the perspective, which is shared by this designer, that learning entails both objective and constructive learning activities, and that the most realistic model of learning lies between the two (Jonassen, 1991). The constructivist values that will inform the instructional strategy are the following: 1) authentic activity, 2) modeling and cognitive apprenticeship, 3) representing multiple perspectives, 4) generating and constructing, and 5) reflection. These values will be reflected in the designed learning environment and employed to achieve the training objectives described earlier.

Authentic activity. Context is one of the key components that a designer needs to address when fashioning a learning environment (Choi & Hannafin, 1995). Constructivist philosophy suggests that learning must be situated in authentic activity (Bredo, 1994). In order to learn to use tools and knowledge as practitioners use them, the learner must enter the practicing community and its culture. Becoming a practitioner requires that the learner first be exposed to a domain's conceptual tools in authentic activity. Authentic activities are the ordinary practices of the culture. The difficulty with a classroom setting that exists outside of the practicing community is that it frequently becomes a substitute for authentic practice, incorporating both conceptual and actual tools that are not found or used in authentic contexts. When this is the case, learners are ill-prepared to function as participating members of the community because their

knowledge is linked to a context that does not reflect that of practitioners. Knowledge indexes the situation in which it arises and is used. The embedding circumstances of the learning context provide essential parts of its structure and meaning. Because knowledge is situated, learning methods embedded in authentic activities are essential (Brown, Collins, & Duguid, 1989).

Authentic activity has a strong motivating potential for learners because it presents situations that are relevant to their desires and goals and allows them to improve their knowledge and performance in settings that have personal meaning for them (Choi & Hannafin, 1995). The demands and objectives of learning activities become clear to learners when the task is meaningful (Hung & Chen, 2001). In authentic activities students not only learn the application of conceptual tools but they must learn when different strategies or methods are appropriate and how they affect the setting differently. Authentic activities also give students the opportunity to exploit contextual resources to accomplish their goals (Choi & Hannafin, 1995).

Authentic learning occurs when instruction is designed to facilitate, simulate, and recreate real-life complexities and occurrences (Karagiorgi & Symeou, 2005). Jonassen (1991) asserts that the most important application of constructivism in ISD is the provision of instruction in relevant contexts. Instructional environments and teachers should focus on realistic approaches to solving real-world problems. Savery and Duffy (1995) also list the design of an authentic task as one of the key guidelines for designing a constructivist learning environment. The training program described here was built around an authentic and meaningful task for new MTC teachers, situated in the actual environment and expectations of their job. This task requires new teachers to create a language lesson plan for use on their first day in the classroom. They have access to all of the resources available to experienced teachers and operate under similar constraints, such as time and curriculum expectations. All of the objectives, explanations, guidance, resources, and reflection that comprise this instruction are directed towards the accomplishment of this authentic task. Doing so should foster the construction of applicable knowledge and conceptual tools, facilitate the transfer of student learning and performance to future situations on the job, and generate strong intrinsic motivation.

Modeling and cognitive apprenticeship. Modeling is the process by which the learner observes and mimics the expert (Choi & Hannafin, 1995). It enables a learner to be exposed to knowledge as conceptual tools and problem-solving strategies as they are employed by practitioners and without reification. Reducing knowledge to reified terms creates the illusion of a simple, direct relationship between learners and the subject matter. The process of reification attempts to lift knowledge out of practice in order to eliminate the need for learners to manage the complexities inherent in authentic practice. When knowledge is decontextualized in this manner it becomes very limited in its applicability to real-world problems (Wenger, 1998). By utilizing models, the learner can observe and mimic real-world processes and problem-solving strategies as they are utilized by practitioners in a variety of authentic contexts without oversimplification of the process. Through models students begin to associate what occurs in authentic situations with why it occurs (Choi & Hannafin, 1995).

Choi and Hannafin (1995) note that there are essentially two kinds of modeling: 1) modeling of physical processes, which illustrate what occurs, and 2) modeling of cognitive processes, which helps to illuminate why things occur and how decisions are made. They also note that modeling is most effective when it occurs during task performance. The training program described here provides several examples of language lesson plans, or models of physical processes, for learners to review and scrutinize as they proceed with the task of creating their own lesson. The examples were gathered from experienced teachers and address a variety of situations and problems to give the learner a sense of the range of solutions as well as an opportunity to identify patterns and commonalities among all solutions.

Each example lesson plan also includes descriptions of how the lesson plan was made, the situation it was used in, and why certain decisions within the plan were made. This enables practitioners to model their thought processes for the learner, thereby providing insight into the complex relationship between the context and the strategy. This instructional feature is based on the constructivist method of cognitive apprenticeship. Cognitive apprenticeship describes the process by which the apprentice builds mental models and gradually becomes an independent practitioner, through a combination of observation, coaching, and practices (Hay & Barab, 2001). It emphasizes the relationships between domain

knowledge and the thought-processes by which experts apply knowledge in order to solve real-world problems. Successful cognitive apprenticeship requires that the thinking of both the expert and the learner be made visible (Choi & Hannafin, 1995).

Representing multiple perspectives. A rich learning environment accommodates multiple solutions to a problem and multiple representations of knowledge from the perspective of different cases and situations (Jonassen, 1991). Any specific concept must be approached a wide range of contexts so that learners can see how it relates to the varying environmental factors and complexities inherent in different settings. This practice enables transfer of knowledge to a broader range of domains and circumstances (Karagiorgi & Symeou, 2005). Transfer is facilitated by experience with a variety of concrete instances that are interrelated in key ways (Choi & Hannafin, 1995). When the situations and sources of knowledge construction are varied, learners are more easily able to generalize knowledge and transfer it to novel situations.

Several researchers have described the representation of multiple perspectives as a key characteristic of any successful constructivist learning environment. Savery and Duffy (1995) stressed that a successful learning environment should represent the complexity of the actual environment in which the task is performed, it should challenge the learner's thinking, and enable the learner to test ideas against alternate perspectives. Honebein (1996) listed as important goals in a learning environment that the student should be exposed to and learn to appreciate multiple views and perspectives, as well as multiple means of representing knowledge. The training program describe here provides models and perspectives from a variety of sources, including peer-created lesson plans from numerous sources, designer-created models, student comments and feelings, and coaching from a supervisor. As the new teacher proceeds through the instructional task, each of these resources are available for consideration and examination to enable the new teacher to create mental models that will transfer to a variety of relevant real-world problems and situations.

Generating and constructing. At the heart of the constructivist philosophy is the notion that the learner constructs unique knowledge structures, understandings, and mental models through meaningful

activities and social interactions (Gruender, 1996). In other words, knowledge is created in the student through discourse, the creation of things, and practice. Even everyday understanding is a creative process that requires one to construct explanations for behaviors and events that have occurred and to consequently construct personal behaviors and events. Brown, Collins, and Duguid (1989) note that knowledge representations that arise from activity are fundamentally different from those that arise through description or explanation. The perceptions and experience that are the result of action are richer, more meaningful to the learner, and more transferable.

Jonassen (1991) suggests that in the instructional design process a task analysis should focus on identifying and providing the necessary tools and resources that will enable learners to construct things, and simultaneously, knowledge. Both Jonassen (1991) and Barab, Hay, and Duffy (1998) emphasize that the designer's role is to provide generative construction toolkits embedded in relevant learning environments that will enable learners to build both things and understandings. Each strategic element of the instructional solution described here, including sample peer-created lesson plans, student comments, designer-created models, and real world resources, are part of the toolkit provided to new teachers to enable them to construct a unique language lesson plan that will be relevant to their circumstances. The lesson plan that is created in the process becomes a reflection of the understanding that have been constructed in the mind of the learner and the locus for assessing what has been learned and how well the learner is prepared to solve real-world problems.

Reflection. Some of the most significant values of the constructivist philosophy are those of personal autonomy and reflectivity. Constructivism proposes that the learning environment should support and encourage autonomy within the learner (Gruender, 1996). Instruction can help learners take control of the learning process by engaging learners in self-questioning and reflection (Lebow, 1993). The metacognitive process of reflection enables learners to internalize experience from the social world to the individual world and it encourages self-awareness about the knowledge construction process (Honebein, 1996). The framework proposed by Savery and Duffy (1995) indicates that a learning environment should provide opportunities for learners to reflect on both the content and processes of

learning. Similarly Honebein's (1996) seven goals for constructivist learning environments dictate that learners must have the opportunity to reflect and explain how they solved a problem.

The instruction described here provides opportunities for learners to reflect in action, as they evaluate models and resources and make decisions about the lesson plan they are creating. They also have opportunities to reflect on what they created following each stage of the instruction and to describe the process that they went through and their rationale for different decisions made during the creation process.

In summary, the proposed instruction incorporates the constructivist values of authentic activity, modeling, multiple perspectives, generation, and construction into a learning approach designed to achieve the objectives outlined above by leveraging the following instructional components:

1. The overarching, authentic task of planning a language lesson which anchors all instructional activities and resources.
2. The task to construct a meaningful and unique lesson plan in a manner that reflects learner knowledge construction using the resources provided.
3. The opportunity to observe and mimic models that represent a variety of perspectives and contexts.
4. The responsibility to reflect on content learned and the process by which it was learned.

Initial Design

Initially, the instructional product was designed to walk teachers through the process of creating a language lesson specific to the needs of their current students by requiring the teacher to formulate lesson elements that build upon each other. The teacher would be charged with the responsibility of preparing students to perform a language task in an upcoming event and the teacher would need to prepare the lesson objective, examples, scaffolding, and practice activities that would help students understand necessary vocabulary and grammar structures. When asked to compose each lesson element the teacher has the option to explore a variety of helpful resources to assist the new teacher in constructing a reliable and useful understanding of how to plan each element of the lesson as shown in Figure 1.

