



# Journal of the International Society for Teacher Education

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Teacher Reflections and Student Learning



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Teacher Reflections and Student Learning

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# JOURNAL OF THE INTERNATIONAL SOCIETY FOR TEACHER EDUCATION

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## **From the Editor**

As the Editor of JISTE, I want to thank our former Associate Editor, Peggy Saunders, at Weber State University, USA for her incredible commitment, dedication, and work with JISTE over the years. Peggy and I began our journey together as Editor and Associate Editor back in 2010 at the ISfTE meeting in Brazil. Since then, our collaboration has been comprehensive and joyful. However, after her appointment to Assistant Secretary General in 2015, Peggy decided that JISTE 20.1 would be her last as Associate Editor.

I am proud to have our two new Associate Editors, Vera Woloshyn and Leanne Taylor, both from Canada, on the Editorial team of this issue of JISTE. The contributors to this issue of JISTE – JISTE 20.2 – may have noticed how our new Associate Editors have been comprehensive and meticulous in their work reviewing and editing articles. Over the past several months, they have sent sharp and clarifying questions to the authors and have been comprehensive in their English editing. The thorough work of our new Associate Editors has contributed to the ongoing professionalization of the Journal of the International Society of Teacher Education. I would like to express my thanks to both of you.

## About this Issue – Teacher Reflections and Student Learning

This issue of JISTE entitled *Teacher Reflections and Student Learning*, highlights the importance of teacher reflection and professional knowledge for student learning, skills training and continued professional development. The authors in this issue represent four continents – America, Europe, Africa and Asia. Each invite us to consider how teacher reflection and in-depth subject knowledge are significant in the development of teacher professionalism and student growth. As the authors' research illustrates, when teachers research their practice, they are better positioned to develop professionally and improve students' learning.

In their article, *Reflective practice in English teacher education: Why active learning is not enough*, teacher educator Anna Krulatz presents the process and outcomes of an action research project designed to improve pedagogical practices in a Norwegian in-service English teacher course. Drawing on a Reflective Teaching Model, Krulatz examines her teaching method, planning, and organization and suggests that teacher reflection can improve classroom methodologies, bolster critical thinking, and enhance student learning.

Lea Lund from Denmark also highlights the importance of teacher reflections in professional teacher development. In her article, *How teachers reflect on their pedagogy: Learning from teachers' pedagogical vocabulary*, Lund draws on a qualitative study of teachers of adult learners and considers what teacher reflections tell us about the choices teachers make about their teaching practice. The paper highlights that when teachers write and dialogue about their teaching beliefs and experiences, they rely less on their gut feelings and are better positioned to apply pedagogical research and theory to their everyday teaching.

In the article, *Mentoring: A key to the professional development of the teacher*, Elias R. Mathipa and Sizakele, M. Matlabe investigate the importance of mentoring in teachers' professional development. Drawing on research conducted in the South African context, the authors suggest that, when used appropriately, mentoring can have a positive impact on the teaching and learning environments of both mentor and mentee.

In their article, *Mathematics fluency and teaching self-efficacy of teacher candidates*, American researchers, Sheryl J. Rushton, Kristin M. Hadley, and Penée W. Stewart investigate the relationship between mathematical knowledge and elementary teacher candidates' perceptions of their teaching ability. Their study suggests that when teachers have good professional subject knowledge they are more likely to perceive themselves as being good teachers.

Jackie Pow from Hong Kong explores how advances in Information Technology can inform students' geographical imagination. His article, *Revitalizing students' geographical imagination in a digital world*, suggests that volunteered geographic information and digital cartography are especially useful tools that can enhance critical thinking, generate reflection on learning, and develop students' geographical imaginations.

Similarly, Norwegian authors Cornelia Brodahl and Unni Wathne explore how digital media and technology may contribute to teacher reflection and student learning in mathematics. In their article, *In-service teachers' perceptions of the design and quality of mathematics videos in their on-line learning*, the authors explore how in-service teachers enrolled in on-line mathematics courses perceived the benefits of video podcasts in their learning processes. The

study makes recommendations for the development of educational podcasts for the teaching of mathematics.

Nuray Senemoğlu, Dilek Ilhan Beyaztas, and Suzan Beyza Kapti's article, *Graduate students' opinions of professors' competencies in graduate schools of education*, investigates Turkish students' perceptions of, and experiences with, university teachers' professionalism and subject knowledge. The study found that graduate student participants believed professors needed to improve their capacities in terms of subject area knowledge, learning facilitation, measurement and evaluation, and communication. The study's findings carry implications for how professors might consider developing their professional skills and build stronger relationships with students.

Leanne Taylor, Vera Voloshyn, and Karen Bjerg Petersen

# REFLECTIVE PRACTICE IN ENGLISH TEACHER EDUCATION: WHY ACTIVE LEARNING IS NOT ENOUGH

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**Abstract:** *This paper presents the process and the outcomes of an action research project aimed at examining and improving pedagogical practices in a Norwegian in-service English teacher course through the use of the Reflective Teaching Model (Hart, Najee-ullah, & Schultz, 2004). The project was conducted in a constructivist-based classroom and consisted of the following steps: initial reflection, plan for action, action, and repeated reflection (Elliot, 1991). Course activities and student papers were included in the analysis. The improved, post-evaluation teaching approach, while still based in constructivist views of learning (Biggs, 1996; Vygotsky, 1978), utilized various scaffolding techniques (Wood, Bruner, & Ross, 1976) and an experiential pedagogical approach referred to as the Loop Input (Woodward, 1988, 2003). The outcomes suggested that reflective teaching practice in higher education can lead to improved classroom methodologies as well as increased critical thinking and attainment of course objectives among students.*

**Keywords:** reflective teaching model, action research, English teacher education, pedagogical practice

## Introduction

No one course can prepare future teachers for all the challenges that they may face in their classrooms. Thus, one of the primary goals of teacher education programs is to nurture autonomous and self-directed teachers who constantly reflect on their teaching practice, evaluate their assumptions about teaching, and base changes and innovations in their teaching on effective and meaningful decisions.

Teacher educators can promote reflective teaching (Schon, 1983) through modeling in their own courses. The Reflective Teaching Model (RTM: Hart, Najee-ullah, & Schultz, 2004), originally implemented in mathematics and science teacher education, fosters ongoing observation and evaluation, thus encouraging teachers to identify and examine their own teaching practices and beliefs in order to implement changes that lead to improved learning. The model consists of a plan–teach–debrief sequence, during which lessons are first prepared and delivered, and then

followed by focused reflection directed at increasing teacher awareness of pedagogical decisions and their effectiveness. The RTM stresses both shared authority between teachers and teacher educators and the importance of collaboration among teachers, as both teachers and teacher educators are seen as active participants in learning and teaching.

Loop input (Woodward, 2003), a type of experiential learning that promotes deep reflection about teaching and learning processes, can be integrated with the RTM to prompt teachers to examine and transform their teaching practices. It consists of both the process and content of learning (Woodward, 2003, p. 301). Through loop input, teacher education students learn how to create and execute pedagogical practices by participating in activities that exemplify these practices and at the same time utilize course content. According to Woodward (2003), students can “learn more deeply as a result of [the]

reverberation between process and content” (p. 303) through using loop input. Decompression time, which corresponds to RTM’s debriefing stage (where students engage in analysis and reflection of the instructional method that they have just participated in), is a crucial element of loop input (Woodward, 2003, p. 303).

As an applied linguist working with pre-service and in-service ESL (English as a Second Language) and EFL (English as a Foreign Language) teachers, and a former ESL and EFL teacher myself, I have always attempted to minimize lecture and optimize active learning in my courses. Nevertheless, I noticed that although I used loop input (Woodward, 2003), group work, discussions, and workshops in my EFL endorsement classes, my students struggled with the final course assignment that involved the development of an original, grade-appropriate EFL lesson and reflection. Even though we covered theories of language acquisition, methods and approaches to language teaching, input, output, interaction, social, and individual factors in language learning, multiple intelligences (Gardner, 1995), and Bloom’s taxonomy (Bloom, Englehart, Furst, Hill, & Karthwohl, 1956), my students complained that they were dissatisfied with their work. I also noticed that while most of the lessons they designed followed a logical sequence (warm-up, new material, follow-up), the students did not demonstrate a mastery of the course objectives. Rather, the lesson plans were based on common-sense beliefs about teaching and learning, such as, “I use this activity because it is fun for my students.” These factors prompted me to ask, “What am I doing wrong?” As a result, I conducted an action research project that utilized elements of RTM to undertake a formative assessment of my students and myself in an effort to improve my classroom practices. Through active reflection, the project described here aimed to identify the gaps in my students’

learning and to inspire changes to my teaching.

## **Literature Review**

### **RTM and Teacher Education**

Teacher training programs tend to be evaluated using student learning outcome data, standardized observations, and surveys (Worrell, Braceck, Dwyer, Geisinger, Marx, Noell, & Pianta, 2014). While these forms of assessment constitute valid and reliable sources of evidence and a foundation for judging the quality of teacher education, they may not provide teacher trainers with sufficient qualitative details about the merits of their individual practices. This information can be supplied through ongoing formative assessment and reflection using models such as RTM.

To date, RTM has been primarily implemented to help teachers and teacher trainees reflect on their own teaching practice (e.g., Hart et al., 2004; Weinburgh, Hart, & Carriere, 2007; Weinburgh, Smith, & Clark, 2008). However, teacher educators’ chief goal is to support teachers and teacher trainees in developing teaching expertise. To do so, they have a responsibility to continue to learn and to reflect on their own teaching. As modeling is a common pedagogical component of teacher education programs, teacher educators can engage in the RTM model in order to promote reflection and learning for themselves and the pre- and in-service teachers enrolled in their courses.

### **Good Teaching**

In order to deliver instruction that addresses the needs of teachers and teacher trainees, teacher educators need to ask themselves, “What constitutes good teaching?” Samples and Copeland (2013) and Bain (2004) postulate universal teaching principles that abide in all

academic disciplines: being knowledgeable, creating opportunities for critical thinking, placing high expectations on students, providing feedback, promoting active learning, and engaging in continuous self-assessment aimed at improving teaching practices. These principles can be used as a starting point in evaluating one's own teaching practice.

Constructivist approaches to teaching that are based on the belief that learning occurs as a result of an active construction and reconstruction of reality and is dependent on variables such as prior knowledge (schemata) and beliefs about the world (Bruner, 1961; von Glasersfeld, 1995; Piaget, 1972; Vygotsky, 1978), are considered superior to traditional, teacher-centered approaches based in positivism (Bransford, Brown, & Cocking, 2000; Prince & Felder, 2006). The main characteristics of a constructivist classroom include linking the content of instruction to students' prior knowledge, providing appropriate scaffolding, promoting collaborative tasks, and guiding students in the attainment of independent learning (Fosnot, 1996; Prince & Felder, 2006).

Active learning, which conforms to constructivist theories of teaching, can be defined as student-focused learning that is engaging, interactive, and cognitively demanding. The use of active learning tasks, such as posing challenging questions or comparing, contrasting, and integrating ideas, leads to increased learning motivation and allows students to take responsibility for their own learning as they make decisions regarding how to conduct the task at hand (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991). The use of active learning tasks also is positively related to improved critical thinking (Astin, 1993; Shim & Walczak, 2012).

Research on effective teaching

additionally suggests that instructional activities that engage students in problem solving and activate higher-order thinking skills are positively correlated with learning outcomes (e.g., Hake, 1998; Jakee, 2011). Similarly, inductive instructional approaches, such as inquiry learning, problem- and project-based learning, just-in-time teaching, discovery procedures, and task-based instruction, "[have been] found to be at least equal to, and in general more effective than, traditional deductive methods for achieving a broad range of learning outcomes" (Prince & Felder, 2006, p. 123).

Finally, good teaching should be guided by clear goals and objectives that place a range of cognitive demands on learners. Bloom's taxonomy (Anderson & Krathwohl, 2001; Bloom et al., 1956) helps teachers to set clear learning goals for students, as well as, to develop and deliver appropriate instruction. In addition, the taxonomy enables instructors to create valid assessment tools and helps learners to develop appropriate and effective learning strategies.

### **Exploratory Action Research Project**

#### **Context and Objectives**

In reflecting on their teaching, instructors can scrutinize syllabi, course objectives, assignments, lectures, activities, and methods of assessment. RTM, with its sequence of plan-teach-debrief, provides a useful formative assessment framework for teacher education program analysis while at the same time enabling teacher educators to model reflective teaching practices to teachers and teacher trainees.

This reflective action research project was conducted in an in-service EFL endorsement course for Norwegian EFL elementary school teachers. The objectives of the project were to reflect on and

improve teaching practice while modeling reflective teaching. The course in which the action research was conducted was rooted in constructivist approaches to teaching and learning (Bruner, 1961; von Glasersfeld, 1995; Piaget, 1972; Vygotsky, 1978), and the project focused on examining the effectiveness of explicit and implicit learning, active, and experiential learning. The course curriculum included the following topics: foundations of first and second language acquisition, approaches to language teaching, the Sheltered Instruction Observation Protocol (SIOP) model (Echevarría, Vogt, & Short, 2013), Bloom's taxonomy (Anderson & Krathwohl, 2001; Bloom et al., 1956), multiple intelligences (Gardner, 1995), and designing teaching materials, resources, and activities.