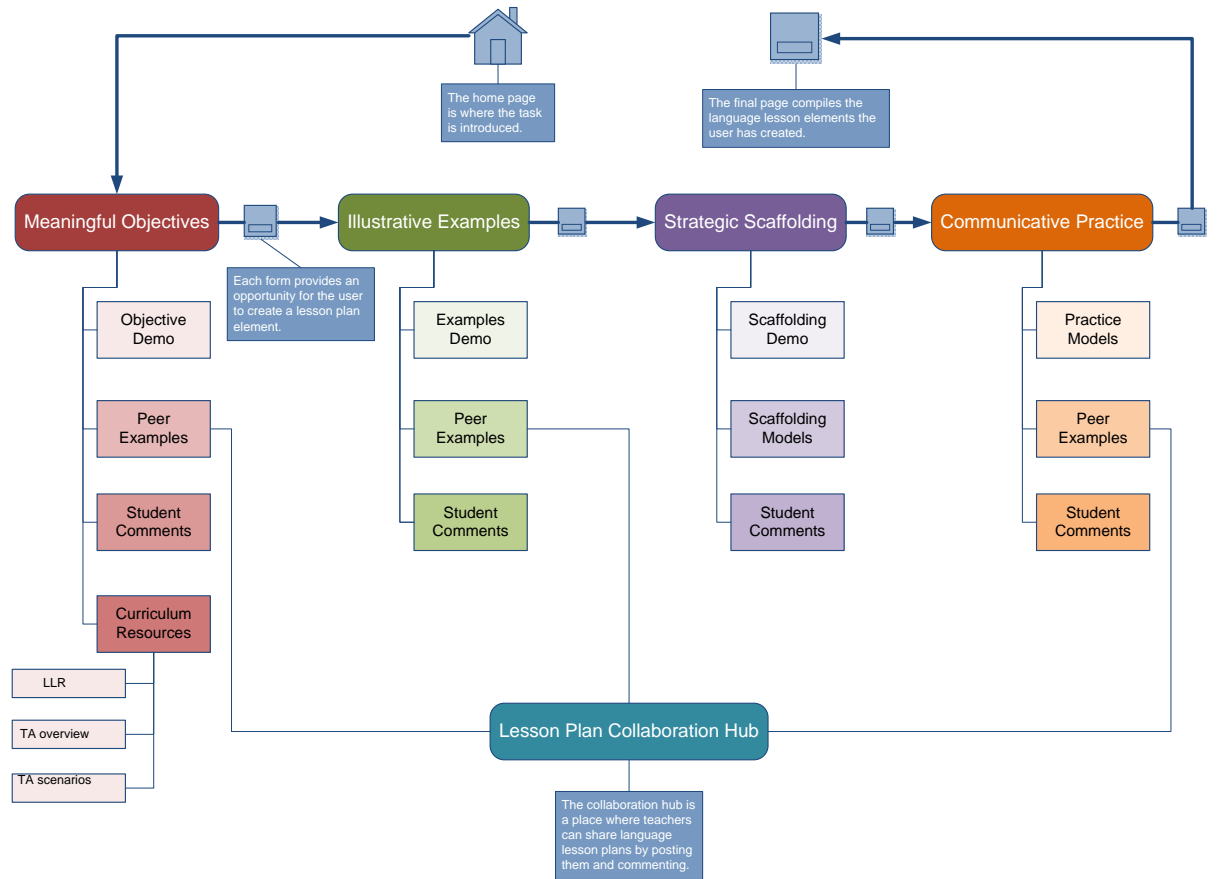


Figure 1. Task and software flow for the initial project design.

When the teacher feels ready, he or she could proceed to compose an element of the language lesson within the training program. Once a lesson element has been created, the teacher may proceed to the next element of the language lesson plan. As the teacher continues to create each of the four lesson plan elements, the training program would track and compile them such that at the end, the teacher is able to view a completed and fully-functional plan that he or she has uniquely created to meet student needs.

To support the creation of each element of the language lesson plan the teacher is provided a selection of resources to explore and learn from. The resources represent a variety of different perspectives and are presented using different media to aid the teacher in constructing a rich understanding of the community practices used when planning language lessons. The first type of resource is a model or demonstration from the expert or trainer perspective. The second type of resource is selections of lesson plans created and used by other teachers to represent a peer perspective and give the new teacher greater insight into how to apply generalized principles to his or her specific language. Thirdly, users of the training are able to review comments from students as they discuss things their teachers have done that have been either helpful or not. In addition to these learning resources, the training also contains direct links to important curriculum documents and materials that inform lesson preparation.

To increase opportunities for teachers to interact with one another and to collaborate on lesson plans and ideas, a hub is created where teachers could post their own lesson plans and review those of others. The training module connects new teachers with this hub where they could be exposed to the ideas and techniques of their peers. The collaboration hub is based on blog design, enabling users to submit their own topics and comment on others' topics. In order for ideas to be accessible the content is tagged by language, grammar principle, and performance task. Teachers can then quickly search content to identify topics relevant to the needs of their students.

When users are finished using the training they have in hand a completed language lesson plan, ready to be taken to the classroom. The unique and rich nature of each lesson plan that results from the program makes it difficult to assess their value and effectiveness without human judgment. To provide

helpful a helpful assessment to the new teachers and to link their supervisors into the learning process, the final lesson plan created through the program is automatically emailed to the teacher's supervisor for review. This approach provides meaningful information to the supervisor about the teacher's capabilities and progress while helping the teacher to receive personalized feedback specific to his or her language and circumstances.

Content. This instructional solution for MTC teachers is designed to help them produce a customized language lesson plan that will address the learning needs of their students. The content for the instruction is based on the lesson preparation methods utilized by the MTC for the past 4 years coupled with best practices culled from some of the MTC's most successful language instructors. The content scope focuses on the most basic elements of a language lesson plan found in most simple, workable lessons at the MTC. Examples of language lessons provided by peers should encourage and inspire new teachers to continue to develop their lesson planning skills and to explore new directions. The core instruction addresses four key components of a lesson plan: meaningful objectives, illustrative examples, strategic scaffolding, and communicative practice. These four areas of content have been defined by consensus of stakeholders in training and supervisory roles at the MTC in consideration of principles outlined in *Preach My Gospel*, the primary resource for missionary instruction at the MTC.

1. **Meaningful Objectives.** Formulating an objective for a language lesson requires identifying upcoming events and activities in the students' schedule along with the tasks that must be accomplished in the target language in order for the student to achieve success in that event. The next step is to select a particular task to focus on in a given language lesson. Finally it is necessary to choose the vocabulary set and grammar principles that will be both relevant to the task and appropriate to the students' proficiency in the target language. Utilizing this process requires teachers to understand and draw upon a few resources provided by the MTC. The syllabus provides a schedule of key events students must prepare for along with descriptions of what tasks in the target language are required during those events. The Language Learning Record outlines vocabulary sets and grammar principles particular to the target language that

teachers should use to track what the students have demonstrated proficiency in, and what areas they have yet to learn.

2. Illustrative Examples. The MTC approach to language learning emphasizes the importance of allowing students to discover meanings and grammatical patterns and structures over delivering explicit explanations of such things. A student is better able to see and interpret patterns in the target language when the teacher organizes or creates language examples that illustrate grammatical patterns within the context of a meaningful objective. Instructors who are successful at creating illustrative examples tend to employ variations of the following process:
 - a. Write one phrase that uses the desired grammar principle and is relevant to the outlined objective. Be sure to strip away clauses or other phrase elements that are not necessary and which may distract from the targeted grammar principle.
 - b. Create additional sentences by varying one element of the original phrase in a manner that will emphasize the pattern of the target grammar principle.
 - c. Write one phrase that is relevant to the outlined objective but which uses a grammar principle that may serve as a contrast to the target grammar principle, and vary it in the same manner that the original sentence was varied. For example, if the target grammar principle is a past tense where the verb is varied to emphasize changes in the verb form, a teacher may want to contrast it with a present tense sentence where the same verb is varied.
 - d. Adjust the phrases so that there is a narrative sequence to them. For example, use the phrases to tell a story or have a conversation. The students should be able to predict what the next phrase might say.
 - e. Arrange the phrases to visually underscore grammatical patterns and forms. Organize sentences so that their parts are aligned and similar words are grouped together making the underlying sentence structure easier to see.

3. **Strategic Scaffolding.** Without some guidance and support from the teacher, most students will be overwhelmed by the task of discovering and understanding grammatical patterns from complete sentences. Effective teachers support students' efforts to discover by planning appropriate scaffolding such as the following:
 - a. Invite students to discover meaning before form. Teachers should focus first on helping students learn what words and phrases mean before addressing the grammatical structures in the examples. Doing so enables students to understand the proper use of grammar to create meaning and puts them in a better position to identify grammatical patterns themselves.
 - b. Demonstrate the meaning of words and phrases. This can be done through the use of pictures, actions, facial expressions, synonyms, or antonyms.
 - c. Focus students' attention by highlighting key elements within the examples.
 - d. Ask questions that invite students to observe and analyze the examples.
 - e. Provide time for students to reflect on and discuss examples.
4. **Communicative Practice Activities.** Following an initial grasp of the meanings of words and relevant grammatical forms, students need practice activities that require them to use their understanding in order to communicate. This means that activities should require students to both express and interpret meaning by correctly applying their understanding of grammatical patterns. Examples of practice activities that require communication include question and answer, comparing and contrasting, or relating sentences and narratives cooperatively.

Software/Logic. The framework for the different elements of the training would be created in the Flash format. Flash is currently installed in over 95% of computers in the world and has become ubiquitous in the world of e-learning because of its flexibility, portability, widespread adoption among computer users. For this training, Flash was used to create the virtual environment in which the anchoring task is introduced to the user, as well as the four subsequent sub-tasks: defining and objective, composing examples, planning support and scaffolding, and preparing practice activities. The Flash

framework would also become the springboard from which the user could access the resources which support completion of each task. The resources would be provided in a variety of media including audio clips, video clips, and text documents. To maximize compatibility with most user's systems and with the flash framework, media resources would be presented in the most common formats; audio will be provided in .mp3 format, video in Flash video or .flv format, and documents in .pdf format.

The Flash framework would appear to the user as a split screen. Part of the screen would be used to present instruction and navigation while media and input opportunities would be located in the other part of the screen. It is believed that consistency with this approach would increase usability by increasing the chance that the user will know where to look for key content and controls. Additionally, changes in color and title icons would emphasize a sense of progression and location within the module and help the user distinguish between different tasks. Icons would also be associated consistently throughout the program with each different type of resource, helping the user to quickly navigate resources without having to read lengthy descriptions repeatedly.

The teacher would be required to make a variety of decisions while working through the process of fashioning a language lesson plan. The teachers' choices would determine how the instructional system responds. Opportunities for users to influence the direction and response of the instruction would include the following:

1. Inputting custom language lesson elements. At each stage of the instruction the teacher is asked to create a lesson element and input it into the system via a text input field. That custom-created element would then become part of the final language lesson plan assembled by completing the training. The teacher will also be able to choose whether to send the lesson plan to peers or the supervisor, or both, for review.
2. Choosing which resources to explore. When asked to create a lesson element the teacher will have the option of exploring a few resources designed to facilitate the formulation of that element.

3. Media control. All audio and video clips will offer the customary controls for pausing, stopping, fast-forwarding, and adjusting volume.
4. Interactive models. Each lesson element will have a flash-based model that the teacher can interact with in order to understand it better. The teacher will be able to float over or click on different elements of the model for descriptions or explanations.

Process

Addressing the current needs of new MTC teachers and the limitations of current training resources in a manner that is feasible and effective prompts the use of approaches and tools that have not been tried or tested within the MTC environment. For this reason, design and development of the proposed instructional training product utilized a rapid-prototyping approach. Rapid-prototyping enabled the designer to receive early, reliable feedback from users about which elements of the instruction were working for them and which were not. It also allowed the designer to manage a complex training product more simply, by quickly testing rough layers of the product separately prior to assembling the layers into a cohesive whole. Doing so saved a great deal of time and potentially wasted effort and resulted in a product that more closely met the needs of the learners. Understanding gleaned and changes made as a result of the rapid-prototyping process are discussed more fully in the Production section of this treatment.