As the final course project, the participants were asked to deliver a grade-level appropriate lesson plan and reflection paper. Students completed two drafts of this assignment during the course of the semester. The first draft was submitted before I undertook the analysis of course activities and implemented changes to my teaching practice. The second draft was submitted at the end of the semester after I had implemented changes to the course.

Because this project aimed at changing my own teaching practices and improving student learning, an action research design was used. Action research seeks solutions to a specific local problem, is typically cyclical and reflective in nature, requires the active participation of the researcher, and leads to change. The action reflection cycle usually consists of the following steps: reflection on a problem or a question, making a plan of action, taking action to execute the plan, and repeated reflection (Elliot, 1991). In this project, I integrated the action reflection cycle with the RTM plan-teach-debrief sequence. The first step in the cycle consisted of the analysis and evaluation of students' first

drafts of mandatory course work (reflection on a problem or a question), followed by an examination of my own teaching practices (debriefing and making a plan of action). I then revised my lesson plans and implemented changes in my teaching (taking action to execute the plan), and finally evaluated the students' second drafts of mandatory coursework (repeated reflection/debriefing). I provide a detailed account of each of the stages next.

## **Reflection**

**Course assignments.** The first step in this action research project consisted of an evaluation of students' first drafts of mandatory coursework. Due to institutional constraints, summative assessment in the course in which this project was undertaken is restricted to a final paper (lesson plan and reflection) and an individual oral exam. Therefore, I conducted ongoing formative assessment to identify strengths and weaknesses in my teaching and introduce changes as needed. I usually used the checklist of the best teaching practices provided in Samples and Copeland (2013; adapted from Wankat & Oreovicz, 1993). Even though I believed that my instruction fulfilled most of the "good teaching" criteria (Samples & Copeland, 2013, p. 183), I decided to engage in a more detailed reflection process as I noticed that my students were not achieving the following course outcomes:

- Describe theories underlying various second and foreign language teaching methodologies.
- Identify variables that affect the process of second and foreign language acquisition.
- Apply theoretical knowledge to activity and lesson development and planning.
- Design age- and proficiency-level appropriate English teaching

materials, activities, activity plans, and assessment tools.

**Assessment of first drafts.** The first drafts were evaluated using an assignment rubric (Appendix A). Most of the teachers in this course used the “What? How? and Why?” template to design their lessons focused on the reading of a story book. I did not

impose the use of the template and my informal analysis lead me to believe that the template was not a systematic approach supported by theoretical underpinnings but rather, a commonly used template for lesson planning in Norway. Table 1 presents a short excerpt from one student’s first draft.

Table 1  
*Excerpt From a Student’s First Draft*

Time	What to Do	How to Do It	Why I Do It
7 minutes	Clarify the task (write alternative story ending) and criteria.	Talk to the class, and hand out the criteria on paper. See if anyone has any questions regarding the task.	To give the needed information both in writing and orally.
15 minutes	Pair them up.	Working with a partner.	To give them the opportunity to communicate and collaborate.

Based on the analysis of the lesson plans, the following challenges were identified:

- Lessons were teacher-centered (e.g., teachers stated the lesson goals) versus student-centered (e.g., brainstorming with students to activate their schemata).
- No content and language objectives were stated.
- Students were typically told to read aloud and explain unknown words in the core activity.
- Whole class discussion was the most common activity in the follow-up stage.
- Students were asked to draw their favorite character from the book or design a front page of a wordbook rather than being engaged in activities that focused on language development.
- Scaffolding was minimal and usually provided through drawings/pictures, body language, and a word bank.
- There was no explicit mention of multiple intelligences (Gardner, 1995), and only linguistic, visual-spatial, and intrapersonal intelligences were accommodated.
- Justifications for the selection of specific activities were weak and intuitive, typically based on personal beliefs rather than relevant theory or research.

In sum, the teachers struggled to make links with language learners’ background knowledge; create learner-centered activities that engaged all eight intelligences (Gardner, 1995); select activities that were linked to the learning objectives; provide sufficient scaffolding or assistance in completing tasks; ensure a balance between explicit focus on language forms and functions; and develop communicative competence. They also

were unable to use theory or current research findings to justify their pedagogical choices. These conclusions prompted me to undertake a close examination of my own teaching and to adjust my practices.

### Plan of Action

#### Assessment of instructional practices.

The second step in the research cycle

consisted of the evaluation of my teaching practice. Course activities from the first half of the semester, amounting to nine hours of instruction, were examined. I performed a detailed analysis of the types of activities that I used in my lectures, classifying each as either implicit, explicit deductive, or explicit inductive. I also identified each activity as either an experiential learning or loop input activity (see Table 2).

Table 2

#### *Analysis of Course Activities*

Session Topic	Activity	Activity Type	Delivery Method
SIOP model	SIOP components: instant expert/jigsaw	Explicit inductive: students ‘assemble’ the model in a collaborative task	Loop input: instant expert is modeled using course content
Communicative language teaching	Venn diagram: compare and contrast foods you like and dislike	Implicit: students model the activity	Experiential learning: language task appropriate for elementary school learners
Teaching grammar	Guided lecture notes	Explicit deductive: students complete lecture notes while listening to the lecture	N/A

The results confirmed that I practiced “good teaching” (Samples & Copeland, 2013, p. 183). I found that I used a lot of tasks that reflected my belief in the superiority of constructivist approaches to learning, such as collaborative loop input and experiential learning tasks. The majority of the activities also were cognitively demanding, as they engaged students in analyzing, creating, comparing, and explaining, which are associated with high cognitive demands (Anderson & Krathwohl, 2001; Bloom et al., 1956). In addition, I noticed that I preferred explicit inductive or implicit tasks. Instead of

introducing a topic and lecturing on general principles, I engaged my students in tasks in which they analyzed the materials and arrived at conclusions independently. For example, they read and presented new information using a graphic organizer, became topic experts, and then taught new information to their classmates. Other times, they experienced language tasks by actively participating in them. On the rare occasions when I chose to lecture, I provided students with guided notes to engage them with the material (Larwin & Larwin, 2013).

## Pedagogical Practice: Scaffolding and the Loop Input

The analysis above seemed to suggest that my teaching practices conformed to my beliefs about good teaching. However, a closer look at the delivery of several

experiential and loop input activities revealed that I provided my students with limited scaffolding and opportunities to debrief and reflect on their own learning process. Table 3 provides examples of the activity analysis procedure that I used for an in-depth reflection on my teaching.

Table 3  
*Analysis of Experiential and Loop Input Activities*

Activity	Teaching Phase 1	Teaching Phase 2	Debriefing	Scaffolding
SIOP components: instant expert / jigsaw (loop input)	Group work to become experts on an assigned SIOP component	New groups and reciprocal teaching	N/A	N/A
Venn diagram: compare and contrast (experiential learning)	Write a list of foods you like and dislike	Compare your list with a partner; find similarities and differences	N/A	Graphic organizer, but no modeling about how to use it
Bingo: key terms (loop input)	Make bingo cards using key terms	Play bingo using cards from Step 1	N/A	Minimal: an example of a bingo card
Student generated questions about a text (loop input)	Write skinny and fat questions about a text on some aspect of teaching theory	Students answer each other's questions	N/A	Teacher models one skinny and one fat question

As I analyzed each activity, I noticed that students had several opportunities to engage in active learning. The activities were engaging, interactive, and cognitively demanding. Nevertheless, I expected my students to complete challenging tasks outside of their zones of proximal development (ZPD: Vygotsky, 1978) independently, and I almost never provided them with the chance to reflect explicitly on the learning process in class. I realized that I had become so focused on implementing inductive and implicit

teaching that I ignored the possible benefits of explicit instruction.

### Action

**Pedagogical practice: Combining deductive and inductive learning.** Based on my analysis, I identified the following areas of weakness in my teaching:

- Over-reliance on inductive and implicit teaching methods.

- Lack of reflection/deconstruction in experiential learning and loop input activities.
- Minimal scaffolding during student-centered activities.

As a result of my intense focus on using learner-centered teaching methods, I overlooked the importance of explicit learning processes. Explicit teaching is not limited to lecturing, which I use sporadically, but also can be implemented by intentionally drawing students' attention to content. For example, students can be asked to figure out rules or to reflect on a task they have completed (Prince & Felder, 2006). In teaching methods such as loop input or experiential learning, this means that participants should have an opportunity to suspend their participation in the activity being modeled in order to analyze it (Woodward, 1988, 2003). Finally, the results of my teaching reflection suggested that I used insufficient scaffolding, assuming that my students were able to act as experts and create ZPD for each other without external help from the instructor.

To address these weaknesses, I implemented revised teaching practices in the second half of the semester. I did not abandon active learning practices for the sake of lecturing, but I set a goal for myself to help students make explicit links between the content of the course and real-life applications (e.g., their classrooms: Blumenfeld et al., 1991). In addition to stating the learning objectives at the beginning of each class, I also drew students' attention to the objectives throughout the lesson (Bloom et al., 1956; Echevarría et al., 2013). Whenever an activity or a teaching method was modeled, we also took time to debrief and reflect (Woodward, 1988, 2003). Moreover, I added various scaffolding techniques to create learning conditions that enabled students to develop with support from their peers and myself

(Bruner, 1961). I used task modeling and clear examples, and asked cognitively demanding questions. I modeled and encouraged the use of various graphic organizers as well as physical and verbal tools to help students recall prior knowledge (Echevarría et al., 2013).

Finally, I invited my students to participate in the creation of an improved lesson-planning template. I asked them to consolidate the major findings from applied linguistics, language learning and teaching, and second language acquisition theories to create an enhanced tool for their lesson planning. They were explicitly instructed to include the principles of communicative language teaching, content-based instruction, Gardner's theory of multiple intelligences (1995), SIOP model (Echevarría, et al., 2013), and Bloom's taxonomy (Bloom et al., 1956). This engaged them in critical thinking and helped them apply the core course concepts in their own classrooms.

The majority of the students initially followed the "What?, How?, Why?" template when planning lessons for their final course project. As we engaged in a discussion about good teaching practices and effective lesson planning, as well as undertook a summary of the key concepts covered in the course, the participants suggested that we add "When?" to the template. The revised template reflected the EFL/ESL lesson-planning framework proposed by Brinton and Holten (1997) consisting of the following stages: *into* which focuses on activating students' schemata; *through* which is the core component of the lesson and where students learn new language and content; and *beyond* in which students apply learned skills, content, and language to new contexts. In particular, I was impressed with their suggestion to include this addition to the lesson-planning template as, while I had followed the model in my delivery of the course, it was

not until I added the deconstruction step to my implicit modeling that my students noticed and acknowledged this practice as valuable and relevant.

### Repeated Reflection

**Assessment of second drafts.** Following the implementation of modified instruction, the students submitted their second drafts of the assignment, which were compared to their first drafts and evaluated using the assignment rubric (Appendix A). Overall, the second drafts

exhibited greater conscious planning and better integration of course concepts. The lesson plans followed the template students had generated during the collaborative activity. The lesson plans also included detailed content and language objectives to guide each lesson. Most of the objectives were written using Bloom’s taxonomy (Anderson & Krathwohl, 2001; Bloom et al., 1956), and the students’ applied theoretical concepts and practical skills learned during the course to justify their pedagogical choices. Table 4 illustrates these improvements.

Table 4  
*Excerpt from a Student’s Second Draft*

When	What to Do	How to Do It	Why I Do It
Into 15 minutes	Activating schemata and introducing the task and criteria (write alternative story ending).	In small groups, students arrange pictures in chronological order and recreate the story.	To activate background information (retell the story).
Through 25 minutes	Write alternative story ending.	Students select story elements (who, what, where) and rewrite the story ending in small groups.	To provide opportunities for collaborative learning (interpersonal intelligence), output, interaction and negotiation of meaning.

Overall, the main improvements noted in the second drafts can be summarized as follows:

- Lesson plans were organized logically and followed a detailed template.
- Content and language learning objectives were stated.
- Student-centered activities were present as well as teacher-centered learning activities.
- Teaching activities and strategies that had been modeled in the course were present in the lesson plans (e.g., instant expert, mind maps, making predictions).
- There was increased use of authentic materials and prompts.
- There were explicit and implicit references to different intelligences.
- Students manifested reasoning based on language teaching theory and methodology, increased their use of professional terminology, and provided in-depth reflections.

- Students correctly applied the following key concepts: building background, increasing motivation, activating schemata, providing meaningful input, enhancing metacognitive skills, reflecting on the learning process, developing predicting skills, and using collaborative learning strategies.

The repeated reflection, which consisted of a detailed analysis of the second drafts, concluded this action research project. However, as I continue to reflect on my teaching practice, I believe that the findings presented here apply to all my courses.

Action research has serious limitations. Without the implementation of direct measures, it is impossible to determine to what extent other variables affected the results. Factors such as instruction time, student attitudes, and feedback on the first drafts likely also played a role in facilitating student development. Nevertheless, it seems that, at least locally, ongoing assessment of teaching methods and continued reflective practice can positively impact student success.

### **Conclusion**

The goal of this paper was to report on an action research project conducted in an EFL endorsement course aimed at improving pedagogical practices in the course. Shim and Walczak (2012) argued that in order to teach critical thinking skills effectively, college instructors needed to develop their ability to “organize the class presentations, formulate and ask challenging questions in class, give clear explanations about abstract concepts, and encourage students to apply course concepts” (p. 25). The project presented here involved reflecting on my own teaching practice (Hart et al., 2004) in order to identify the characteristics of

course activities that can increase students’ critical thinking and thus improve the attainment of course objectives. The findings suggested that more cognitively demanding tasks, in particular tasks that require analysis and reflection (Anderson & Krathwohl, 2001; Bloom et al., 1956), consistent with the decompression stage in the input loop (Woodward, 1988, 2003), increased students’ abilities to apply learned knowledge to new tasks. In addition, inviting students to participate in the creation of a detailed, explicit paradigm to guide their lesson planning resulted in most students being able to create a logically sequenced lesson based in applied linguistics theory.