The development of the instruction proceeded layer by layer, with each layer being tested by teachers and teacher supervisors to ensure that the approach and product meet their needs. The design layers that were tested were learning task, the learning content, and the collaboration between teachers. An initial strategy based on relevant learning principles was laid out and translated into simple, lo-fidelity pieces of the proposed training that teachers could respond to individually. Rapid-prototyping ensured that the end-users were able to provide input early on, and that they continued to give feedback relating to design decisions throughout the development of the project. The strategy and design evolved in a direction consistent with the feedback and results of the formative evaluations conducted during the rapid-prototyping process. As the components were refined they were fused together to give the users a sense

of the instruction as a whole. Once the instructional strategy and design were pinned down, prototypes focused more on general usability and resolving bugs. From the initial stages until the completion of the project formative data was gathered from key stakeholders and end-users regarding the content, the value of examples from peers and stories from students, the clarity and efficiency of key models, the practicality of online discourse with peers about each other's lesson plans, and the success of the complete package.

Over fifty different languages are taught at the MTC and, though there are similarities between languages within a family, each language possesses characteristics that distinguish it from others. Due to the significant undertaking it would be to adapt the training module to each of the different languages and then to test each module in each language, the endeavor described here focused on creating a prototype usable for teachers of the largest language area at the MTC: Spanish. For the prototype, Spanish-language models and examples were used to assist Spanish-language teachers in adapting the MTC approach to second-language instruction to the circumstances and needs specific to their language. The effectiveness of the program was presented to key stakeholders following initial testing to suggest that development be continued to include all MTC languages.

Modifications

Through the course of prototyping and receiving feedback from both users and stakeholders, a number of the initial elements of the design were modified to better suit the needs of the learners and the constraints inherent in the environment, and also to enhance and improve learning. The notable improvements to the design that resulted from prototyping sprung from the following discoveries: 1) teachers needed opportunities to revisit and revise lesson elements that they had already created as their knowledge grew, 2) teachers desired more guided reflection opportunities and more formal means of recording and utilizing what they learned as they reflected, 3) expectations for rich collaboration had to be changed to better accommodate teachers' time constraints and stakeholders' requests, 4) while most resources were ideally presented in the teaching language of the users (in this case Spanish), teacher found it useful to have at least one example of teaching strategies in a language they did not understand so they could view the strategies from a learner's perspective, and 5) teachers wanted to be able to better

evaluate the plan they had created before sending it off to their supervisors for inspection. This section will describe how these needs became apparent during the prototyping process and what design changes were made to accommodate these needs.

The first prototype was designed to test the anchoring task in order to determine how relevant and interesting teachers found it and whether they felt that learning to achieve such a task would be helpful to them in their daily job performance. The task was described to them verbally by an independent training coordinator who also provided completed samples of each element of the task to help the teachers grasp the output of the task. Teachers were then asked to fill out an anonymous survey wherein they indicated how relevant, interesting, and helpful they would find instruction on the task described, and what changes they might make to the task. The response was overwhelmingly positive. Each of the teachers indicated that the task was very relevant to their jobs and that learning to perform the task as it was presented would be either very helpful or indispensable. In consequence of these encouraging results few changes were made to the anchoring task itself. The only changes made were practical and related to the making the task terminology more accessible.

Following the task prototype, each of the resources were prototyped and provided to teachers in print form to determine how helpful each resource was in supporting the creating of lesson plan elements. Teachers were first given examples of language lesson objectives created by peers (see Appendix A) and asked to study them and create a similar lesson objective. Following this exercise, the teachers were given statements from students about language practice activities and then asked to study the statements and create a practice activity. In both cases the teachers found the resources generally useful but insufficient by themselves to effectively accomplish the task. This was expected to be the case as part of the initial design provided for several different resources to be offered to teachers to aid them in accomplishing each task. Several teachers remarked that strategic questions to focus their attention on important aspects of the resources would have helped them to maximize what they were able to learn from them. As a result of this finding the design of the training was adjusted to include questions associated with each resource that would help guide the teachers study.

It was also observed that, when the time came to write their own objectives, most teachers went back to the resources and tried to remember what they had seen in those examples when they first looked at them. During the second iteration, when teachers were asked to create a practice activity, more teachers took notes while studying the student comments and relied on those notes when creating their own activities. This observation led to a significant change in the design that enabled the learners to record and review the things they learned from each of the resources. An electronic journal was built into the training module. Each time they teacher examined one of the resources they had the opportunity to record their observations and reflections in the journal which they could review when it came time to formulate their own lesson elements. This change to the design is reflected in Figure 2.

The next prototype was designed to test the collaboration element of the initial design. Selected teachers were given printed copies of 10 Spanish language lesson plans created by experienced teachers. They were asked to review the lessons and then to write comments about each lesson plan they reviewed. No guidance was given regarding the nature of the comments they should write. After they had written comments they exchanged their copies with another teacher and read one another's comments.

Following this exchange they were given a survey and asked to indicate they value of 1) reviewing lesson plans created by peers, and 2) commenting and reading other's comments. The teachers indicated, in surveys and subsequent discussion groups, that reviewing lesson plans created by peers was invaluable in helping them understand how to adapt the generalized MTC approach to their specific language and classroom needs. However, the majority of the teachers found that the process of commenting and reviewing others comments, while of some value, was not worth the time and effort required considering their busy schedules. Furthermore, the teachers seemed to agree that while they would like to share their own lesson plans with other teachers, they were unlikely to do so given the time constraints they work under.

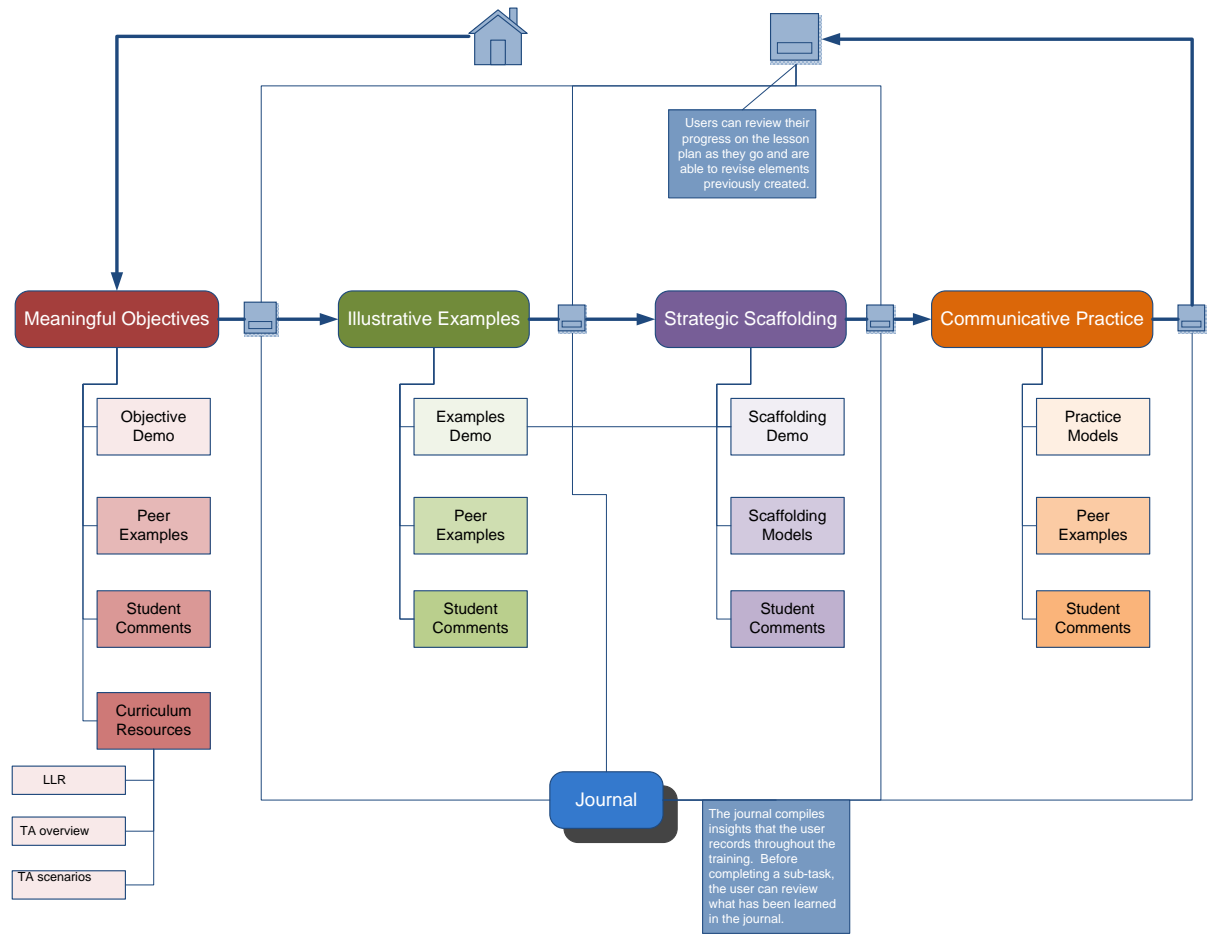


Figure 2. The addition of an electronic journal to the design.

The matter of computer-mediated teacher collaboration was discussed at length with several key stakeholders during the design process. Those involved in the discussion included training coordinators, training managers, and the director of training services at the MTC. These stakeholders expressed general concern for the demands placed on teachers' time and requested that expectations or to spend time outside of their normal duties in collaboration be removed from the scope of this teacher training program. Managers advised that legal implications restrict the MTC from encouraging teachers to pursue work-related activities while off the clock. Stakeholders also expressed concern about using teacher-created lesson plans in the training of new teachers that have not been screened for effectiveness by supervisors. In light of these concerns expressed by both users and stakeholders it became necessary to change the design of the training program. Rather than creating a hub where users could share and discuss lesson plans, effective lesson plans were identified in advance by administration and included in a static format in the training module, as illustrated in Figure 3. In this manner new teachers were still able to examine authentic lesson plans created by peers but were not asked to spend additional time in their already tight schedules to further collaborate. The notion of facilitating simple and efficient collaboration between teachers remains an important that MTC administration is interested in exploring in the future.

The next layer of the training that was prototyped was video demonstrations of scaffolding techniques used by teachers in the classroom to help students discover grammatical patterns and meanings of words. Initially, a demonstration of a Spanish language teacher interacting with students was recorded.

The user response to the demonstration was favorable however, in the focus group it was suggested that demonstration be in a language that was foreign to the teachers, enabling them to better understand the value of the scaffolding techniques by seeing them through the eyes of a novice language learner. To test this hypothesis a German-language demonstration of scaffolding techniques was recorded and show to the Spanish-language teachers. The teachers' responses showed significantly more insight and understanding into the techniques, presumably because they had both been exposed to them previously and they now had had the opportunity to experience the value of the techniques firsthand.