Research on effective teaching in higher education has identified several approaches as effective in promoting students’ learning and cognitive growth. In particular, inductive, learner-centered teaching activities, such as collaborative tasks that engage higher order thinking skills, have been deemed effective (Bain, 2004; Samples & Copeland, 2013; Shim & Walczak, 2012). My pre-intervention teaching methods were based in constructivism, and I fostered active, collaborative learning in my classes. Nevertheless, I realized that I needed to make some modifications if I wanted my students to achieve the course objectives. My findings lead me to conclude that a one-size instructional approach does not fit all students’ needs. Each class is comprised of individuals with varying needs and learning styles, and thus, needs to be planned accordingly. While overall, it is important to engage students in active learning tasks, it is crucial for teacher educators to conduct ongoing formative assessment of student attainment as well as their own teaching in order to implement pedagogical practices that are best suited for their classrooms.

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## Appendix A

### Course Assignment and Grading Rubric

#### Learning goals

You will be able to:

- Select and adapt grade level appropriate instructional materials for your students
- Write grade level appropriate language learning objectives
- Select and prepare activities that promote the specified language learning objectives
- Design a lesson plan following the INTO-THROUGH-BEYOND model. Your lesson plan must include at least one communicative activity and a grammar point (which can be taught implicitly or explicitly)
- Develop writing skills associated with writing an academic text in English

#### Components of the assignment

The assignment consists of a lesson plan and an essay in which you reflect on your pedagogical choices and the delivery of the lesson.

**Lesson plan:** Your lesson should focus on a story book and be planned for about 90 minutes of instruction time. You can assume that it is one of the lessons in a sequence – if so, briefly explain what your students already know and what will happen next. Select the following components of your lesson:

- a) Topic
- b) Lesson objectives including language (i.e. grammatical/functional structure such as subject-verb agreement, tense, aspect, greetings, apologies). Remember that the language and the activities you select have to be grade-level appropriate – consult the relevant objectives for English language learning in the national curriculum if necessary.
- c) Activities
- d) Materials

You have to use the Into-Through-Beyond design. State the time you predict for each activity. Create and include supplementary materials whenever possible (e.g., handouts, power points, materials to be used on a Smartboard), and list the ones you cannot include (e.g. a link to a video, a book or a game you would be using). You can adapt materials that you have already used with your students or that are available to you as a part of the course package provided by the school. Be creative!

**Essay:** Write a 2-3 page essay in which you justify the choice of objectives, materials, and activities for your lesson. In your paper, make at least three references to the required course readings. Your paper should have the following sections (1-2 paragraphs each):

- a) An introduction - a brief description of your lesson (topic/theme, objectives, strategies)
- b) Objectives – What objectives did you select for your lesson? (i.e. What do you want your students to be able to do? Are you teaching the language point implicitly or explicitly? Why?)
- c) Into – What activities did you select for the Into stage and why?
- d) Through – What activities did you select for the Through stage and why?
- e) Beyond – What activities did you select for the Beyond stage and why?
- f) Reflection – Reflect on the teaching of this lesson. Were you able to engage your students? Were the activities easy/difficult to implement? Did you meet the objectives? What would you do differently next time you teach this lesson?
- g) Conclusion – a summary of the main points and a closing statement
- h) A list of references – list all sources you have referred to in your text. Please remember to use correct in-text citations as well.

## Grading Rubric

Criterion	Points (0-3)	Comments
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**Lesson plan**

The lesson is centered around a story  
 Lesson objectives are stated and are measurable (do NOT use verbs such as 'know' or 'understand'; refer to Bloom's taxonomy for appropriate verbs)  
 The objectives include specific language goals, and these include vocabulary and a grammar point  
 All activities are grade-level appropriate  
 The lesson plan follows the INTO-THROUGH-BEYOND model  
 The lesson plan includes at least three SIOP components  
 All supplementary materials are either included (whenever possible) or described  
 Time predicted for each activity is stated

**Essay content**

The essay contains a brief description/overview of the lesson  
 Each of the sections of the lesson (Into, Through, and Beyond) and the selected activities are described and justified  
 The essay contains a detailed reflection on pedagogical choices and the implementation of the lesson  
 The main points are summarized in a conclusion  
 There are at least three references to the required readings

**Essay format**

The essay is logically divided into paragraphs (sections)  
 The formatting is consistent (font size and style, margins, page numbering)  
 The essay is written using grammatically correct, academic English, including correct punctuation and capitalization

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# HOW TEACHERS REFLECT ON THEIR PEDAGOGY: LEARNING FROM TEACHERS' PEDAGOGICAL VOCABULARY

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**Abstract:** *This paper considers the importance of teachers' beliefs and pedagogical awareness in relation to their teaching practices. The paper draws on findings from an in-depth qualitative study of ten teachers of adult learners over a period of eight months. The study examined the potential of learning in practice and explored how teachers reflect on their pedagogy. In this paper, I consider what these reflections tell us about the choices teachers make about their practice. The findings reveal that teachers' gut feelings play a significant role in shaping their thoughts and beliefs and in informing their choices and teaching practices in class. I suggest, however, that these teachers' everyday practices do not hold pedagogical learning potential on their own, as individual teachers are not all capable of taking advantage of the opportunities offered to them in their everyday teaching. The study reveals that over time – when working with teachers' beliefs during the process of writing and discussing – their pedagogical awareness strengthens and they are more capable of taking advantage of the opportunities offered to them in their everyday teaching.*

**Keywords:** teacher beliefs, teacher education, teacher reflection, teacher thinking, teacher vocabulary

## Introduction

Although teachers develop professional skills through formal teacher training, including pre-service and in-service training programs, teachers also acquire knowledge about teaching through their teaching experiences (Darling-Hammond, 1999; Richardson, 1996). Because teachers spend most of their time in the classroom it is reasonable to assume that a great deal of their competency and skills develop there too. A wealth of research explores the knowledge, skills, and awareness required of teachers of adult learners and suggests that teacher knowledge is constantly in the process of development (Merriam, Caffarella, & Baumgartner, 2007). Therefore, in many ways, teachers can be regarded as adult learners themselves. However, little is known about how teachers draw on their experiences in the classroom to develop their teaching practices. In this paper, I explore what

Schön refers to as a “swampy lowland” (1983). The swampy lowland metaphor highlights the situation where practitioners do not necessarily “make effective use of research-based theory and technique” but, as leaders of learning, articulate and justify their choices through “trial and error, intuition, and muddling through” situations that are often “confusing ‘messes’” (Schön, 1983, p. 42). An investigation of how teachers' reflection processes inform their professional growth could deepen our understanding of the internal and often invisible mechanisms that affect teachers' professional decisions and shape the experiences of those with whom they interact.

This paper draws on a qualitative study of teachers teaching adults in the adult learning context. It examines the potential of learning in practice and explores how teachers reflect pedagogically and what these reflections tell us about the choices

teachers make about their practice. In the first section, I draw on the literature to explain the concept of *learning to teach*. Next, I briefly discuss the importance of continuing professional development in teacher education and highlight literature that describes research on teacher thinking. In the remaining sections I describe the research design and participants. Next, I present the study's findings and explore teachers' pedagogical awareness through three levels of reflection. The paper concludes with a discussion of the study findings including connections to the literature.

### **Defining *learning to teach***

The knowledge of teaching as theory and practice, or what Leinhardt (1990) refers to as "craft knowledge" suggests that "expert teachers possess a practical knowledge of their craft..." which can be considered "contextualized knowledge" (p. 19). However, assessing craft knowledge is not an easy task because the contexts in which educators teach are complex, multilayered and variable (Leinhardt, 1990). The field of adult learning specifies that learning "rarely occurs in splendid isolation from the world in which the learner lives; ...it is intimately related to that world and affected by it" (Jarvis, 1987, p. 11; as cited by Merriam et al., 2007, p. 5). Therefore, it may not be meaningful to separate *what* the teacher knows from *how* he/she performs what he/she knows. Teachers' practices and contexts in which they act are key to personal cognition and learning (Greeno, 1997; Putnam & Borko, 2000). The notion that cognition is situated and social explains that much of what individuals do and think is intertwined with the contexts in which they act. Elbaz (1983) and Clandinin and Connelly (1987) explored the construct of *practical knowledge* as the foundation for much of the research on teacher thinking. The construct explains how teachers understand or know the teaching situation in a

classroom, and is similar to Schön's (1983) notion of *knowledge-in-action* and Fenstermakers' (1994) understanding of *teacher knowledge/practical*, (knowledge through experience). This entanglement of knowing and knowledge and situation calls on the perspective of embodied knowledge, a knowledge that is more than cognitive but is a kind of knowing where actions are inseparable from persons. Accordingly, teachers' thought processes and experiences must be considered when we examine processes of learning and decision-making that make up tacit knowledge. These considerations are exemplified in teacher education and continuing professional development (CPD), the topic of the next section.

### **Teachers' Continuing Professional Development (CPD)**

Recent literature on teachers' CPD emphasizes that when teachers investigate, experiment, discuss and reflect on their teaching, and when they collaborate with fellow teachers, they become better informed critics of their practice (e.g., Atkinson & Bolt, 2010; Hammerness et al., 2005; Woolhouse & Cochrane, 2010). Critical reflection has long been considered essential in the development of teachers' professional autonomy (Calderhead, 1989; Zeichner & Liston, 1987). This article builds on the ideas of Dewey (1910) and the work of Schön (1983), which suggest that when teachers develop professionally, they engage in research on their practice. In this process, teachers are considered reflective learners who explore their own teaching and development of opinions and attitudes (Elliott, 2004).

Dale (1998) distinguishes between three levels of competency (C) in the context of what he calls "educational rationality," or the communicative act of teaching that gives "priority to goal-setting, planning, and evaluation" (p. 256):

C1. The carrying out of teaching (teaching activities).

C2. The construction of teaching programs, curriculum, and lesson planning.

C3. The communication and construction of a theory of teaching plans, the act of teaching, and pupils' learning process.

Dale's (1998) construct of educational rationality offers an ideal foundation for the teaching profession. While investment must be made in both C1 and C2 levels, teachers also must incorporate C3 - reflection and dialogue. In other words, teaching is not only a technical act but requires a combination of these three levels of competency. Level C3 articulates the importance of collaborative peer reflections and underlines the synergy between the *why* (theory) and *how* (method) in teaching and education. Teachers' practical reasoning must not preclude attention to C3 and C3 should be an integral part of teachers' workdays. A focus on all three levels reminds educators not to let the *how* dominate so that teachers only focus on and search for teaching concepts as the solution to better teaching or only measure learning in terms of student outcome. Rather, the incorporation of the third level of meta-discussions and thinking helps educators consider the *why*, which is unpredictable and open to constant negotiation (Biesta, 2009).

### **Teacher Thinking – Focusing on Beliefs as Predictors of Actions**

Research on teacher thinking suggests there is a strong connection between teachers' actions and beliefs – sometimes understood as knowledge (Craig, Meijer & Broeckmans, 2013; Richardson, 1996). Similarly, much of this research recognizes that beliefs are the foundation of action and a major determinant of behaviour. Although the construct *belief* is complex and is associated with the construct

*knowledge* (Lund, 2011; Pajares, 1992; Richardson, 1996), knowledge commonly is understood as consisting of facts whereas beliefs are regarded as opinions. However, beliefs can be much stronger predictors of behaviour and far more influential than knowledge in determining how individuals organize and define tasks and problems (Nespor, 1987). By studying the beliefs that inform teachers' thinking, educational researchers are in a better position to understand the processes that guide teacher behaviour, judgment, decision-making, and planning (Biesta, Priestley, & Robinson, 2015; Nespor, 1987). Even when teachers accept information from others "they filter it through their own personal belief system, translating and absorbing it into their own unique pedagogies" (Kagan, 1992 p. 75). Teachers lean towards their prior "implicit theories," beliefs, and experiences when learning to teach (Clark & Yinger, 1977, p. 295). Increasingly, teachers' histories – both personal and professional – are thought to play an important role in what they learn from professional development experiences (Ball & Cohen, 1999). Research shows that teacher experiences and reflections-on-action/practice may lead to changes in and/or additions to beliefs since beliefs and actions are interactive (Calderhead, 1996; Fenstermacher, 1994; Mansour, 2009; Richardson, 1996). When teachers engage others in discussions related to classroom practice, a form of reflection, teachers are better able to evaluate and learn about their teaching. In my study, I was interested in understanding how teachers of adult learners rationalize and articulate arguments for their planning choices with learners (Brinkmann, 2007; Pendlebury, 1990).

### **Research Design**

Following Giorgi's (1985) phenomenological process, this study explored learning from a first-person

perspective. I used thick description and triangulation to deepen the analysis of the data and support the validity of the study. For example, I used an open coding process that was data-driven (Miles & Huberman, 1994), employed Nvivo qualitative data analysis software to maximize transparency (Lund, 2015), and distilled hundreds of open-ended themes down to 61 themes. Furthermore, to understand the teachers' process of reflection on the *why* and *how* in education, I studied both the tacit aspects of teachers' unspoken beliefs and their actual actions/performances. Building on Dale's (1998) 3rd level of competency, C3, I also examined teachers' ways of thinking before, during and after teaching.

The study included several stages (see Appendix A). First, I focused on teachers' experiences in specific situations. For example, teachers were asked to document their experiences by addressing several open-ended questions in reflective journals, to which I had access. This type of approach enabled me to consider the teachers' thoughts alongside various actions and events. Second, I built on the teachers' journal entries to develop an interview guide, which I used to conduct individual semi-structured interviews with the teachers. Third, I conducted observations in the teachers' classrooms. Fourth, I conducted a second round of semi-structured interviews with the teachers. In all stages, discussions between the researcher and the participants were designed to uncover connections between teachers' practices and beliefs including practical reasoning and arguments (through elicitation and reconstruction) behind their practice (Fenstermacher & Richardson, 1993).

I also was informed by the following five premises of a practical argument (Fenstermacher & Richardson, 1993, p. 106-107):

1. The value premise: statements describing the benefit derived from an action.
2. The stipulative premise: statements that interpret, provide meaning, or offer theoretical rationale for the activities under inquiry.
3. The empirical premise: statements that are empirically tested and can be supported or rejected through scientific methods.
4. The situational premise: Statements that clarify and describe the context for the action.
5. An action or intention to act: the conclusion of a practical argument. Teacher reasoning becomes a topic for inquiry only after the teacher has acted.

Data collection and analysis of the teachers' vocabulary and reflections also used Toulmin's model of argumentation. The model of argumentation is a method of reasoning. It involves the *fact*, *claim*, and *warrant* of an argument. The fact (sometimes labelled data) is the evidence used to prove something. The claim is what you are proving with the fact (data). The warrant is the principle or assumption that connects the fact (data) to the claim. These three elements of an argument are all regarded as necessary to support a good argument (Horner, 1988). I used this model when analyzing Fenstermacher and Richardson's (1993) five premises of reasonable, warranted practical arguments.

### **Participants**

Ten teachers of adult learners (3 males and 7 females) volunteered to participate in this study. Participants' teaching experience ranged between 1-27 years (see Appendix

B). Their head teachers characterized participants as eager to investigate and question their own teaching. Interviews were conducted in Adult Education Centres (AEC) in Denmark over a period of eight months (see Appendix B). All participants were teachers at the AECs. In Denmark, all students who attend AEC's and participate in general qualification educational settings are 18 years old or older and are therefore considered to be adults. These students have attended compulsory school but may not have passed exams. AEC classrooms present a range of challenges for teachers since classrooms are heterogeneous, provide courses at the lower-secondary, upper-secondary, and post-secondary levels (Lund, 2015) and include students with a range of life experiences, educational backgrounds, personalities, and learning styles and needs. In the next section I explore findings that emerged from the teachers' journal writing and my interviews and observations of these teachers. Of significance was teachers' vocabulary (how they talked) and how it affected their ability to reflect pedagogically or to be pedagogically aware.

### **Teachers' Pedagogical Awareness**

The data analysis revealed three levels of reflection, or the use of different pedagogical vocabulary, among teachers about their practice: Random Non-Pedagogical Justification (R), Random Pedagogical Justification (R+), and Specific Pedagogical Justification (R++). These levels offer important insights into teachers' pedagogical awareness. The following sections elaborate on each theme as described by the teachers.

#### **Random non-pedagogical justification – gut feelings.**

At this level, teachers' arguments contain random justifications for their reasoning.

With reference to Toulmin's model of argumentation, at this level, facts are justified based on experience (what Toulmin refers to as warranty). Practical arguments are based on a value premise. At this level, the teachers' pedagogical vocabulary is largely non-existent.

The interviews illustrate that teachers tended to develop effective routines through repetition. Teachers used words and phrases such as, "I usually do this," "habit," "a bag of experiences," "routine," and "my own gut feeling." Also predominant in teachers' vocabulary were embodied phrases such as, "I constantly keep my ear to the ground," "I feel and sense the room and the students." They also used emotionally charged words such as: "sweating," "crying," "anxiety," "frustration," "stress," "tension," "feeling," "awareness," and so on. Teachers' responses suggest that they relied mostly on what they labelled as their *gut feelings* and their *learning styles* and referred to their learning experiences both as children and in teacher training. The teachers learned from experience primarily while teaching through trial and error. Surprisingly, effective routines did not necessarily depend on a pedagogically justified foundation relating to the pedagogical awareness of teaching, as outlined in Fenstermacher and Richardson's (1993) five premises of a reasonable, warranted practical argument. The findings showed that the teachers' rationale was weak both in everyday practice and when discussing their practice. The findings showed that teachers' pedagogical vocabulary and reflections were sometimes only vaguely grounded in educational arguments. The findings also revealed a complexity about teachers' reflexive practices. My primary findings revealed that routine practices learned through trial and error were mainly based on gut feelings and unreflective testing in practice. For example, when teachers were asked to describe an

unsuccessful situation, one teacher recalled the following situation where experiences and trials did not generate solutions to classroom challenges,

The best I could think of was to try to discipline ‘let us try to...’ or ‘Peter, now you must listen’ etc.... The situation ended up with my throwing one of the guys [an adult learner] out. Then there was peace; it was as quiet as a morgue. The operation was successful but the patient died... I felt taken by surprise, had no cards to play apart from showing who decides in the classroom. (Teacher A)

Another teacher shared a similar situation in a journal entry, describing challenges with disengaged learners who prefer to use the Internet during class, which annoyed other students.

I hate to scold the students as I experience it as a kind of impotence. And basically I feel a sense of powerlessness in relation to the actual class... I feel sort of helpless, both professionally because I do not think the students benefit from the lesson, but also educationally/pedagogically because I do not like having to ask the students to close computers and put away cell phones and stuff. Without being able to put my finger on why, I have not found the right way to address this and I end up just letting myself be irritated. (Teacher B)

These statements demonstrated that the teachers’ practice does not in itself offer a pedagogical learning potential. What is illustrated here is that a pedagogical dilemma emerged when teachers’ impotence becomes evident and their practical experience seemingly failed to provide educationally sound solutions. All participants described similar dilemmas and described situations where they failed to find solutions based on trial and error.

Teachers recounted and remembered these situations as horrible and frustrating. However, a small part of the teachers’ trial and error approach did lead some to engage in considerations of and reactions to broken routines, abrupt occurrences, or sudden change. Dewey (1910) understood these occurrences as “problems” or problematic situations that change an individual’s way of thinking and knowing. For Dewey (1910), a problematic situation emerges when one experiences sudden change that “perplexes and challenges the mind so that it makes belief ... uncertain” (p. 9). This approach is elaborated in the next sections.

### **Random pedagogical justification – topic and test related.**

At this level, teachers’ arguments used more random pedagogical justifications to support their reasoning. With reference to Toulmin’s model of argumentation, facts were justified in part on pedagogical grounds, but were still mainly based on assumptions grounded in their experience. The practical argument contained one or more of the five premises for a practical argument. The teachers’ pedagogical vocabulary was articulated.

At the R+ level, teachers’ vocabulary included superficial reference to pedagogy. At this level, teachers might justify their teaching practice in relation to curriculum and tests. For example, in an interview, I asked Teacher A to elaborate on an entry in her journal where she said she was keen on making students wonder in her lessons. As Teacher A explained, “I’ve read about the wondering in the official curriculum guidelines [her fact/data] from the Ministry of Education [the warrant].” She later elaborated on how she tries to make the students wonder and think critically about topics and described how she “uses more modern social media such as *Youtube* and homepages ... because the students are such terribly weak readers and they need

something to refer to in order to pass the exam.” In this example, her fact/data and warrant are related to the students’ low ability to learn.

Teacher A further elaborates on why she uses social media and movies to help the students to think critically. She makes this argument:

And by showing small video sessions and stuff, you [the students] can actually get a feeling for a subject and knowledge on some themes and stuff that is much harder if you have to read it. So in that sense you can say that pictures in this context can sometimes say more than a thousand words. (Teacher A)

In this sense, the teachers’ arguments for the *why* in teaching often related to the official curriculum demands (testing), but teachers rarely made connections between testing and their choice of methods. The teachers’ reasoning on the *why* and *how* was illustrated in the following observation, taken from my field notes, “Teacher D is saying that the class is doing a web quest on the specific topic and some experiments in the laboratory in order to prepare the students for the summer tests.” In this scenario, the teacher’s argument for the *why* of teaching is unrelated to the *how* of teaching.

### **Specific pedagogical justification – juggling between thoughts and practice**

In the final level, teachers’ arguments contained more thorough pedagogical justifications. In reference to Toulmin’s model of argumentation, facts are justified mainly on pedagogical warranty (assumptions). At this level, there is proficient juggling between C1-C2-C3. Moreover, the practical argument entails the main part of the premises for a practical argument. At this level, teachers have mastery of pedagogical vocabulary.

Interviews revealed that when teachers made pedagogical justifications grounded in the how and why of education, a new level of reflection was reached. This level combined each of Dale’s (1998) three levels of competency (C1, C2 and C3). For example, Teacher B explained her underlying thoughts about teaching in her journal, noting her frustration with students who just wanted categorized facts and who resisted focusing on argumentation and discussion or developing a social and philosophical understanding of concepts. Her students felt they needed to be able to quote facts on periods of literature and models for text analysis. Teacher B explained that she did not believe a focus on facts was appropriate for study in the humanities. The teacher used her reflective journal to illustrate her concern. In her entry she described an experience taking her class to visit an art exhibition at the museum and explained how she had faced resistance from a student who did not understand what she could gain out of the visit. When asked to elaborate on this example during the interview the teacher said:

If I had been a little more honest, I would have said to her: ‘This/it doesn’t matter at all, what matters is that we are in a process where we experience something’. But instead I said to her that ‘It’s true it’s hard, I want to help you with some more structures on the subject’. I think that Danish as a subject contains levels of abstractions that can be very high. And there is also a limit to how much I want to reduce art just to make it clear and understandable. So I talked with the students about Bloom’s taxonomy and abstraction levels, and about being independent and to move away from interpreting the text closely and refer more to one’s own thoughts and even draw some independent conclusions. But whether or not the student got the point, I do not know. I think it takes

some time to adjust and learn. Sometimes it's just like a coffee machine where the coffee drips slowly through the machine. It may well be that the students have not got my point right now, but it could be that there will be a coffee production at some point because it simply works in the subconscious. (Teacher B)

Teacher B's reflections connected conclusions and facts. Her considerations showed how she is grounded in the pedagogical considerations of performing, planning and justifying her teaching.

### **Teachers' Practices – A Space for Learning when Supported**

All participants articulated the benefit of having to share their reflections with others. Being included in a research project also encouraged teachers to reflect on their teaching. Teacher B provided a powerful statement about the role of written reflection in her professional development, likening the experience to a litmus test (and indicative of individuals' opinions of a subject).

When I've been writing this, it was amazing how much it's about myself ... You could suddenly see some things. Yes some patterns and the moment you see them, then you start – you might be able to work a little with them ... Maybe something that has been developing gradually.... the moment you suddenly see that then things have a certain colour and then thinking, well, it's there, I have to work. So in this way there will be a move in a new direction ... [like using] Litmus paper! (Teacher B)

Similarly, when responding to the question (in an interview) "what circumstances could have changed the unsuccessful situation for the better" (see Appendix A), Teacher C explained that such instances

encouraged her to think and act differently when faced with similar incidents. She added that she benefited from participating in the study, noting that she would like to incorporate this form of reflection on her practice into her daily routine.

... It is nice to be able to sit down quietly and point-by-point and then just write a little because I am not accustomed to ... It was especially the last question 'what will you do?' or the coaching-style question 'what will you do differently next time?' (Teacher C)

Teacher C added that the journal writing exercise changed her perspective on her classroom and made her more aware of her actions. This awareness allowed her to make successful changes that addressed previously problematic situations. Her new vocabulary and ability to articulate her teaching experiences ultimately helped her tackle and meet students' needs more effectively.

### **Summing Up – Teachers' Vocabulary and Pedagogical Awareness**

In sum, these teachers' everyday teaching practices do not in themselves offer a pedagogical learning potential. Rather, teachers' experiences highlight the difficulties they faced taking advantage of the pedagogical opportunities offered to them in their everyday teaching. An exploration of teachers' vocabulary revealed that teachers' gut feelings (R) took up most of their thinking. Teachers spoke to the different levels of reflection as follows: (R) = 131 quotes, R+ = 77 quotes, R++ = 35 quotes. Thus, teachers most frequently developed and reconstructed their practical arguments at the (R) level and their teaching practice was based mainly on gut feelings rather than on pedagogical justifications. However, teachers did engage at the R+ and R++ levels, indicating that their experiences talking and writing about their

teaching reflections as participants in the project highlighted that they were capable of providing pedagogically justified and sound arguments that worked with their beliefs.