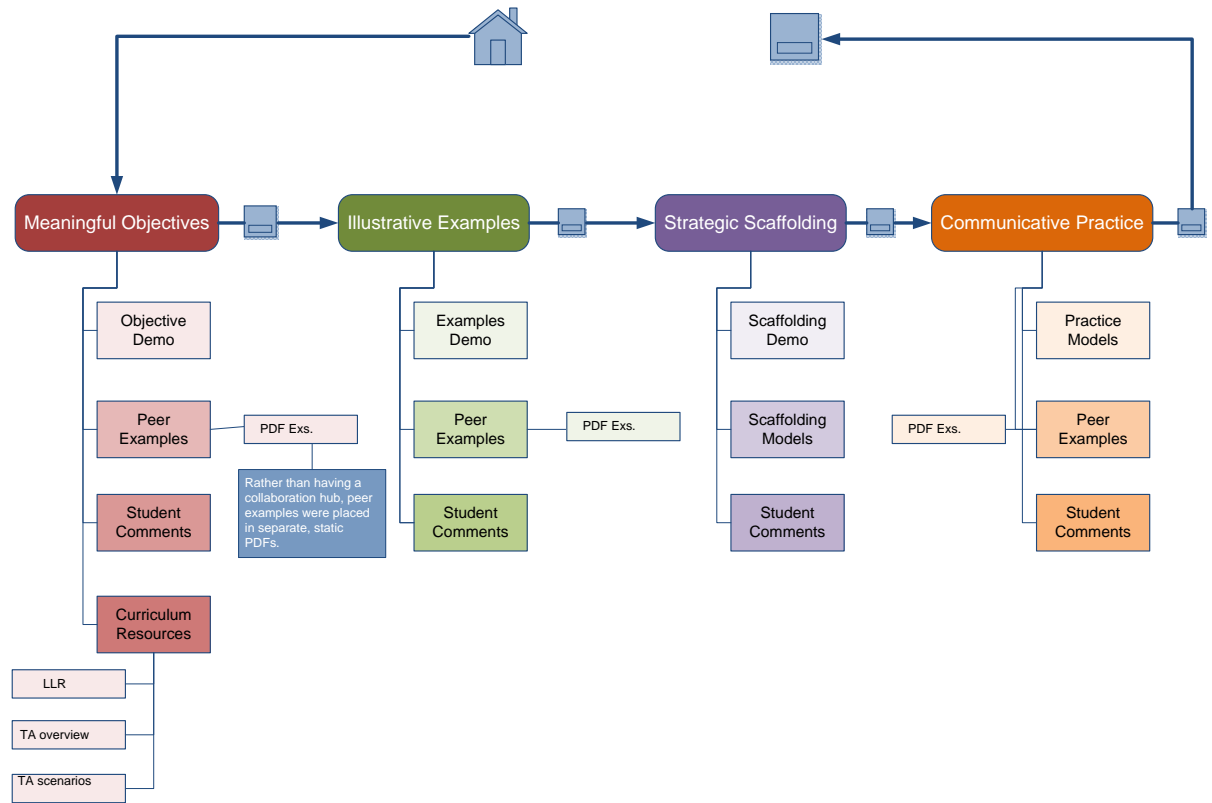


Figure 3. Static PDFs replace collaboration hub in the design.

The new teachers also expressed quite a bit more enthusiasm about the German-language demonstration. Consequently, the German-language demonstration is used in the final version of the training.

Once the different layers of the training had been prototyped the first stage of the training task was assembled as a prototype to evaluate how well the elements and resources work together to support the new teacher in creating a language lesson plan. Using Flash as the framework, the anchoring task of creating a language lesson plan was introduced, followed by an invitation to complete the first step in the task: forming a language lesson objective. After the task was introduced, teachers were given various resources in electronic format, including peer-created examples of objectives, an expert model, comments from students, and key curriculum documents. Along with each resource teachers were given one or two questions to focus their attention and an input field that enabled them to enter what they learned from each resource into an electronic journal. Once the teacher felt ready, he or she could proceed to create a unique lesson objective and to enter it into the field provided. Generally, the teachers felt that the resources provided were sufficient to prepare them to accomplish the task and were engaged by the relevance and meaning of creating a useable lesson objective. Several of the teachers expressed frustration because they were not able to receive a score or some form of feedback about the objective they had created prior to submitting it to their supervisor for review. Creating a uniform and objective method of scoring uniquely created plans and administering it electronically is an enormous challenge and would also be inconsistent with the constructivist values espoused in the design of the training itself. A suitable solution was designed that allowed the teachers to evaluate the lesson plans they had created prior to submitting them for review by inviting the teachers to create their own criteria as they studied the resources provided, and then giving them an opportunity to measure their product against that criteria and revise it as necessary.

It became evident in the final prototypes that the teachers continued to gain insight into elements of the training even after completing the section that pertained to that element. Several times while writing example sentences, a teacher wanted to go back and change the objective they had written.

Likewise, frequently when a teacher was creating a practice activity he or she wanted to revisit and adjust

the example sentences that had previously been written. The ability to view and refine the lesson as a whole as a teacher's knowledge becomes more complete became a noticeable crucial element and one that is consistent with the notion of knowledge construction. One of the final changes to the design was to add functionality that enables teachers to revisit and revise any lesson plan element they had already created at any time. This functionality considerably improved the cohesiveness of the lesson plans produced through the training.

Production

As is the case in any development project, the final product incorporated changes from the initial design resulting from feedback received and discoveries made throughout the process of prototyping and formative evaluation. These changes resulted in alterations to the production schedule and budget. This section details the changes made to the schedule and budget, and provides a description of the final product.

Process

As described in the previous section, the production of the training module was accomplished through a series of rapidly created prototypes. Production began by individually creating and testing single, lo-fidelity layers of the product. Subsequent prototypes fused the earlier layers, now refined, and polished the interface and delivery methods.

The first design layer prototyped was the anchoring task that gave meaning and context to the training content. Teachers were asked to comment on the relevance of the task to their needs and interest in the classroom. Once the task had been defined in a manner that engaged the teachers, each of the different resources that become the training content to support the task were prototyped and provided to teachers for review in print format. Teachers were surveyed about the value and helpfulness of each resource in accomplishing the task of creating a language lesson plan. The resources that were prototyped and tested included lesson elements created by peers, comments from students, and expert-created demonstrations. The final element to be prototyped before begin to integrate the design layers was the collaborative element. Teachers were invited to review lesson plans created by peers and to both comment

on them, and read others' comments. As described earlier, the feedback received during this portion of the testing resulted in scaling this element back significantly.

Once the task and resources had been refined they were fused together in electronic format and individual stages of the task were prototyped and tested. The first sub-task tested was that of writing a language lesson objective. The prototype consisted of the task description, resources for the teacher to explore, and an opportunity for the teacher to compose his or her own objective. The purpose of this prototype was to determine how well the format and combination of resources supported the teacher in successfully accomplishing the task. The sub-task of creating practice activities for a language lesson was also prototyped and tested. Following the sub-task prototypes, each of the sub-tasks were integrated into the complete task: combining the four lesson elements to create a complete language lesson plan. The entire training program was prototyped as a whole. At this stage the testing focused primarily on usability and minor adjustments to the interface and navigation were made prior to making the final prototype.

Schedule and Budget

Initially, the project was designed to produce a fully functional prototype within approximately one month. Delays in receiving approval for the project pushed the start date back nearly one month. The amount of time needed to complete the project was about two weeks longer than initially scheduled. This was due to additional time needed to collect peer examples and unanticipated adjustments to the design and production of the prototype resulting from user feedback. A comparison of the proposed dates with the actual dates for each project task is shown in Table 1.

The design and development of the proposed project was completed as a function of the designer's employment at Brigham Young University, MTC therefore no personnel costs were anticipated or incurred during the course of the project. Materials were required for prototyping and testing purposes and were included in the proposed budget.

Table 1.

A Comparison of the Proposed Schedule with the Actual Schedule.

Task	Proposed Start Date	Proposed End Date	Actual Start Date	Actual End Date
Content Script	2/27/2009	2/27/2009	3/20/2009	3/20/2009
Content Test	3/2/2009	3/2/2009	3/27/2009	3/27/2009
Collect Peer-created lessons	2/27/2009	3/5/2009	3/20/2009	3/30/2009
Test Peer-created lessons	3/6/2009	3/9/2009	3/30/2009	3/31/2009
Collect Student's Stories	2/27/2009	3/3/2009	3/20/2009	3/30/2009
Test Student's Stories	3/4/2009	3/5/2009	3/30/2009	3/31/2009
Obj. Model	3/5/2009	3/6/2009	3/31/2009	3/31/2009
Test and Revise Obj. Model	3/9/2009	3/10/2009	4/1/2009	4/2/2009
Examples Model	3/5/2009	3/6/2009	4/3/2009	4/3/2009
Test and Revise Examples Model	3/9/2009	3/10/2009	4/6/2009	4/6/2009
Scaffolding Model	3/5/2009	3/6/2009	4/7/2009	4/10/2009
Test and Revise Scaffolding Model	3/9/2009	3/10/2009	4/13/2009	4/15/2009
Practice Model	3/5/2009	3/6/2009	4/13/2009	4/14/2009
Test and Revise Practice Model	3/9/2009	3/10/2009	4/14/2009	4/16/2009
Gather baseline data for lesson quality	3/2/2009	3/5/2009	3/23/2009	3/25/2009
Gather baseline data for pre. Time	3/2/2009	3/4/2009	3/23/2009	3/25/2009
Develop module 1	3/11/2009	3/13/2009	4/2/2009	4/6/2009
Test and revise module 1	3/16/2009	3/16/2009	4/6/2009	4/15/2009
Develop module 2	3/17/2009	3/19/2009	4/15/2009	4/17/2009
Develop module 3	3/17/2009	3/19/2009	4/20/2009	4/21/2009
Develop module 4	3/17/2009	3/19/2009	4/21/2009	4/22/2009
Test and revise package	3/20/2009	3/23/2009	4/22/2009	4/29/2009
Gather summative lesson quality data	3/24/2009	3/25/2009	5/4/2009	5/4/2009
Gather summative experience data	3/24/2009	3/25/2009	5/4/2009	5/4/2009

Paper costs for print-based prototypes and surveys were \$27.40 which exceeded the proposed amount by \$16.90. The cost difference is due to additional prototyping beyond what was initially planned. CDs were also used for prototyping purposes and cost \$18.34 which was \$1.66 less than what was budgeted.


Description

The final training program produced through the prototyping process is a Flash-based framework which guides the user through the process of creating a language lesson plan in four stages or sub-tasks. The sub-tasks upon which the training is structured are 1) writing a meaningful lesson objective, 2) creating a lesson display consisting of language examples, 3) planning helpful interventions to assist students in discovering patterns and meaning, and 4) making practice activities that provide students with opportunities to communicate. The Flash-based framework also either houses or acts as a springboard for a variety of resources which enable the user to accomplish each sub-task. With each resource the user is provided an opportunity to reflect on what can be gleaned and to record those insights. Within each sub-task the user is asked to compose an original lesson plan component specific to the needs of his or her students. While writing a lesson plan element the user may review insights recorded as he or she studied resources, or review and adjust previously created lesson elements. The user may do this whenever he or she feels ready but each lesson element must be composed before moving on the next component. Once each of the four sub-tasks has been completed the user has an entire language lesson plan which can be printed and emailed to the supervisor for review and feedback.

Upon beginning the training program the user is immediately faced with the task at hand (see Figure 4.); the teacher must plan a language lesson to prepare the students to communicate in the target language in their upcoming Teaching Appointment which will occur within the next few days. The user is informed that the training program will walk her through the process of creating a lesson plan and will result in a functional lesson plan which she can use in the classroom with her students. By clicking on the 'Begin' button, the teacher is immediately taken to the first sub-task: creating a language lesson objective.

Tomorrow...

Your first district of missionaries arrives. You will meet them and teach them one of their first language lessons. This training will prepare you by helping you plan your first language lesson.