### **Discussion and Concluding Remarks**

The findings demonstrate that teachers learned from experience and often engaged in trial and error approaches to their practice. Although this may not be surprising, it is nonetheless concerning that their routines did not seem informed by pedagogical rationales or a pedagogical awareness of teaching. The findings demonstrated that teachers who lack an educational and pedagogical vocabulary tend to rely on their gut feelings (R) and seldom grounded their teaching practice in pedagogical theory. Actions were based mainly on feelings, and these feelings were seldom related to a higher pedagogical goal, such as the level C3. However, when teachers were supported through collegial dialogue, supervision, and debate they tended to develop a deeper understanding of their beliefs and actions (R+ and R++), a finding supported in the Continuing Professional Development (CPD) literature (Atkinson & Bolt, 2010; Hammerness et al., 2005; Woolhouse & Cochrane, 2010). Building on this CPD literature, this research draws attention to the importance of teachers' prior classroom experiences and beliefs about teaching in the development of pedagogical awareness.

This study suggested that teachers may benefit from critical pedagogical reflection that exposes the hidden aspects of their everyday teaching. The study illustrates that it may be rewarding to engage teachers in a reflective dialogue about their actions and beliefs in relation to their teaching goals, highlighting the interrelationship between actions and beliefs. My data analysis suggests that in the absence of solutions to problems in their classrooms, teachers tended to

overemphasize gut feelings rather than pedagogical theory when they reflected on their practice. Working with reflective journal writing (Kaplan, Rupley, Sparks, & Holcomb, 2007; Surbeck, 1994), developing practical arguments (Fenstermacher & Richardson, 1993), playing the part of a critical friend (Baskerville, Goldblatt, & Ccje, 2009) or acting as the devil's advocate in epistemic interviews (Brinkmann, 2007) with colleagues or researchers – could have potential benefits to routine practice particularly if teachers are considered as researchers of their own practice.

This study showed that when teachers explained their practical reasoning by articulating a practical argument, they became empowered with a meta-perspective on their teaching. The interaction between different competence levels is achieved when working with practical arguments. The idea that research can simply be internalized by teachers must be dismissed as the practical reasoning behind the teaching practices takes place in a complex and personally orientated situation. The dialogical approach therefore generates pedagogical questions to support reflection by encouraging teachers to develop their pedagogical vocabulary. The dialogical approach has the potential to help teachers make sense of the basis for their actions. Teachers' reflection on and work with expanding their vocabulary and pedagogical awareness is a process that may benefit them in making sense of experience and developing their non-tacit knowledge.

Although many school reforms seek to establish team building and knowledge sharing, teachers remain relatively isolated in their classroom. When working with the development of the professions, it is still teachers' personal reflections and actions that take up most of the working day. There is room for improvement in this area

if we are to steer away from a purely technical approach to teaching. The paper recommends that we should strive for active dialogical participation in a collegial learning community, an argument that is in line with international literature (Flores, 2006; Mansour, 2009). Moreover, if teachers' preconceptions are not addressed

through dialogue or other means, teachers may retain problematic beliefs throughout their programs and careers. Opportunities to reflect through writing and discussion, as illustrated in this paper, can support and foster different approaches to teaching and learning.

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## Appendix A

Teachers were asked to address the following questions in their reflective journal writing:

<p><b>1. Please describe a successful teaching experience you've had.</b></p> <ul style="list-style-type: none"><li>• Try to think of your teaching within the last couple of days or weeks and try to describe a specific successful situation from the classroom.</li><li>• If you have a hard time remembering a specific present situation you may think further back in time.</li><li>• Describe the situation as detailed as possible.</li><li>• What happened? What did you do?</li></ul>
<p><b>2. Please describe why this specific situation was successful in your opinion?</b></p> <ul style="list-style-type: none"><li>• Try to describe what it was about the situation that made it successful in your point of view?</li></ul>
<p><b>3. Please describe what have affected that the situation turned out well?</b></p> <ul style="list-style-type: none"><li>• Try to describe what might have affected the situation in a positive way?</li></ul>
<p><b>4. Please describe a unsuccessful teaching experience you've had</b></p> <ul style="list-style-type: none"><li>• Try to think of your teaching within the last couple of days or weeks and try to describe a specific unsuccessful situation from the classroom.</li><li>• If you have a hard time remembering a specific present situation you may think further back in time.</li><li>• Describe the situation as detailed as possible. What happened? What did you do?</li></ul>
<p><b>5. Please describe why this specific situation was unsuccessful in your opinion?</b></p> <ul style="list-style-type: none"><li>• Try to describe what it was about the situation that made it unsuccessful in your point of view.</li><li>• For instance point to the obstacles.</li></ul>
<p><b>6. Please describe what have affected that the situation did not turn out well?</b></p> <ul style="list-style-type: none"><li>• Try to describe what might have affected the situation in a negative way?</li></ul>
<p><b>8. Please describe what circumstances could have changed the unsuccessful situation for the better?</b></p> <ul style="list-style-type: none"><li>• Try to describe what you think might have contributed to the situation had not been unsuccessful/unsatisfactory.</li><li>• What could, for example, have been done differently?</li><li>• What could you do differently in a similar situation?</li></ul>
<p><b>7. Please describe what happened after the unsatisfactory/unsuccessful teaching situation?</b></p> <ul style="list-style-type: none"><li>• Try to describe what you where thinking or how you acted or reacted just immediately after the failed situation.</li></ul>

## Appendix B

Data collection took place over a period of eight months during the fall of 2011 and spring of 2012.

Informant pseudonym	Sex Female or Male	Age	Years of experience of teaching	Date and year of receiving the teachers' reflections journal	Interview #1: On the basis of the teachers' written reflection journals	Length of the interview #1: Hours, minutes, seconds	Date, year / time of observation	Number of classes	Teachers' subject during observation	Interview #2 Date and year	Length of interview #2: Hours, minutes, seconds
A	M	42	11	Sept. 17. / 2011	Sept. 19. 2011 / 12:30 PM	1:03:14	Jan. 10. 2012 / 10:05 -11:45 AM	2	Social science	Jan. 10. 2012	0:40:49
B	F	40	7	Oct. 05. / 2011	Oct. 07. 2011 / 10:00 AM	1:18:54	March 22. 2012 / 02:45-03:30 PM	1	Language	March 22. 2012	0:43:27
C	F	35	3	Oct. 04. / 2011	Oct. 06. 2011 / 02:00 PM	1:05:00	Jan. 11. 2012 / 08:05-09:45 AM	2	Language	Jan. 11. 2012	0:42:00
D	F	46	13	Oct. 10. / 2011	Oct. 12. 2011 / 01:00 PM	1:15:02	March 21. 2012 / 10:05-12:45 AM	2	Geographic	March 21. 2012	1:32:59
E	M	30	1	Sept. 27. / 2011	Sept. 29. 2011 / 08:30 AM	0:56:20	Feb. 22. 2012 / 08:05-08:55 AM	1	Social science	Feb. 22. 2012	0:19:47
F	F	49	22	Sept. 04. / 2011	Sept. 06. 2011 / 11:00 AM	1:20:20	March 28. 2012 / 08:05-10:55 AM	3	English	March 28. 2012	0:53:09
G	M	61	25	Oct. 23. / 2011	Oct. 25. 2011 / 10:00 AM	1:25:52	Feb. 29. 2012 / 12:05- 01:45 PM	2	Language	Feb. 29. 2012	0:36:06
H	F	48	6	Sept. 12. / 2011	Sept.12. 2011 / 09:00 AM	1:01:38	March 01. 2012 / 12:05-01:45 PM	2	Language	March 01. 2012	0:39:00
I	F	56	15	Sept. 11. / 2011	Sept. 13. 2011 / 10:00 AM	1:05:31	Feb. 24. 2012 /11:05-12:50 AM/PM	2	Language	Feb. 24. 2012	0:42:20
J	F	52	17	Sept. 17. / 2011	Sept. 19. 2011 / 02:00 PM	1:05:55	Feb. 23. 2012 / 01:00-01:45 PM	1	Social science	Feb. 23. 2012	0:29:55
<b>Text in total*</b>				<b>10 written reflection journals</b>	<b>10 interviews Interview #1 = 12 hours of interviews</b>		<b>18 classes= 13 hours of observation 10 pieces of handwritten field notes from 13 hours of observation during class</b>		<b>7 different subjects/ disciplines</b>		<b>10 interviews Interview #2 = 7 hours of interviews</b>

\*50 pages of transcription per informant= transcriptions in total= 500 pages of text excluding the handwritten field notes contained in Nvivo during the analysis.

# MENTORING: A KEY TO THE PROFESSIONAL DEVELOPMENT OF THE TEACHER

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**Abstract:** *The teaching profession has a long history of providing mentorship to mentees (budding lecturers) through focused, collaborative, and one-on-one relationships. However, despite new lecturers' ongoing need for guidance and assistance, mentoring is relatively neglected as a concept in institutions of higher education. This study explores the concept of mentoring in higher education institutions to ascertain whether different mentoring strategies and approaches can be utilized to support junior researchers who are in need of guidance, coaching, and assistance. In this study, purposively sampled mentors and mentees were interviewed about their views of, and experiences with, mentoring. The study extends beyond the mentoring research and highlights that mentoring can promote unintended outcomes due to its dynamic nature. The article also addresses how both the mentor and mentee play important roles in the success of the mentoring process. The article concludes with recommendations for mentoring programs.*

**Keywords:** mentor, professional growth, development, education

Bozeman and Feeney (2007) point out that "more than 500 articles on mentoring were published in management and education literatures during the 10 years leading up to 1997" (p. 720). However, the vast majority of this mentoring research emerged in the 1980s and 1990s (e.g., Burke, McKenna, & McKeen, 1991; Burke & McKeen, 1996; 1997; Dirsmith & Covaleski, 1985; Fagenson, 1989; Noe, 1988; Ragins, 1997; Thomas, 1990). Despite this abundance of studies, the literature on mentoring remains "less useful than one might hope because fundamental, conceptual, and theoretical issues have been skirted. Findings are abundant but explanations are not" (Bozeman & Feeney, 2007, p. 720). The dearth of recent theoretical and conceptual studies on mentoring suggests that mentoring has been neglected as an essential developmental activity. This neglect has implications for the promotion of research in higher education institutions

where budding academics benefit from mentoring to develop their research capacity.

Bozeman and Feeney (2007) argue that the concept of mentoring is a complex and complicated process. To illustrate this complexity, the authors ask the following questions: a) is mentoring different when the mentor is the protégé's employer or supervisor at work? b) is acknowledgement required for a mentoring relationship? c) who is the mentor? d) must the mentor and protégé like one another? e) what part of knowledge transmission is mentoring and what part is not? f) can groups mentor individuals? and g) when does mentoring begin and end? Notwithstanding Bozeman and Feeney's (2007) position, this article explores how application of different strategies and approaches can develop our theoretical and practical understanding of mentoring processes in institutions of

higher education. As we elaborate below, mentoring is a multifaceted process that can take place almost everywhere that there is a need for assistance and guidance.

The varied definitions of the concept mentor suggest that how an author uses the term may depend on individual preference. For example, the concept of mentoring can refer to acts of accompanying, respecting, collaborating, listening, and trusting in which the mentee, someone who is in need of assistance and support, is entrusted into the hands of a well-informed and intelligent person who can formally and confidently provide guidance and help. Kram and Isabella (1995) point out that “mentors provide young adults with career-enhancing functions, such as sponsorship, coaching, facilitating exposure and visibility, and offering challenging work or protection all of which help the younger person to establish a role in the organisation, learn the ropes, and prepare for advancement” (p. 111).

Wikipedia provides over 50 definitions of mentor. Mentoring can be formal or informal and mentors may be any age or at any stage of life, although they generally have expertise in the area in which they are mentoring. Jones, Harris and Miles (2009) explain that, “in academia mentoring appears to concentrate on the development of the person” or mentee (p. 273). For Callan (2006), “mentoring is a recognised activity concerned with the supported professional development of practitioners in work-based practice” (p. 16). Overall, the goal of mentoring is manifold and includes: raising and improving levels of research output; improving levels of individual or institutional research co-operation; or grooming new cadres who should take over when the older generation retires. Whatever the goal, a mentor “should not see their mentee as someone with a problem but as a young person with much

to offer in the relationship and who just needs some additional support” (Dolan & Brady, 2012, p. 109).

## **Rationale**

### **Career Development**

Several studies have noted that individuals’ opportunities for career development are enhanced when they have mentor support (Gabaro, 1987; Kram, 1985; Levison & McKee, 1978; Roche, 1979). These studies suggest that mentors can empower mentees when they use strategies such as coaching and role modeling and when they involve mentees in challenging assignments (Hansford, Tennent, & Ehrich, 2002; Hobson & Sharp, 2005). Knowledge and the art of knowing can remain isolated phenomena when not nurtured and incubated through well-designed mentorship programmes. Given that universities and colleges as well as departments within different institutions are under pressure to increase research output, mentoring can guide, assist and support scholars to increase their productivity and realise their objectives. When experienced researchers engage in mentorship practices, young and budding researchers may be motivated to venture into current and unexplored fields of research, increase their research productivity, and bolster their innovation and creativity. Not only is this increase in research productivity significant for the mentee, but a high research capacity is often a marker of a successful higher education institution and country.

### **Institutional Research Capacity**

In this article, we are motivated to consider the value of mentoring as mentoring can support the research capacity, productivity, and reputations of struggling institutions. Universities with different classifications can have disproportionate access to resources,

which in turn affects research output. For example, in South Africa, 23 universities are classified as Historically Disadvantaged Institutions (HDIs) or Historically Black Institutions, (HBIs) and Historically Advantaged Institutions (HAIs) or Historically White Institutions (HWIs). These classifications are the result of the apartheid dispensation that favoured white institutions over Black-based or founded institutions. Table 1 lists the top ten universities in Africa in 2011. The top four African universities (leaders in research output), are formerly Historically White Institutions. The other six are Historically Black Institutions. These HBIs have been resourced poorly and have not been able to function as optimally (in terms of research output) as their White counterparts. Of the universities listed in Table 1, none are former Black South African universities (HDI/HBIs). From the onset, Black institutions of education have received the fewest resources compared to Indians, Coloureds and Whites respectively. The Study Commission on U.S Policy towards South Africa (1981) identified this issue early on, highlighting that, “African education is markedly inferior to White education. To a lesser extent, the education of Coloureds and Indians is also inferior” (p. 113).

The information in Table 1 also provides a gloomy picture when one compares the research output of the top ten universities in the African continent with universities around the world. In 2011, no HBI/HDI universities were featured. Historically, Black universities were referred to as bush colleges because they were built in secluded rural areas in the Black homelands where there were no industries to sponsor them. They struggled to attract qualified staff and to raise resources to render them functional and viable. In 1994, the new democratic government, comprised of a majority of Black parliamentarians, promised to address these inequities by providing resources for

the Historically Disadvantaged Institutions. Despite these efforts, HBIs continue to face considerable resource deficits. “The funding of universities must address the plight of disadvantaged institutions while ensuring that the relatively advantaged institutions ... remain internationally recognized and competitive” (Department of Higher Education and Training, 2013).

Mentoring programs enhance an institution’s research capacity. Mentoring has been found to increase professionalism, scholarship and research output because its singular aim is for experienced researchers to guide, assist and support budding researchers on their journey to becoming responsible, independent and self-sufficient academic intellectuals. As Hamilton (in Hein & Nicholson, 1986) suggests, “mentoring is an old and honourable way of assisting a neophyte in a profession” (p. 143).

**Reciprocal Benefits: Ubuntu.** Mentoring is a shared two-way opportunity for learning and growth between the mentor and the mentee. Although the mentee gains knowledge, skills, experience, support, guidance and assistance, the mentor gains experience and insight into how he or she can employ new mentoring techniques and approaches. The acquired knowledge also helps mentors to plan an effective programme that can address the needs of a mentee more effectively. The concept of Ubuntu highlights the importance of the reciprocal benefits of mentoring. In English, Ubuntu means a human being is a human being because of other human beings or I am because we are, and since we are, I am. Letseka (2000) and Shutte (1994) argue that Ubuntu implies an interactive ethic in which our humanity is shaped by our interaction with others as co-dependent beings. With a value system of Ubuntu at the foundation of the mentoring process, individuals can effectively network in institutions of

higher education and forge healthy partnerships that support the growth and development of scholars. Mentoring also helps novice scholars to obtain advice,

information, feedback, and coaching that improve their self-esteem.

Table 1  
*The Top Ten Universities in Africa, July 2011*

University	Ranking in Africa	Ranking in the world
University of Cape Town (UCT)	1	324
University of Pretoria (UP)	2	507
Stellenbosch University (SUN)	3	540
University of Witwatersrand (WITS)	4	699
University of KwaZulu Natal (UKZN)	5	729
Rhodes University (Rhodes)	6	1083
University of the Western Cape (UWC)	7	1156
Cairo University (CU)	8	1219
University of South Africa (UNISA)	9	1221
Makerere University (MU)	10	1256

Note. Adapted from the Ranking Web of World Universities, July 2011 ([http://www.webometrics.info/en/Ranking\\_africa](http://www.webometrics.info/en/Ranking_africa)).

### Theoretical Framework

Despite the importance of mentoring in institutions of higher education, no applicable theory of mentoring is available. Bozeman and Feeney (2007) demonstrate “the difficulty of using existing research and theory to answer fundamental questions about mentoring” (p. 720). As Keller (2007) explains, “despite longstanding interest in mentoring as a means to influence children's lives, a solid theoretical and empirical literature addressing important issues involved in youth mentoring has only begun to

emerge” (p. 24). Similarly, Bozeman and Feeney (2007) caution, “we nominate *mentoring* as an outstanding illustration of limited progress in theory for a topic that is obviously important and amenable to convenient measurement” (p. 719). To this end, we must understand the mentoring “concept as a precursor to theory” (Bozeman & Feeny, 2007, p. 724). In the absence of a relevant theory of mentoring, this article draws on theories of motivation and on Maslow’s hierarchy of needs to understand mentoring as a concept. We also present a Johari Window model to illustrate the relationship between

individuals in a mentoring partnership.

Hamachek (1990) outlined key elements of motivation, suggesting that where extrinsic motivation pushes us from the outside, intrinsic motivation pushes us from the inside. Extrinsic motivators are most effective at starting one's motivational machinery while intrinsic motivation is usually necessary to keep that machinery going. For Hamachek (1990), praise is a more powerful motivator than criticism of work performance; praise that is specific and contingent on actual success works best. He explains that confident, high self-esteem students both want and need a high level of personal and intellectual challenge. However, the ability to motivate students is not a gift given to a chosen few but is the result of hard work and careful planning.

Motivation is key to the mentoring process. Mentors provide extrinsic motivation that can ignite the mentee's intrinsic motivation and interest. In other words, a mentor can inspire self-confidence in the mentee that in turn develops their individual empowerment. A relationship based on motivation, mutual respect, trust and understanding is key to empowering the mentee by helping them develop the knowledge and skills needed to succeed in a career. A constructive mentor-mentee relationship that builds a mentee's confidence and self-esteem seems the best strategy to achieve desired skills, knowledge, values and attitudes that a mentee requires to become a successful academic scholar. Drawing on Hamachek's (1990) understanding of motivation, we suggest that successful mentoring requires rigorous work, meticulous planning, and face-to-face encounters in a one-on-one relationship.

The hierarchy of needs theory (Maslow, 1954) is useful for our discussion of mentoring. Maslow (1954; as cited in Hamachek, 1990) presented five levels of

human needs that are hierarchically arranged from lowest to highest. The lowest needs (and most essential for human survival) are: food, water, sleep, oxygen, and sex. The highest human needs include the acquisition of new knowledge and an understanding of issues and activities central to human survival. These central activities might include investigating, examining and exploring one's environment to make meaning of human existence. Sometimes these activities are used to discharge fairness and justice in situations where people are interdependent and interrelated. Although the high level needs are not life threatening, they are important because they lead to self-actualization, self-discovery and self-realization. The majority of people survive without knowing their significance. In between the lowest and the highest needs there also is a host of middle level needs that inform our lives. How individuals prioritize their needs along this hierarchy informs their motivation to achieve.

In academic contexts, individuals may meet the highest need and achieve self-fulfillment through the publication of articles, chapters, books, and by mentoring junior colleagues. Engaging in research activities can propel motivated academics towards achieving high levels of performance in a field of scholarship. By definition, budding researchers are individuals who are on a journey of discovering their true potential as scholars. Exceptional mentees are naturally inquisitive about their selves and are motivated inwardly/intrinsically by the need to discover their intellectual strengths and weaknesses as potential researchers.

As Lall and Sharma (2009) explain:

The aim in any group should always be to develop the 'open area' for every person, because when we work in this area with others we are at our most effective

and productive and the group is at its most productive too. The open free area, or 'the arena', can be seen as the space where good communications and cooperation occur, free from distractions, mistrust, confusion, conflict and misunderstanding. (p. 138)

To this end, Carper (1978) is of the view that “[o]ne does not know *about* the self; one strives simply to *know* the self” (p. 18). It is through knowing the self that one is able to relate to another human being as a person. This view is of significance to both the mentor and the mentee as they engage each other in matters of self-discovery, self-realization and self-actualization through acts of mutual enrichment and development. Generally, a

common desire to know and to experience life through self-discovery as an intellectual should contribute to a successful mentor-mentee relationship.

We use the Johari Window (Luft & Ingham, 1955) to illustrate four possible mentoring relationship scenarios. As illustrated in Figure 1, there are four possible mentoring relationships that can unfold depending on the willingness and ability of mentor and mentee. The variable *willingness* represents the environmental factors associated with either intrinsic or extrinsic types of motivation that may influence a mentee to achieve on a higher level. The variable *ability* represents a mentee’s inherent gifts and talents, which a mentor seeks to unfold and maximize in a mentoring relationship.

1. Willing and Able	2. Willing and Unable
4. Unwilling and Able	3. Unable and Unwilling

Figure 1. A quadrangle illustrating possible mentoring relationships.

The first quadrant, *Willing and Able*, depicts a win-win situation for both mentor and mentee. In this scenario, incentives such as assistance, support and guidance motivate the mentee to participate in a potentially empowering mentorship process. A mentor who is given incentives like a pay raise or promotion will likely be motivated to conduct a sterling job supporting the mentee. A mentor who is willing and able to assist, guide and support a willing and capable mentee is likely to enhance a mentee’s skills, knowledge and practice of conducting research. The scenario portrays a mentoring relationship with the most likelihood of success. In this scenario, the task of mentoring is made easier for both the mentor and mentee because both are

endowed with positive virtues like *willingness* and *ability*. This scenario advances the view that experienced, willing and able mentors are essential for a successful mentoring relationship.

The second quadrant, *Willing and Unable*, depicts a win-lose scenario. Here, the mentee may be willing to learn but is unfortunately not gifted or talented enough to accomplish their goals. Although hard work coupled with the use of incentives can, to some extent, produce positive results, in this situation there is less guarantee of success. This scenario depicts a situation that calls for patience and might be characterized by the saying, *where there is a will there is a way*. Although all mentees lack some form of knowledge and

therefore seek mentors to develop their capacity to conduct research, the less knowledge and skills mentees possess, the more difficult it will be for them to succeed regardless of their willingness or motivation. In this scenario, a mentor must be well equipped to deal with challenges that arise when a mentee is willing but not necessarily capable of mastering the skills and art on conducting research as required.

The third quadrant, *Unwilling and Able*, depicts a lose-win scenario. In this scenario, the mentee has the ability to achieve but is unwilling to cooperate or be helped by a mentor. Although the use of incentives might motivate the mentees to engage in and benefit from a mentoring relationship, ultimately this situation is likely to yield poor results.

The fourth and last quadrant, *Unable and Unwilling*, depicts a lose-lose scenario for the mentor and mentee. This situation holds little promise for the mentoring relationship because the mentee is unwilling to be mentored or receive support and does not have the capacity or knowledge to fulfill the exacting tasks associated with doing research work.

Our study builds on the theoretical and conceptual framework of mentoring outlined above. Our objective was to explore mentors' and mentees' views toward the concept of mentoring and ascertain which strategies, methods and approaches might benefit budding researchers who still need guidance, assistance and support as they seek to become full-fledged, self-sufficient, productive academic intellectuals in their fields of research. We suggest that, from a mentoring angle, experienced researchers are best suited to mentor young and developing researchers to grow and develop into successful scholars.

## Methodology

This paper employed a hermeneutic method to study the concept of mentoring. As Higgs (1995) explains, such a method is applicable in a variety of contexts since "...hermeneutics is no longer regarded as being confined to our study of historical text and dialogue – it can also be applied to our understanding of contemporary literary and scholarly works" (p. 12). The researchers used the hermeneutic method not to conduct interviews but to interpret the text of the literary works they had consulted. Abulad (2007) explains "hermeneutics as the art of interpretation" (pp.11-23). In other words, we used hermeneutics to decipher the meaning of the written words as used in the sources we consulted.

The authors used purposive sampling to select interview participants. Purposive sampling "is a type of sampling in which the units to be observed are selected on the basis of the researcher's judgement about which ones will be the most useful or representative" (Henning, Van Rensburg, & Smit, 2004). Five mentees and three mentors were interviewed. Selected participants had the requisite experience of mentoring junior colleagues in scientific research in the field of education. Mentors not only had experience mentoring budding researchers, but as seasoned professors they had worked with Masters and Doctoral students, had published extensively in high impact journals, and had written scholarly books. Interviewees were accessible, information-rich, and willing to be interviewed. We deliberately chose these scholars because of their ability to: describe a typical profile of a mentee; discuss what possibilities should exist for collaboration; and detail what type of cooperation must take place between the mentor and the mentee in order to achieve success. The interviews took place during free periods at one university where the researchers were

employed. The university is a HWI and had merged with two other universities, including one HBJ. The study had ethics clearance to collect interviews and all interviewees provided consent to participate.

All interviewees were asked the following questions:

1. Did you enjoy mentoring or being mentored?
2. Did your association lead to the publication of an article?
3. If you published a paper, who contributed more?
4. Are you still collaborating?
5. Is there anything that you learned from working together?

Data were classified and grouped into two categories: *fruitful/beneficial* mentorship experience or *inconsequential/waste of time* mentorship experience. These two groupings formed themes that were used to determine findings, draw conclusions and make recommendations.

### **Findings and Discussion**

We are interested in how Higher Education institutions make use of mentorship strategies to develop junior researchers professionally and academically so they can actualize and realize their potential as scholars. We referenced literature that suggests individuals can and do benefit from having supportive working relationships (Gabaro, 1987). With regard to the first interview question (Did you enjoy mentoring or being mentored?) participants suggested that mentors and mentees were unhappy with their working relationship, a finding that seems to contradict claims in the literature. Mentors described mentees as lazy, lacking initiative and creativity, and wanting things to be done for them. Mentees pointed out that mentors used them to publish papers without acknowledging their contributions. The

mentees saw the mentoring relationship as exploitative, and ultimately left them feeling discouraged, demotivated and reluctant to continue with the relationship.