Get Started

Click on the button below to begin defining the objective for your lesson.




Figure 4. Introduction of the anchoring task to users.

Each sub-task module is designed in the same way. On the left the user is provided with options to explore that will assist him in preparing to compose his own lesson element. On the right the teacher may begin creating a unique lesson element when he feels ready (see Figure 5. and Figure 6.). The resources available to the teacher are relatively consistent across each sub-task and are marked by consistent icons. The resources all fall into one of four categories: expert models, peer-created lesson elements (see Appendix A), student comments, and curriculum-related documents.

The expert models are the most diverse of the resources as their form changes significantly between sub-tasks. In the first sub-task, writing a lesson objective, users are able to listen to audio clips of a teacher introducing a lesson to students with an effective objective and an ineffective objective. In the second sub-task users are able to view a simple Flash movie that demonstrates the flow of writing example sentences in the target language. In the third sub-task there are two types of expert model. The first is a video demonstration of a teacher providing instruction in German and using helpful strategies to assist the students in identifying the meanings of words and grammatical patterns. The second is an interactive Flash model that enables teachers to see different help strategies being applied to a set of Spanish language examples. The strategies illustrated in this model are highlighting, using pictures and actions to communicate meaning, and asking questions. By clicking on the title of each strategy, users can see how it would be applied to a given set of example Spanish sentences. In the final sub-task, teachers are shown the dialogues of students engaged in five different practice activities.

Each time a resource is provided the user is also given one or two questions to focus her attention, and an opportunity to electronically record the insights she gains (see Figure 7.). Insights and observations are recorded in a text field on the same page with the resources. Each text field is associated with a variable enabling the information entered therein to be recalled at other places throughout the lesson. Each time the user begins composing her own lesson plan element, she is able to review, in a journal page, all of the insights recorded in text fields within that sub-task. At the end of the entire program the user can review the journal page created for each sub-task and choose to print them out for later use.

Lesson Objective



Learn to formulate an objective for a language lesson by exploring the tools below.

When you're ready, proceed to the next section to create your own lesson objective.



Figure 5. The first subtask requiring the user to define an objective.

Lesson Display



Well written example sentences illustrate key grammar and vocabulary to help students accomplish the lesson objective. Explore the tools below to learn to create effective language examples.



When you're ready, proceed to write example sentences for your language lesson plan.



Figure 6. The second subtask requiring the user to write example sentences.



Lesson Objective – *demonstration*

Listen to these two examples of language lesson objectives by clicking on the icons to the right. One is meaningful while the other is not. When you're done, describe the difference between the two examples in the box below.

An effective objective is meaningful to the students. They need to know why they're learning it and when they will use it.







Figure 7. A demonstration of effective and ineffective lesson objectives.



Once the user feels ready he may return to the main page of the sub-task and proceed to compose his own lesson plan element in the text field provided (see Figure 8.). At this time, the user may choose to review an electronic journal page that has collected the insights he has recorded within that sub-task (see Figure 9.). He may also review and revise lesson elements he has previously composed in other sub-tasks. Once the element is created, the user clicks the 'Submit' button and moves on to the next sub-task. The lesson elements are gathered electronically through the use of variables and presented as a whole at the end of the training program.

Once each of the sub-tasks has been completed the user is given a final opportunity to review the lesson plan she has created in its entirety (see Figure 10.). As with individual sub-tasks, the user can again review journal pages for each sub-task and revise each of the lesson elements she has created. Once she feels ready, the final step is to click the 'Submit' button which emails the lesson plan to her supervisor for review. She is also given the option to print the lesson plan for her own use in the classroom.

Once the user has created a working lesson plan through the use of this program there are a number of opportunities available that will help the user continue to expand his knowledge and skill in both planning and executing lesson plans. The user is able to take that lesson plan directly into the classroom and begin using it in order to see how it plays out in a dynamic environment. He can then make adjustments as necessary. The user is also able to sit down with his supervisor and mentor and talk through the lesson plan with them, or with other peers. These individuals have extensive personal experience in teaching language and are able to give the user additional perspectives and insight pertaining to the improvement of the lesson plan. One of the training programs strengths lies in the user-created output, because this output, the language lesson plan, becomes an accessible point of discussion for the user and his peers or supervisors. When it is produced and sent out via email to others it sparks dialogue and becomes a catalyst for the continued social construction of the knowledge base that was initiated by this training program.

Lesson Practice

Before describing a practice activity for your lesson you may choose to review what you learned by clicking on the journal below. You may also review the other parts of the lesson you have already created.



When you're ready, proceed to describe a practice activity for your language lesson.

describe your practice activity here

Submit ↗





Figure 8. The user creates his own lesson plan element in the space provided.




Objectives 

An effective objective is meaningful to the students. They need to know why they're learning it and when they will use it.

The missionaries really care if the lesson is relevant to them. They need to see that it will help them do what they want to do.

All of the objectives indicate a task that the missionaries will accomplish, a grammar principle that will help them, and an event that they need to prepare for.

Display 

Simple sentences that follow a clear pattern. They are set up so that missionaries can compare and contrast different grammar principles.

Missionaries like lots of examples that will help them see patterns more clearly.


The teachers try and come up with examples that are relevant to their missionaries' circumstances.

Help 

Use lots of actions and pictures to help missionaries understand the meanings of words. Ask questions to try and get them to figure things out.

Missionaries need to be able to know where to look and what to be looking for. These strategies can help them do that.

The missionaries clearly appreciate when the teacher requires them to figure things out for themselves.

Practice 

Make sure that they have to listen to each other and are truly communicating.

Have them do lots of practice with their companions rather than as a large group.

Missionaries love practice activities that are fun.


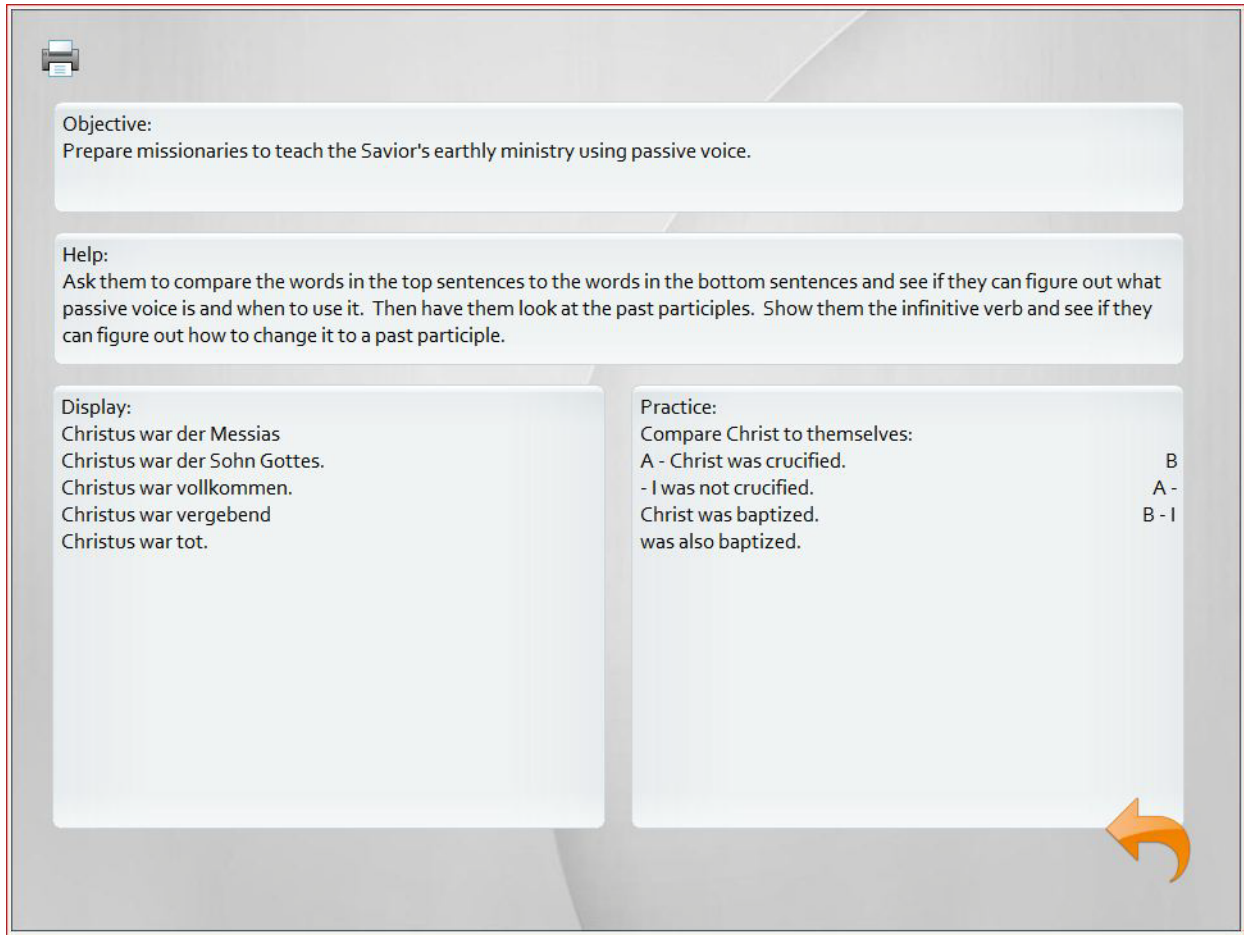


Figure 9. The electronic journal.



Objective:
Prepare missionaries to teach the Savior's earthly ministry using passive voice.

Help:
Ask them to compare the words in the top sentences to the words in the bottom sentences and see if they can figure out what passive voice is and when to use it. Then have them look at the past participles. Show them the infinitive verb and see if they can figure out how to change it to a past participle.

Display:
Christus war der Messias
Christus war der Sohn Gottes.
Christus war vollkommen.
Christus war vergebend
Christus war tot.

Practice:
Compare Christ to themselves:
A - Christ was crucified.
- I was not crucified.
Christ was baptized.
was also baptized.

B
A -
B - I

Figure 10. The language lesson plan.

Practical Modifications

In the course of prototyping and testing it became prudent to make a number of modifications to the product in order to enhance its usability and functionality. As alterations to the initial design were made in response to user feedback it was, in many cases, necessary to change practical aspects of the product. These changes were not necessarily aimed to improve the user's learning, but rather to create a simpler, more user-friendly experience.

One of the most significant design changes resulting from prototyping was to eliminate the development of tools for ongoing collaboration between teachers from the project. Despite this change of plans it was still crucial to the instructional design of the module to provide opportunities for new teachers to examine authentic examples of lesson plans created by their peers. This course correction meant that the production process and ultimate product were significantly different from the original plans. Authentic language lesson plans needed to be identified, vetted for effectiveness, and integrated into the training program in a static, but accessible manner. In order to identify the best lesson plans to include, supervisors were asked to invite their top language teachers to submit 2-4 language lesson plans. The assessment instrument originally designed for assessing the lesson plans output by new teachers through the training in development was used to rate each language lesson that was submitted. The top 25 plans were then filtered for variety in grammar principles and vocabulary set, narrowing the group down to 16 plans that would be used in the training program. It was decided that the most accessible means of integrating the examples into the training would be to create a .pdf portfolio and upload it to the MTC server. This format would make the information organized and accessible on nearly every browser, and also supported full search capabilities enabling teachers to quickly find relevant examples.