According to Thomas (1990), the term developmental relationship is one that provides needed support for the enhancement of an individual's career development and organizational experience. It is also a relationship in which the parties have knowledge of one another and can both potentially benefit. With respect to the second question (Did your association lead to the publication of an article?), there was little evidence of a developmental relationship. Most mentors and mentees explained that their association did not yield good results but only ended with each accusing the other of dishonesty. The mentees reiterated their concerns that the mentors exploited them, while the mentors upheld their view that mentees were lazy and wanted to be spoon-fed.

Jones et al. (2009) explain that when developing a formal mentoring process, the following must be considered:

who will be mentored, on a matching method, the voluntary participation of the mentors needs to be ensured, the rules need to be minimized, while the mentor's personal freedom within the relationship should be maximized. Although these are given points, what should be avoided is the temptation to mechanise this process, thus removing the human element from it. (p. 275)

When responding to the third question (If you published a paper, who contributed more?), interviewees revealed that their mentoring relationship was not founded on any key principles or guidelines, including those that might address collaboration, division of labour, research output or publication credit. Rather, the relationship

between the mentor and mentee appeared to have been left to chance. The misunderstandings resulted in accusations of inequity as both mentor and mentee claimed to have done more work than the other.

The mentoring process is concerned with contributing to professional, academic and personal growth. Such growth is not possible unless there is an atmosphere of mutual respect and trust based on team spirit and that leads to cooperation and a fruitful association (Jones et al., 2009). However, in response to the fourth question (Are you still collaborating?), most participants said they decided to terminate their mentoring relationship and no longer collaborated. This finding highlights the importance of reciprocity and mutuality in any productive mentoring relationship, something that participants articulated was for the most part absent.

Although all mentoring situations are unique, participants' experiences offer useful lessons for developing mentoring partnerships. With regard to the fifth and last interview question (Is there anything that you learned from working together?), both the mentors and the mentees said their experience provided them with knowledge and lessons that they will apply in the future. For example, mentors noted the importance of familiarity, saying they would like to choose their mentee and not to be assigned people they do not know. Similarly, mentees said their experience may have been more positive if they had been assigned mentors with whom they were already acquainted.

Rhodes (2002), a renowned scholar in the area of mentoring, is of the view that "mentoring is a relationship between an older, more experienced adult and an unrelated, younger protégé -- a relationship in which the adult provides ongoing guidance, instruction, and encouragement aimed at developing the

competence and character of the protégé" (p. 3). However, the most common complaints of modern academics are: loneliness, isolation, detachment and depersonalisation, which can lead to faculty "burn out" and ultimately ineffective mentoring (Hamilton, as cited in Nicholson, 1986, p. 149). These challenges often occur in institutions and contexts that lack the networks and partnerships necessary to build strong communities in which such valuable mentoring practices can flourish. Our review of the mentoring literature, including our interviews with mentors and mentees, indicates that a community of practice that fosters collaboration and cooperation and carries goals of mutual benefit and progress is essential to scholars' success. We suggest, as do Anderson and Shannon (1988) that, "mentoring is a nurturing process in which a more skilled or more experienced person, serving as a role model, teaches, sponsors, encourages, counsels and befriends a less skilled or less experienced person for the purpose of promoting the latter's professional and/or personal development" (p. 40).

### **Conclusion and Recommendations**

We offer the following preliminary conclusions and recommendations:

- **Familiarity.** Mentoring relationships are strengthened when mentors and mentees are acquainted before they are assigned to work together. When mentors and mentees are not strangers, but have some familiarity with each other, they are more likely to begin their mentoring relationship from a position of communication and cooperation. These are necessary qualities for successful mentoring experiences.

- Clear expectations. Mentors and mentees benefit when they have clear expectations of the mentoring relationship. To outline these expectations, a memorandum or mentoring agreement is recommended. This agreement should not be imposed but should evolve in the process of dialogue and communication and from a position of mutual understanding.
- Outline of role. Mentors and mentees should begin their relationship with a clear understanding of their roles in the mentoring process. These roles would include clearly laid out understandings

of relevant responsibilities, boundaries and timelines. Understanding these roles early in the process can reduce confusion and resentment and foster cooperation.

In conclusion, a mentoring program with clearly identified, defined and achievable targets is essential to any mentoring venture. Mentoring in higher education institutions would benefit from clear principles and an understanding of the concept of mentoring, rather than approach the relationship from uninformed positions.

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# MATHEMATICS FLUENCY AND TEACHING SELF-EFFICACY OF TEACHER CANDIDATES

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**Abstract:** *Developing high levels of mathematical skills in students is a concern for teachers worldwide, since most of the fastest growing occupations require significant mathematics or science preparation. Teachers need to be prepared to teach mathematics successfully. If teachers are not fluent in simple mathematical calculations, they may not feel confident in applying complex pedagogical content knowledge. This paper explores the association between mathematics fact fluency and mathematics teaching self-efficacy. Fifty-seven elementary teacher candidates completed two assessments. The first assessment was a mathematics fact fluency assessment evaluating the participants' fact fluency for the four basic mathematics operations: addition, subtraction, multiplication, and division. The second assessment was the commonly used Mathematics Teaching Efficacy Beliefs Instrument. Person  $r$  correlations were completed to examine the relationship between mathematics fact fluency and self-efficacy in teaching elementary mathematics. Positive relationships were found between participants' scores on the Mathematics Teaching Efficacy Beliefs Instrument and the addition and multiplication fact fluency scores. Personal mathematics teaching efficacy was related to addition fact fluency with higher teacher candidates' efficacy scores associated with the correct completion of more addition facts. Mathematics teaching outcome expectancy was positively related to addition, multiplication, and total facts completed.*

**Keywords:** mathematics fluency, teaching self-efficacy, teacher candidates, cognitive load

## Introduction

Mathematical fluency is defined as the ability to perform a computation with accuracy, speed, and minimal effort (Cates & Rhyme, 2003; Ramos-Christian, Schleser, & Varn, 2008). To date, much of the available research about mathematical fluency has investigated the effects of fluency on elementary students' abilities, attitudes, and beliefs (Billington & Skinner, 2002; Cates & Rhymer, 2003; Poncy, Skinner, & Jasper, 2007; Ramos-Christian et al., 2008; Therrien, 2004). In general, as students' mathematical fluency increased, performance in mathematical activities improved and mathematical anxiety decreased. However, there is seemingly less research exploring the relationship between teacher mathematical fluency and performance. Presumably, the same associations between mathematical

fluency and beliefs should hold true for teachers as well as students.

## Background

In the United States, the *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics [NCTM], 2000) emphasized computational fluency for all students. NCTM produced a document titled, *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics* (NCTM, 2000). This document stressed, "developing quick recall of basic addition facts and related subtraction facts and fluency with multi-digit addition and subtraction" (p. 14). The *Singapore Mathematics Syllabus* (Primary one to four) also highlighted achieving mastery of basic addition, subtraction, multiplication, and division

facts (Ministry of Education, 2012).

Researchers have (Poncy, Skinner, & Jasper, 2007; Ramos-Christian et al., 2008; Therrien, 2004) suggested that increasing students' accuracy and speed (fluency) for basic math facts can increase their performance in mathematical activities. One explanation for increased student performance may be that automaticity of math facts reduces cognitive demands on working memory. Students who lack fluency may spend more of their working memory on recalling basic math facts, and thus, have less space in working memory to focus on other math activities. Kelley (2008) asserted that basic fact fluency is as central to higher-level mathematics as decoding is to reading. Some students have difficulty in their mathematics class because they are not fluent with their basic mathematics facts (Ramos-Christian et al., 2008). Furthermore, students who can perform fluently with basic mathematical skills are more likely to be successful in applying those skills to new and more advanced mathematical concepts and tasks (Poncy et al., 2007; Ramos-Christian et al., 2008). Researchers found that students who are fluent in basic mathematical skills are less anxious and more engaged in math activities than those who lack mathematical fluency (Billington & Skinner, 2002; Cates & Rhymer, 2003).

The complexity of effective mathematics teaching also can place more demands on the working memory of teachers, thus creating higher cognitive load. Cognitive load describes the total amount of mental effort needed to complete a task. Cognitive load is influenced by the nature of the task (i.e., number of elements that need to be processed, task complexity), and learners' expertise (Antonenko, Paas, Grabner, & van Gog, 2010). The limited capacity of working memory sets the parameters for cognitive load. Since 1956, psychologists have maintained that the brain can only consciously hold between five and nine

pieces of information at any one time (Miller, 1956). When working memory also is used to process the information in some manner, the number of items working memory can hold can drop to two or three (Sweller, van Merriënboer, & Paas, 1998). Thus, the more cognitive processing needed, the less 'space' available in working memory and conversely, the less taxing the cognitive processing, the more 'space' available in working memory. When teachers are able to retrieve math facts easily without calculation, they have more space in their working memory to consider how to modify their instruction so that their students can learn math more effectively.

Teachers of mathematics need to believe that they can teach mathematics effectively to students, as well as that they can perform mathematical tasks proficiently. "To be effective, teachers must know and understand deeply the mathematics they are teaching and be able to draw on that knowledge with flexibility in their teaching tasks" (NCTM, 2000, p. 17). This capacity relates to the "profound understanding of fundamental mathematics" described by Ma (1999, p. xxiii) which was found to be lacking in many elementary mathematics teachers in the United States. The National Research Council (2001) stated that teachers needed to be flexible in their mathematical practice, understanding the full horizon of the mathematics that they teach.

Teacher efficacy may influence teachers' abilities to teach mathematics effectively (Holzberger, Philipp, & Kunter, 2013). Bandura (1997) defined self-efficacy as "beliefs in one's capacity to organize and execute the courses of action required to produce given attainments" (p. 3). Efficacy is task specific and describes individuals' sense of how successful they will be at certain tasks. Pajares (1997) described self-efficacy as "a context-specific assessment of competence to

perform a specific task.” (p.15) Because self-efficacy is task specific, there has been considerable interest in developing task specific scales to measure different types of efficacy (Bandura, 2006). Enochs, Smith, and Huinker (2000) considered mathematics teaching efficacy as consisting of two constructs. Personal mathematics teaching efficacy (PMTE) involves teachers’ beliefs about their ability to be effective teachers. Mathematics teaching outcome expectancy (MTOE) involves teachers’ belief that their instruction can bring about student learning. Teacher self-efficacy is related to student achievement and more productive teaching behavior (Heneman, Kimball, & Milanowski, 2006; Woolfolk Hoy & Burek-Spero, 2005).

Poor mathematics teaching self-efficacy is related to mathematics anxiety (Bursal & Paznokas, 2006; Hadley, 2010; Swars, Daane, & Giesen, 2006). According to Raymond (1997), past school experiences can influence mathematic teaching practices. It may be that mathematics anxiety is caused in part by poor fact fluency. Therefore, low mathematics teaching self-efficacy of some teacher candidates may have resulted from struggles with fact fluency in elementary grades. Teacher candidates who struggle with math fluency also may struggle to achieve high mathematics teaching self-efficacy. In this study, we explored the relationship between mathematics fact fluency and mathematics teaching self-efficacy of elementary teacher candidates. We hypothesized that there would be a positive relationship between teacher candidates’ fact fluency and teaching self-efficacy beliefs.

## Method

### Participants

This study used a correlational design to explore the relationship between 57

elementary teacher candidates’ mathematics fact fluency and mathematics teaching self-efficacy beliefs. The study utilized all the elementary teacher candidates enrolled in a teacher education program during the semester before their student teaching practicum. The teacher candidates were female and ranged between 20 and 60 years of age. The teacher candidates attended a university in Northern Utah, USA.

### Instruments

Each of the 57 participants completed two assessments. The first assessment was a fact fluency assessment that consisted of 100 single-digit addition problems, 100 single-digit subtraction problems, 100 single-digit multiplication problems, and 100 single-digit division problems. The assessment was created using a web-based worksheet generator. The problems for each operation were on separate sheets. Participants’ scores were based on the number of correct answers on each part of the assessment.

The second assessment that the participants completed was the *Mathematics Teaching Efficacy Beliefs Instrument (MTEBI)*: Enochs et al., 2000). This instrument is the one most commonly used in the literature to investigate mathematic teaching efficacy. Each item in the original assessment had five response categories; however, for this study each item was modified to consist of four response categories (see Appendix A). A four-point response scale was used to produce an ipsative (forced choice) measure where no indifferent option was available.

The *MTEBI* consists of two subscales: *Personal Mathematics Teaching Efficacy (PMTE)* and *Mathematics Teaching Outcome Expectancy (MTOE)*. *PMTE* refers to teacher candidates’ beliefs about their own knowledge and abilities in

mathematics to become effective mathematics teachers. *MTOE* refers to teacher candidates' beliefs about their ability to directly affect their students' mathematical learning. For data analysis, some items were reverse coded so that higher scores always represented higher teaching self-efficacy. Subject specific and factorial validity for the *MTEBI* was established by the authors, with Cronbach alpha of .88 for the *PMTE* subscale and .77 for the *MTOE* subscale (Enochs et al., 2000). For this administration, the *PMTE* had a Cronbach alpha of .79 and the *MTOE* was .76.

### Procedure

All teacher candidates participating in the current study submitted a signed informed consent form. The participants were assured that their responses would be kept confidential.