Another resource that is also provided online in .pdf format is the curriculum documents. During usability testing with the final prototypes, several teachers mentioned that, when accessing the curriculum documents they were unsure how to use them or what they should be looking for. The curriculum documents are already text-heavy and it was felt that additional instructions prefacing the documents would distract from the documents themselves, rather than clarifying them, by diverting the user's focus

from the task. A simple solution was to create rollover comments within the documents themselves. Rollover comments allowed the user to receive brief, relevant information about specific elements of each document as it was needed. In this manner, needed support could be provided to the user without diverting her attention from the document itself or the task that required its use.

The terminology used to describe the sub-tasks was revealed to be a usability issue during final prototyping as well. During a focus group with teachers who had tested the final prototypes it was clear that they did not relate well to two of the key terms in the training: *scaffolding* and *lesson examples*. As described earlier in this treatment, *scaffolding* as a sub-task refers to the interventions employed by the teacher while teaching to help learners discover meanings of words and grammatical patterns. *Lesson examples* as a sub-task refers to writing illustrative sentences in the target language that are used during a lesson to exemplify vocabulary and grammatical patterns. The teachers consistently grasped for synonyms when trying to discuss these two sub-tasks. The reasons for their discomfort are fairly clear. *Scaffolding* is theoretical term whose meaning in learning contexts is clear to individuals familiar with research and theories in the field of instructional design. Because the users of this training program have no formal background in education or instructional design they struggled to relate to this term in the context of the training. The term *lesson examples* is simply ambiguous. Within the training program there are numerous types of examples provided, such those created by peers and by experts. When lumped together in a training program with so many different kinds of examples, the term *lesson examples* communicates very little. The solution to this miscommunication was quite simple; the teachers were polled in the focus group about which terms they felt would better communicate the intent of the sub-task. After only a few minutes they decided on the terms *help* to replace *scaffolding*, and *lesson display* to replace *lesson examples*.

A final key alteration made to the product as a result of usability testing was the option to print both the final lesson plan created by the user, as well as the electronic journal pages upon which is recorded the user's insights gained in the course of analyzing the various resources. Once the sub-tasks had been assembled into a full prototype which enabled the user to create a complete language lesson plan

they immediately and unanimously asked how to print it out. The omission of a print option was glaring as it undermined some of the key philosophies of the instruction; the training was intended to be relevant to the teachers immediate classroom needs and enable them to construct something useful. Developing print functionality required integrating Javascript commands into the Flash framework so that text entered into the input fields could be exported as a .pdf and printed out using the drivers present on the user's machine. Having the ability to print what they had created and take it into the classroom significantly increased the value of the training program in the eyes of the teachers. Ultimately it was a subtle feature with enormous impact.

Insights

The enormous value of early and frequent prototyping in the production of instructional interventions was evidenced in the ultimate success of this training program. By immediately getting user feedback on the fundamental layers of the design, even in rough form, the program evolved quickly and in a direction congruent with user needs and sound instructional strategy.

It is common to view product development as a process where the design drives the production, but in reality the process is reciprocal between design and production. In this experience there were many instances where changes to the instructional design dictated changes to the production. One such instance was the inclusion of formal opportunities for users to record insights gained by analyzing resources. This change to the design required a significant amount of Actionscript programming and drastically changed the functionality of the training module. Once integrated, the capabilities that were added to the program enhanced the realization of several of the key objectives of the design. Users were now able to view tangible, metaphorical representation of the knowledge they were constructing through the training process.

Often, however, the practical program features associated with production had significant impact on the design. Simple production features that are frequently taken for granted can greatly support or undermine the instructional design of the program. One such instance was the issue that arose with printability. The ability to print out and take away the output of the training was, at first glance, a simple

usability feature, however the users responses to the training once this capability had been added was strongly rooted in the constructivist values that informed the initial design. What had appeared to be a minor flaw in the usability was in fact integral to a constructive learning experience and a crucial element of the overarching task that anchored the instruction in a practical situation. It is perhaps too easy for the instructional designer to become preoccupied with the foundational philosophy and strategy of a learning experience to the point that subtle but significant practical features can potentially undo the effect of an instructionally sound strategy. This experience emphasizes the value of prototyping and usability testing with users.

While immediately prototyping and testing simple layers of the initial design provided valuable insight into user needs and design improvement, it was, in retrospect, a mistake to postpone prototyping the instruction as a complete experience. As described earlier, the sub-tasks were never assembled and tested together in a rough format. The users were never able to test the entire task until the complex electronic version of the instruction sat in front of them. Even completion of the sub-tasks was not tested in a simple, rough version. Helpful direction had been gained by putting the various resources in the hands of users early in easily produced print format, but those resources were not applied to the task until a large amount of programming had gone into an electronic prototype. Consequently, when users were first able to probe the actual process of creating a language lesson plan using the resources provided, their feedback required undoing and reorganizing much of what had already been done. Had the users had a chance to test the instruction as a whole in print and instructor-led format a great deal of time and effort could have been spared in the production process because such features as the electronic journal and the ability to revisit and revise previously built lesson elements could have been integrated into the programming from the outset.

The production process will always be one of trial and error but experiences with the development of this training program will help make future efforts more efficient. Two practices that should be remembered are 1) to prototype early and often so that design and production can evolve simultaneously and support one another and significant usability features are not overlooked, and 2)

prototype the instruction as a whole in rough format early on to improve reliable planning and maintain focus on the overall objectives of the project.

Implementation

The scope of this project was not to reach full implementation but to create a fully functional prototype that would be used as a model for the development of electronic instructional support for new teachers of all languages. Full development and implementation would depend on stakeholder support after a review of the initial assessment data as well as a more in depth pilot. The summative data from the final prototype and stakeholder reactions are discussed in the next section.

Testing

Evaluation Strategy

In order to evaluate the success of the instruction three different measurements were used. The measurements used were 1) criteria outlining the elements of a successful language lesson plan, 2) the amount of time needed to prepare a language lesson plan, and 3) the teacher's personal perception of how helpful the instruction and collaboration opportunities were. The results of these three measurements illustrate whether the instruction effectively accomplishes the primary objectives outlined earlier.

The criteria for evaluating the quality of a language lesson plan directly reflect the instructional content: the characteristics of meaningful objectives, illustrative objectives, strategic scaffolding, and communicative practice activities. A rubric has been devised to allow systematic rating of a lesson plan in these four categories (see Appendix B). Baseline scores were established by applying the rubric to the language lesson plans created by teachers who have been employed at the MTC for four months but not received the instruction. Four months is the time period designated as apprenticeship, after which it is expected that an MTC teacher is fully trained and capable. A successfully designed and implemented instruction and collaboration strategy should result in language lesson plans that more effectively achieve results outlined in the four categories of criteria, as compared to the baseline data from the group described above.

In addition to resulting in stronger language lesson plans, the instruction should also help teachers minimize the time needed to prepare such lessons. As was pointed out earlier, MTC teachers have very limited time in which to prepare lessons therefore the performance achieved through the instruction should not require more time than is reasonable for an MTC teacher. Baseline times were gathered by surveying teachers who have been at the MTC for four months. The survey asked these teachers to indicate how much time it takes them to prepare a complete language lesson. At the very least, teachers who receive the proposed instruction should be able to create a language lesson plan in the same amount of time that it takes teachers who have not received the training. Ideally, teachers who receive the proposed instruction should be able to complete a language lesson plan more quickly and efficiently.

An important factor in determining the success of the instruction is the teacher's own perception of how helpful and meaningful the experience was. Each user was surveyed about their experience and asked to describe their attitudes towards the instruction and their personal estimation of its results. The survey questions gave users the opportunity to indicate their own skill level before and after the instruction, whether they feel the instruction would be valuable to their peers, whether they anticipate the lesson created will be useful in the classroom, and how they felt about the delivery method as opposed to other possible means of delivery.

Evaluation Results

When compared to language lesson plans from teachers who had been working at the MTC for four months, those produced by newly hired teachers as a result of the described training were scored notably better using the criteria rubric for rating language lesson plans. The criteria for rating the plans came from the *Preach My Gospel* manual, which is the source of the MTC curriculum, and was ratified by the MTC language steering committee, which agreed the criteria, as described, effectively represents that qualities desired in language teaching. The four criteria areas were parallel to the four areas of content in the training: meaningful objectives, illustrative examples, strategic scaffolding, and communicative practice. Each of the lesson plans, both from teachers who received the training and teachers who didn't, were examined for how well they represented these four qualities and rated on a 5

point scale for a total of 20 possible points. The mean score for a sample of 12 newly hired teachers who received the training was 18.50 with a standard deviation of 1.07. The mean score for a sample of 14 teachers who had been employed for four months (the standard period for apprenticeship) but had not received the training was 9.86 with a standard deviation of 1.88. The difference between mean scores of 8.64 points suggests that use of the training resulted in language lesson plans that were more thorough and aligned with the desired MTC approach to language teaching. Within the scope of this test we are unable to see whether the strength of the language lesson plans would continue over time and what point teachers would no longer feel a need for the assistance of the training program. It is possible that, as other responsibilities and pressures set in, teachers would no longer give the rigor and attention to their lesson plans that they gave while relying on the support of the training program. To determine whether language lesson plans would remain strong, it is suggested that a pilot test be conducted over the space of four months at which point teachers' language lesson plans again be evaluated using the same criteria. This would enable us to see how long teachers continued to use or rely on the training program to plan lessons, and whether the quality of language lesson plans remained consistent.

In the scores of both those who received the training and those who did not, the weakest scores were in the area of preparing scaffolding, or helps, to assist the students in discovering meanings of words and grammatical patterns on their own. The mean score for those without the training was 1.57, while the mean score for those who received the training was 4.42 on 5-point scale. The likely cause for this is simply that teachers view this area of preparation as relating more to habits and skills to be utilized in the moment rather than an area of teaching requiring forethought. Again, it would be important to look at whether this area particularly would drop over time among those teachers who did receive the training. As they become more comfortable and their language teaching skills become more automated it is likely that they will feel less of need to think through the strategies they will use to help students in advance.

The average time it took teachers to complete the training program and produce a workable language lesson plan was 70 minutes, a little over an hour. When asked about it later, most teachers felt that this was a fairly quick time within which to create their first language however it is much too long to

be completed within the 30 minutes of preparation time that teachers are allotted each day. Teachers who had been at the MTC for four months indicated that they spend approximately 15-20 minutes preparing each language lesson. Although their lessons were notably poorer in quality and thoroughness, the teachers who received the training will need to be observed in order to determine whether, with practice, they can begin to plan language lessons of consistently high quality within the allotted 30 minutes.

The teachers' reactions to the training were decidedly positive. It is difficult to determine how much of their appreciation and engagement is a result of the effectiveness of the training, or simply that it meets a significant need that the new teachers had been struggling with. When the 12 new teachers who participated in the final prototype test were asked in an anonymous survey how relevant the training was to their needs as teachers, they unanimously indicated that it was very relevant. When asked how interesting and engaging the training was, all of the teachers indicated that it was either mostly interesting or very interesting. Eight of the twelve teachers remarked that they found the peer examples most helpful. Two others noted the video demonstration of scaffolding techniques to be most helpful, while the remaining two teachers identified the practice models and the demonstration of writing example sentences as being most helpful. Four of the twelve teachers wrote that the student comments were the least helpful part of the training and the remaining eight teachers left this question blank. While the results appear to be overwhelmingly favorable it is again prudent to note that the teachers' reactions must be viewed in light of the fact that they had previously had little to no support in this area of their jobs. A strong positive reaction is not necessarily an indication of the effectiveness of the training. It is possible that this simply indicates that the training fills a gap in the support for new teachers in a meaningful way.

Recommendations

The data related above was presented to The Director and Manager of Training Services along with a proposal that pilot test of the Spanish language training module be conducted over the course of four months to better establish its long-term effectiveness and usefulness. As stated above, a four-month pilot test of the training program would better indicate whether 1) the new teachers continue to create high-quality language lesson plans over time and outside of the motivation of being brand new, 2)

teachers continue to put forethought into the scaffolding strategies they will use in each language lesson, and 3) the time required for a teacher to plan a language lesson decreases without a significant drop in the quality of lesson plans. The Director and Manager agreed to begin a pilot test with all new Spanish teachers hired within the next month. The test will be conducted under the supervision of the Training Services department at the MTC.

If the results of the pilot test prove favorable it is recommended that development of adaptations of the training for all languages be initiated. Development should proceed by 1) gathering effective examples of language lesson plans created by experienced teachers in each language, 2) rewriting both the expert model in the Lesson Display sub-task and the expert model in the Lesson Helps sub-task to represent each language, and 3) shooting additional video footage of experienced teachers applying effective scaffolding techniques in a variety of languages. Because it was demonstrated that teachers preferred to see this done in a language foreign to them it is not necessary to represent each of the languages. Two important factors should help keep development costs low: the fact that peer examples are naturally created in the course of a teacher's duties, and that rewrites of expert models only require changes in text, not programming.

In consideration of the fact that, prior to the development of this training program, many teachers indicated a strong desire to see what other teachers are doing, and that, when surveyed about this training program, the majority of teachers indicated that reviewing peer examples was the most helpful part, it is recommended that MTC administration continue to explore simple and efficient means for teachers to share plans, tips and experiences with one another. Feedback during the prototyping of this training program suggested that teachers do not have the time or need for reciprocal interaction outside of the classroom, even when electronically mediated. Nevertheless, given the results described here, an opportunity for teachers to simply submit their lesson plans and experiences for others to use would certainly be a valuable resource. I believe that such a resource would significantly ease the burden of training new teachers in a short amount of time, create a stronger sense of community, and develop an expansive and valuable depository of institutional knowledge.

Conclusion

In theory, the notions of objective training and constructive learning are more or less diametrically opposed. In a professional environment, however, it is difficult to escape the expectation that specified competencies be developed to a given level within a specified time and in a manner that aligns with institutionally imposed criteria. Nevertheless, a purely objective training designed to meet these expectations will inevitably fail to address the rich complexities of perspective and practice inherent in the many job-related tasks, particularly in teaching responsibilities. A solely objective training typically presents a single, narrow view of a complex problem that is better approached with insight into the various methods, adaptations, and heuristics utilized by practitioners.

This project demonstrates that, at least in a practical sense, it is not impossible to marry an objective framework with constructivist values. Providing information and resources in the context of an authentic, anchoring task makes information immediately useful and creates motivation for accomplishing learning objectives. Enabling access to the perspectives of multiple parties, particularly those of peer practitioners, helps learners to explore the variety of ways to view and solve problems and increases their arsenal of means. An emphasis on actually constructing or creating something usable and meaningful as a result of the training can potentially heighten the level of engagement. It becomes a metaphor for the knowledge being constructed through the instruction as well as a key encouraging recall and access to that knowledge.

There are a number of design elements to this training that resulted from and were verified through prototyping with user input that would reasonably have potential for improving learning in a variety of settings, both at the Missionary Training Center and in other professional arenas. One such approach was that of organizing informational resources within the framework of an anchoring task. Few organizations seem to struggle with providing enough information to employees and the MTC is no different. The challenge that organizations like the MTC struggle with is empowering employees to know when and how to use informational resources to make decisions and solve problems. Requiring reliance

on such resources within the context of accomplishing a meaningful task and enabling just-in-time access to them allowed newly hired MTC teachers to quickly become comfortable with them to the point that they demonstrated very effective utilization compared to that more experience teachers, many of whom continue to struggle accessing and using the information found therein.

Another useful and transferable strategy whose operational effectiveness was demonstrated in the results of this project is that of providing authentic experiences, stories, and ideas from multiple perspectives. Being able to explore plans from other teachers and stories from students resulted in solutions that were uniquely tailored to the new teacher's personal strengths as well as the needs of students within their language family. I also believe that the teachers' overwhelmingly positive response to the training was due, at least in part, to the emotional impact of becoming a part of a community. Exploring authentic means and methods created and used by peers gave the teachers insight into the unique practices of their language community. Being able to then create something that could stand as an equal among those tools created by peers became, in a sense, an initiation into the community. It engenders a sense of accomplishment that enables them to identify with practitioners within that community and begin an identity shift; they can begin to see themselves as a member of the practicing community because they have become worthy contributors to the body of tools they were able to explore.

While initial use of the training program resulted in successful language lesson plans, it is necessary to continue to explore the impact of introducing a training program that relies strongly on constructivist values. One particular issue that should be further explored is the resulting level of engagement of new teachers within their language-teaching community following the use of the training. It is hoped that teachers who were given the opportunity to explore tools created by their peers in the context of a meaningful task would, following the training, be more likely to continue to discuss and develop such tools together with their peers, given the opportunity. Once new teachers have experienced firsthand the usefulness of their peers' perspectives and knowledge they would ideally be more interested in developing and drawing on that knowledge within the community of teachers. Validating this would require further study.

One means of observing engagement within their language teaching community would be to continue the practice of gathering new teachers together for a few hours of training in foreign language instruction. The experience could be altered from what it has been in the past to be an enhancement of computer-based training described here. If new teachers were to get together after they had created and tried their first language lesson plan there would be the potential for strong community and knowledge building as they share their solutions and experiences with each other and practiced together. The congregation of new teachers, recently initiated into this community of language teachers, for the purpose of refining and expanding their toolset, could become a powerful means of progressing from the construction of single, specific-use tools emphasized in the training described here, to the intentional development of more effective and more effectively shared community knowledge and practices.

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Appendix A

MTC Teacher Peer-Created Language Lesson Objectives

The following are the examples of language lesson objectives created by teachers at the MTC and provided within the training to help new teachers create their own lesson objectives.

<i>Week</i>	<i>Objective</i>
2	<p>“I’m going to help you meet someone and testify of God and Jesus Christ for your upcoming TRC visit. To do this we’re going to learn to use articles to make simple sentences about God and Jesus Christ.”</p> <p>“We’re going to begin preparing to teach the Message of the Restoration in Spanish by learning to teach that God is our loving Heavenly Father. You’ll be able to use these phrases when you testify this week. To teach that God is our loving Heavenly Father we will use the present tense.”</p>
3	<p>“This next week you will be teaching the 1st lesson in English and the task is to get to know someone and talk about their family. Our goal is for you to be able to tell about your families using adjectives correctly.”</p> <p>“Your task in the teaching appointment this week requires you to introduce yourself and get to know someone. We’re going to learn to use conjunctions, or linking words, to help us speak more fluidly when we do that.”</p> <p>“Prayer is necessary to begin fulfilling your purpose and to help others come to Christ through repentance. We can learn to use some simple present tense verb forms to begin praying in Spanish today.”</p>
4	<p>“This week when you’re meeting with your investigator you’ll have a chance to talk about your experiences with work and school. It’s a great chance to talk about what you like, what you want to do, what you should do, and other things like that. We’re going to learn some very useful words that will help you share your preferences and desires.”</p>
5	<p>“What commitments are you going to invite your investigators to make this week in your teaching appointment? To help them make a commitment you have to ask if the ‘will’ do</p>

it. That means that we need to learn to use the future tense so we can invite people to do things. That's our goal today.”

6 “When explaining the background of the events of the Restoration this week, you will need to know how to use the imperfect tense. We use the imperfect tense when we talk about events that happened in the past.”

7 “When you teach the Message of the Restoration this week you're going to invite people to find out for themselves whether what you've taught is true by reading and praying and keeping the commandments. Like we read in *Preach My Gospel*, people need a reason to change, and that means promising blessings. We're going to learn to promise blessings using if...then... statements. These are sometimes called conditionals.

8 “Today you will learn to teach THE ATONEMENT from Lesson 2 using adverbs to help you prepare for you next teaching appointment. Adverbs will help you describe how the Atonement heals people, such as physically, emotionally and spiritually.”

“Your investigator has agreed to come to church this week. Now we've got to give them directions so they can arrive on time! We're going to learn give them directions by using command forms.”

MTC Teacher Peer-Created Language Lesson Plans

The following are the samples of the language lesson plans created by teachers at the MTC and provided within the training to help new teachers create their own lesson plans.

Adjective Agreement, Get to Know Someone

Craig Severinsen

This is designed for missionaries in week three, although the week you teach this is may vary. In week three they will be teaching the 1st lesson in English and the task is to get to know someone and talk about their family. I have decided that the goal I want for these missionaries is to be able to talk/tell about families using adjectives correctly.

To help them reach the goal I will be helping THEM come up with ways to correctly describe what their family is like. Before class I would have brainstormed to come up with a few VERY simple phrases that demonstrate the agreement of adjectives and write them on the board in a comparative way. For example;

LA FAMILIA GRANDE

LAS FAMILIAS GRANDES

I would, however place them far enough apart so that I can fit several phrases below each one. It's important not to do too many but enough that they can comparatively see the reasons why the adjectives are the way they are. (For example, when it has an "a" at the end vs. an "o" or when it has an "s" and when it doesn't, ect.)

Write the phrases you came up with one by one on the board and have them repeat you saying it, if they ask what something means act it out or draw picture to help them, but resist the urge (at least right now) to either TELL them what the word is in English or to EXPLAIN exactly what the grammer principle is. as they repeat the words help them with pronunciation and saying words correctly by repeating several times. (as you can notice we are TEACHING by writing on the board the grammer principle, DEMONSTRATING by saying the words first, PRACTICING by haveing them repeat, EVALUATING their pronunciation, and REPRACTICING as necessary.)

After you have written a number of sentences on the board and have repeated each phrase out loud go through and ask them what THEY think every word means, more than likely they were able to catch on to what all the words mean, but to be sure they are learning it correctly go over each phrase and make sure they understand. (here you can indulge that need to tell them in English what it means, but notice we allowed them to figure it out for themselves first.) Your board should look something like this (I just randomly thought up these sentences, you will probably have better one.)

Singular

LA FAMILIA GRANDE

LA MADRE BONDADOSA

LA HERMANA BELLA

EL PADRE GENEROSO

EL HERMANO TRABAJADOR

Plural

LAS FAMILIAS GRANDES

LAS MADRES BONDADOSAS

LAS HERMANAS BELLAS

LOS PADRES GENEROSOS

LOS HERMANOS TRABAJADORES

After going through and making sure they know what each word means I would ask a series of questions to see if I can't make THEM teach ME what the grammar principle is. Some examples are: What do you notice about these two groups? What differences between the singular and plural are there? Is there a difference between the masculine and the feminine?, What happens if the adjective ends in a vowel and we want to make it plural? A consonant? What about an e? etc.

You'll be very pleased when they teach you and you don't have to do as much. Now it's time to practice, give them about 5 - 10 min and have them write down some sentences describing their own family. When everyone is done have them play the "como es" game. Basically one missionary asks "Como es su

(*member of family*)_?” The other responds “Mi (*same member of family*)_ es _(*adjective they chose to describe them*)_.”

Example:

Missionary A: "COMO ES SU MADRE?"

Missionary B: "MI MADRE ES BONDADOSA"

Missionary B: "COMO ES SU HERMANO?"

Missionary A: "MIS HERMANOS SON TRABAJADORES"

Have them switch and mingle and do it with all other missionaries and you should go around not only listening for mistakes and correcting but participating as well.

When the activity is over have them repeat words that you heard mispronounced and ask questions about any words they heard and do not understand.

Adverbs, The Atonement

Alexander Aldrich

Objective: To teach “La Expiación” from Lesson 2 using adverbs

Explain

Simply tell the missionaries *how* this will benefit them in their purpose. You may say something like, “Today we will learn adverbs. This will help you describe *how* the Atonement heals people, such as physically, emotionally and spiritually.”

Demonstrate

Start with a simple sentence to relate with the adverbs, such as:

LA EXPIACIÓN NOS SANA.

Now, tell the missionaries to pay close attention as you write to what happens to the adjectives in order to say *how* it heals us. You can start by using the adjectives “físico” and “completo” to describe *how*. For example:

LA EXPIACIÓN NOS SANA COMPLETAMENTE.

LA EXPIACIÓN NOS SANA FÍSICAMENTE.

Now, ask a missionary to come to the board and underline where the change occurred. Have another explain in his/her own words what happened. This way, they effectively learn the principle by teaching themselves rather than relying on an explanation from you, the teacher. Use as many examples as needed for comprehension. Make sure they understand that with examples such as these, the adverb is formed from the feminine form of the adjective.

Practice

Create a short list of adjectives, such as these that change depending on gender, with the missionaries. Have each missionary separately write two sentences that relate to the Atonement using two of the listed adjectives. For example:

JESUCRISTO ORÓ SINCERAMENTE POR NOSOTROS. (Y ETC.)

Evaluate

Have each missionary read one sentence aloud. Make corrections as needed.

Re-practice

Now demonstrate how to form adverbs using adjectives where both the masculine and feminine forms are the same, such as “emocional” and “espiritual.” An example:

LA EXPIACIÓN NOS SANA EMOCIONALMENTE.

LA EXPIACIÓN NOS SANA ESPIRITUALMENTE.

Now simply repeat the steps from before for comprehension and practice. Towards the end, as a side note, you will want to include the fact that when there are several adverbs in a row, the **-mente** is only added to the last one.

LA EXPIACIÓN NOS SANA FÍSICA, EMOCIONAL, Y ESPIRITUALMENTE.

Articles, Testify

Objective: Help the missionaries teach themselves articles using simple sentence to talk about God and Christ in preparation for a contact or teaching the first lesson (notice that there are no irregulars). My intention is that this could be done the very first day since there are many cognates. Also, as you read the sentences, be very expressive and use gestures. Tell them that they can use their dictionary and other resources to find answers. Also, when missionaries have questions, repeat the sentences using gestures and being very expressive.

Explain

Write the following sentences and questions on the board. Read the sentences only, without explaining anything. This lets the missionaries discover things on their own. Invite the missionaries to talk as companionships and write down the answers.

DIOS ES UNA PERSONA PERFECTA.

CRISTO ES EL HIJO DE DIOS.

DIOS AMA A TODAS LAS PERSONAS.

DIOS CREÓ EL MUNDO PARA NOSOTROS.

CRISTO ES UN EJEMPLO PERFECTO PARA NOSOTROS.

LA BIBLIA HABLA DE LA PALABRA DE CRISTO.

DIOS ENSEÑA LOS PRINCIPIOS DEL EVANGELIO EN LA BIBLIA.

UNAS PERSONAS OBEDECEN A DIOS.

UNAS PERSONAS NO VIVEN UNOS PRINCIPIOS DEL EVANGELIO.

(have the missionaries focus on meaning first, then grammar)

1) *What is the main theme from these sentences?*

a) God is our Loving Heavenly Father.

b) The Great Apostasy.

c) The Restoration of the Gospel.

2) List 3 things that we learn about God or Christ from these sentences.

(Because there is not a direct translation, I use the word “might”)

3) What might "el," "la," "los," and "las" mean? (the)

4) What might "un" and "una" mean? (a, an)

5) What might "unos" and "unas" mean? (some, a few, a couple of)

(Ultimate Spanish Review pg. 219)

6) When do you use "el" and when do you use "la" (Hint: look at the words they precede)

(masuline, usually o-ending, and feminine, usually a-ending)

7) When do you use "un" and when do you use "una" (Hint: look at the words they precede)

(Same as 10)

8) When do you use "el" or "la" and when do you use "los" or "las"

(When the noun is plural, the article is plural with an "s")

9) When do you use "un" or "una" and when do you use "unos" or "unas" (Same as 12)

After they have worked through the questions for 5-10 minutes, go over the answers with them. It might be good to write all the answers on the board, using the tables from the red book.

Demonstrate

(Definite Articles Practice Activity): *This will give them the opportunity to hear and learn the names of items being used and supporting articles.* Identify masculine and feminine objects in the room and then place them in the center of the room on a table or chair. Pick up each item and tell what it is. Have the missionaries repeat.

Pick up a red book. “EL LIBRO ROJO.” Class repeats: “EL LIBRO ROJO.”

Pick up the missionary pamphlets. “LOS FOLLETOS MISIONALES.” Class repeats: “LOS FOLLETOS MISIONALES.”

Pick up the Bible. “LA BIBLIA” Class repeats: “LA BIBLIA.”

After all the items have been learned, you can test the missionaries by asking a missionary,

“¿DÓNDE ESTÁ LA BIBLIA?” *Point to various objects until the missionary points to the correct object.*

You can also pick up an item and say,

“¿QUÉ ES ESTO, ELDER SMITH?” *Elder Smith names the item.* “LOS FOLLETOS.”

Practice

This will give the missionaries an opportunity to use the language by speaking. Have the missionaries circle around in their companionships.

Pick up a red book. “TENGO EL LIBRO ROJO.” *Give the book to missionary on your side.* “USTED TIENE EL LIBRO ROJO.”

Pick up pamphlets. “TENGO LOS FOLLETOS MISIONALES.” *Give the pamphlets to missionary at your side.* “TIENE LOS FOLLETOS MISIONALES.”

Pick up the Bible. “TENGO LA BIBLIA” *Give the Bible to missionary at your side.* “TIENE LA BIBLIA.”

Give the missionaries to opportunity to take turns picking up and giving to their companion one of various items, just as you have done.

Evaluate

Listen carefully and notice common errors that they make. Correct them as you hear them and then go over them as a class after the activity.

Repractice

(Indefinite Articles Practice Activity) Do the same activity but instead use indefinite articles.

For example:

Pick up a black book. “UN LIBRO NEGRO.” *Class repeats* “UN LIBRO NEGRO.” “YO TENGO UN LIBRO NEGRO.” *Give book to missionary at side.* “USTED TIENE UN LIBRO NEGRO.”

Because you have already done this with definite articles, your demonstrations will be shorter.

Appendix B

Formative Assessment Instruments

Language Lesson Content

In a few sentences describe what you learned from the material.

How relevant was the material to your needs as a new language teacher?

- Irrelevant
- Somewhat relevant
- Very relevant

How interesting was the material to you?

- Completely uninteresting
- Very little was interesting
- Some parts were interesting
- It was mostly interesting

- The content was very interesting

How helpful will the things you learned be to you in the classroom?

- Not at all helpful
- Minimally useful
- Nice to know
- Very helpful
- Indispensable

Which parts of the material were most helpful?

Which parts of the material were least helpful?

What would you change about the material to make it more helpful?

Language Lesson Task

In a few sentences describe the elements of the training task that you remember.

How relevant was the training task to your needs as a new language teacher?

- Irrelevant
- Somewhat relevant
- Very relevant

How interesting was the training task to you?

- Completely uninteresting
- Very little was interesting
- Some parts were interesting
- It was mostly interesting
- The content was very interesting

How clear was the training task?

- Completely baffling
- Mostly confusing
- Parts were clear
- Mostly accessible

- Easy to understand

How helpful will the task be to you in the classroom?

- Not at all helpful
- Minimally useful
- Nice to know
- Very helpful
- Indispensable

Which parts of the training task were most helpful?

Which parts of the task were least helpful?

In regard to creating language lesson plans, what would you have liked to have learned more about?

Language Lesson Usability

How long did you take to complete the training?

Were the resources provided in the training sufficient to accomplish the task?

- Yes
- No

If 'No', what kinds of resources would have been helpful to you?

How clear were the task and instructions?

- Very Confusing
- Difficult to Understand
- Neutral
- Fairly Clear
- Crystal Clear

How easy was the training program to navigate?

- Impossible
- Difficult
- Neutral
- Pretty Simple
- Very Easy

What would make the training program easier to navigate?

Which parts of the training program did not work?

Semi-Structured Focus Group

- What did you learn from using the training program/materials?
- What will you do differently in the classroom because of what you learned?
- What aspects of the training program/materials were most helpful?
- What aspects of the training program/materials were least helpful?
- What would you change about the training program/materials?

Summative Evaluation Scoring Rubric

Language Lesson Plan Criteria Matrix

Lesson Element	1	2	3	4	5
1. Meaningful Objective Objective is relevant to student needs and demonstrates and immediately apply.	There is no clear objective or the lesson topic is in no way connected to student needs and classroom tasks.		The objective addresses possible applications but emphasizes getting abstract. No knowledge of grammar and vocabulary over relevant usage.		The objective emphasizes and specifically outlines when student is will use what they are learning, what they must be able to do, and how they will learn to do it.
2. Illustrative Examples Examples clearly demonstrate grammatical patterns and meanings of words in the context of the objective.	There are no examples of grammatical patterns and vocabulary in use.		Few examples of grammar and vocabulary in use but patterns are not clear or discernible.		Several examples of grammar and vocabulary in context and are given in such a way as to emphasize patterns.
3. Strategic scaffolding Interventions are prepared to help students discover grammatical patterns and meanings of words.	No forethought is given to support that may help students discover meaning and patterns.		Plan includes some questions or highlighting but it is not sufficient to facilitate student discoveries.		Plan includes several different approaches to support that are sufficient to help students discover patterns and meanings.
4. Communicative Practice Practice activities require students to communicate by both expressing and interpreting meaning.	No practice activities have been or practice consist solely of formal drills without context.		Practice activities are contextualized but require only expression without later production.		Practice activities require student to use language in order to communicate meaning, indicating both expression and interpretation.