The basic math fact assessments were administered first. Since mathematical fluency is defined as the ability to perform mathematical tasks with accuracy and speed and minimal effort (Cates & Rhyme, 2003; Ramos-Christian et al., 2008), a time limit of one minute for each of the four assessments was chosen. The participants were instructed that they had one minute to complete as many problems as possible for each basic math facts assessment. They were informed that there would be insufficient time to complete all of the computational questions, but that they should complete as many items as possible. The participants were allowed to rest for one minute between each of the operations. Immediately after completing the four basic math facts assessments, the participants completed the *MTEBI* assessment. The *MTEBI* was administered through ChiTester, an online testing program. No time limit was imposed on the *MTEBI* assessment. It is unlikely that completing the math fact assessment

immediately prior to completing the *MTEBI* biased the results as the two assessments measure very different abilities: math facts ability and perceived mathematical teaching ability. Furthermore, mathematical teaching efficacy is a task specific construct, not an overall feeling of confidence.

### Results

Descriptive analyses were generated using the *Statistical Package for the Social Sciences (SPSS)* and presented a range of scores across the variables (see Table 1). The teacher candidates tended to score in the mid-to-high range with an average of 3 (agree) for both measures of mathematics teaching self-efficacy. Most of the participants were novice teachers of elementary mathematics, with some having taught only two math lessons at this point in their education. These ratings were a bit higher than expected based on their lack of experience and may indicate that they were metacognitively unaware.

For the correlational analysis, the mathematics teaching self-efficacy means were used as both were based on the same 1 to 4 scale rather than the scale scores that consisted of unequal numbers of items across the subscales. Pearson product-moment correlation coefficient was used and correlations were considered statistically significant if the p value was less than .05. As expected, the two self-efficacy subscales were positively associated to each other ( $r = .51$ ) as they are both distinct parts of the larger construct. *PMTE* was positively associated to addition fact fluency ( $r = .30$ ), with higher efficacy scores related to increased completion to addition facts.

Table 1

*Descriptive Statistics for Mathematics Teaching Self-Efficacy and Fact Fluency Measures*

Measure	Min	Max	Mean	SD
<i>PMTE</i>	31	50	39.75	4.34
<i>PMTE</i> mean	2.38	3.85	3.06	.33
<i>MTOE</i>	18	29	23.40	2.40
<i>MTOE</i> mean	2.25	3.63	2.93	.30
Addition facts	30	83	57.37	12.58
Subtraction facts	23	68	42.33	9.26
Multiplication facts	23	61	41.19	8.04
Division facts	17	58	33.98	9.18
Total facts	103	264	174.88	33.44

N = 57

*MTOE* was positively associated with the number of addition ( $r = .28$ ), multiplication ( $r = .31$ ), and total facts ( $r = .30$ ) completed correctly. Total self-efficacy was positively associated with addition ( $r = .33$ ) and total facts completed ( $r = .30$ ). All of the four fact fluency operations were positively related to each other (see Table 2).

Table 2

*Pearson's r Matrix for Mathematics Teaching Self-Efficacy and Fact Fluency Measures*

Variable	<i>PMTE</i>	<i>MTOE</i>	EFF	ADD	SUB	MULT	DIV	TOT
<i>PMTE</i> mean	1.00	.506**	.937**	.300*	.182	.130	.198	.249
<i>MTOE</i> mean		1.00	.776**	.280*	.214	.310*	.222	.300*
Total efficacy			1.00	.333**	.219	.221	.235	.304*
Addition				1.00	.786**	.585**	.629**	.907**
Subtraction					1.00	.527**	.664**	.882**
Multiplication						1.00	.589**	.768**
Division							1.00	.837**
Fact Total								1.00

\* $p < .05$ , \*\* $p < .01$ , N=57

*PMTE* mean (*PMTE*), *MTOE* mean (*MTOE*), Total efficacy (EFF), Addition (ADD), Subtraction (SUB), Multiplication (MULT), Division (DIV), Fact total (TOT)

### Discussion

A positive association between teacher candidates' addition and multiplication fact fluency and mathematics teaching self-efficacy was found in this study. Addition is the first basic math operation learned in school, with all other operations learned by linking one problem to a related problem (Garnett, 1992). Since multiplication is the most closely related operation to addition (being repeated addition), it makes sense for addition and multiplication to demonstrate a greater association with mathematics teaching

self-efficacy relative to the other operations.

Teacher candidates who scored higher on the fact fluency tests reported higher total mathematics teaching self-efficacy. This was particularly so in outcome expectancy. It may be that teacher candidates who scored higher on the fact fluency tests used less of their working memory to recall math facts, thus making more working memory space available to think about the teaching process. Teaching mathematics can be a challenging cognitive task that creates a high cognitive load in teacher

candidates. If teacher candidates can recall math facts fluently, their cognitive load may be lessened and they may be more focused on mathematics teaching and thus, be confident in their ability to teach mathematics effectively. As teacher candidates' math facts scores increased, so did their reporting of mathematics teaching self-efficacy. Further research is needed to discern whether increasing teacher candidates' math fluency results in higher mathematics teaching self-efficacy, or whether higher mathematics teaching self-efficacy facilitates math fluency. Although previous research has found a correlation between mathematics teaching self-efficacy, effective instruction, and student achievement, further research also is needed to establish whether increased fact fluency in teacher candidates results in reduced math anxiety.

This research suggests it might be wise to have teacher candidates practice their basic math facts. As teacher candidates become more fluent in their math facts, the demands on their cognitive loads may lessen and allow them to think more critically and effectively about the complex task of teaching mathematics. Practice also may increase their mathematics teaching self-efficacy. Teachers' sense of efficacy repeatedly has been found to impact student achievement (Woolfolk Hoy & Burke-Spero, 2005; Woolfolk Hoy, Hoy, & Davis, 2009). It may be that improving teacher candidates' math fluency positively impacts their sense of efficacy and thus improves future student math achievement as well.

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## Appendix A

### Mathematics Teaching Efficacy Beliefs Inventory (Adapted from Enochs, Smith, & Huinker, 2000)

Please indicate the degree to which you agree or disagree with each statement as a teacher. (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree)

1. When one of my students does better than usual in mathematics, it is often because I exerted a little extra effort.
2. I continually find better ways to teach mathematics.
3. Even if I try very hard, I do not teach mathematics as well as I teach most subjects.
4. When the math grades of students improve, it is often due to my having found a more effective teaching approach.
5. I know how to teach mathematics concepts effectively.
6. I am not very effective in monitoring mathematics activities.
7. If students are underachieving in mathematics, it is most likely due to ineffective mathematics teaching.
8. I generally teach mathematics ineffectively.
9. The inadequacy of a student's mathematics background can be overcome by good teaching.
10. When a low-achieving student progresses in mathematics, it is usually due to extra attention given by me.
11. I understand mathematics concepts well enough to be effective in teaching elementary mathematics.
12. I am generally responsible for the achievement of my students in mathematics.
13. Students' achievement in mathematics is directly related to my effectiveness in mathematics teaching.

14. If parents comment that their child is showing more interest in mathematics at school, it is probably due to my performance.
15. I find it difficult to use manipulatives to explain to students why mathematics works.
16. I am typically able to answer students' questions.
17. I wonder if I have the necessary skills to teach mathematics.
18. Given a choice, I do not invite the principal to evaluate my mathematics teaching.
19. When a student has difficulty understanding a mathematics concept, I am usually at a loss as to how to help the student understand it better.
20. When teaching mathematics, I usually welcome student questions.
21. I do not know how to turn students on to mathematics.

Notes: Items for the two scales were arranged randomly in the *MTEBI*.

The items designed to measure *PMTE* are:

2, 3, 5, 6, 8, 11, 15, 16, 17, 18, 19, 20, and 21.

The items designed to measure *MTOE* are:

1, 4, 7, 9, 10, 12, 13, and 14.

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## REVITALIZING STUDENTS' GEOGRAPHICAL IMAGINATION IN A DIGITAL WORLD

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**Abstract:** *Many geographers have argued that geographical imagination plays a crucial role in geography education. Unfortunately, geography teachers often find it difficult to stimulate their students' geographical imaginations. One emerging concern is to determine how geography teachers can foster their students' geographical imaginations so that they can develop real understandings of the nature and value of geography. In this paper, two possible areas in which IT can serve a role in revitalizing students' geographical imagination are presented. These areas include volunteered geographic information and digital cartography.*

**Keywords:** geographical imagination, information technology, geography education, volunteered geographical information, digital cartography

### Introduction

Imagination and reason are the main mental faculties of human beings (Sallis, 1987), with educators expected to develop both in their work with students. In general, individuals are curious about the world around them, and may imagine places that they have never visited. Individuals also can use reason to discover what is true about the world. Equipped with the two powerful tools of reason and imagination, individuals begin to explore the world in which they live. This natural investigation of space and time has gradually developed into the discipline of geography (Harvey, 1990). However, due to the changing conditions and needs of contemporary society, the disciplinary boundaries of geography cannot be drawn easily. Thus, the discipline of geography has become fragmented and compartmentalized (Harvey, 1990). More positively, new possibilities in information and communication technology including voluntary geographical information (VGI) and digital cartography have emerged that may assist to promote geography as a

cohesive discipline. Specifically, these two technologically enhanced fields have pulled together various fields related to the study of spatial issues (Sui 2004; Tate & Unwin, 2009) and have released geographers' from their previous foci on technical issues.

The shift of focus from technical issues to theoretical and social concerns has called for a rekindling of the geographical imagination. Meeting this challenge requires greater intellectual engagement of geographers towards making geography a more respected and vibrant discipline (Sui, 2004). To date, the new technologies mainly have enabled the reason side of geography, including the study of maps, scales, and coordination. These kinds of studies have gained a dominant role in the discipline, as these aspects of geography can be taught in a systematic manner (Rodríguez, 2010). However, the recent developments of IT also can facilitate teaching and learning of content as well as procedural knowledge of geography (Stoltman, 2006). In this paper, I explore the possibility that similar to reason, IT

can foster geographical imagination.

To some geographers, geographical imagination refers to a mode of thinking and understanding of the world. It involves scrutinizing the relative importance of places and the relationships between one location and other locations (Daniels, 1992; Gilley, 2010). The notion of geographical imagination has received increased attention among geographers. Relph (2014) described geographical imagination as analogous to the thinking of an artist:

The artist must draw upon insight and feelings and literally imagine them into forms that will make an effective connection with the lives of others. The geographical imagination is a particular means of attempting this that is especially valuable for human geography and environmental understanding; it is a way of thinking that seeks to grasp the connections between one's own experiences of particular landscapes and the larger processes of society and environment, and then seeks to interpret these in a manner that makes sense for others. (p. 157)

Likewise, Morgan (2013) emphasized that the notion of thinking geographically is connected to geographical imagination, with this concept frequently applied in discussions about the purposes of geography education. Morgan believed that geography educators should be concerned with geographical imagination because "it taps into the wider notions of what teaching and learning are for, to create and then to nurture the *imagination*" (p. 273).

Information technology serves an important role in many academic disciplines since the proliferation of personal computers in the mid-1970s. Geography is one of the disciplines that has benefitted from the advancement of

IT, with increasing sophistication in digital cartography as well as the rapid development of VGI as a result of Web 2.0. While there seem to have been no systematic studies about how IT can help in nurturing geographical imagination, it is agreed that geography educators can play a role in harnessing the potential of IT in revitalizing students' geographical imaginations (Downs, 2014).

### **Geographical Imagination**

Harvey (1970) was a pioneer in using the term geographical imagination, paraphrasing a similar concept introduced by Wright Mills (1959) concerning social processes and justice (i.e., sociological imagination). Harvey brought together concepts related to individuals' spatial consciousness, personal sense of societal roles, and the social issues and interactions that shape urban social justice (Marcano, 2011). By explicitly combining sociological and geographical perspectives, Harvey introduced the geographical imagination as a kind of spatial consciousness that, "enables the individual to recognize the role of space and place in his own biography, to relate to the spaces he sees around him, and to recognize how transactions between individuals and between organizations are affected by the space that separates them" (Harvey, 1973, p. 23). Harvey proposed that individuals possess a disposition towards linking personal difficulties with public issues that affect society and shape urban landscape. He believed that the necessity to produce or reproduce space is largely dependent on geographical imagination of social systems that are shaped by the interplay of environmental, socio-economic, and political realities.

Geographical imagination can involve individual or collective conceptions about what place should be, how place is produced, and its actuality. Thus, all beliefs, rationales, or negotiations that give

meaning to the political use of space can serve as foundations for geographical imagination (Marcano, 2011). Yusoff and Gabrys (2011) affirmed that geographical imagination is a means of trying to “understand how unifying or dominant views shared by communities, nations, or distinct groups of people are negotiated, consolidated, and reproduced through images (such as maps, diagrams, icons, and descriptive imagery)” (p. 530). Hence, geographical imagination seems to play an essential role in shaping geographical thinking, perceptions, and models of the world (Gregory, 1993). This kind of imagination is not merely a set of images in individuals’ minds, but a reflection of individuals’ *Weltanschauung* or worldview.

Massey (2006) argued that individuals carry mental images of the world. As images are unique to individuals, they may sometimes come into conflict, or they may serve as sources of conflict. Hence, identifying and explicitly discussing these contradictory mental images seems to be a good starting point for examining geographical imaginations. How these imaginations are developed and produced as a result of geography curriculum or a result of the rapid flow of information through the Internet can then be examined. Massey (2006) suggested that, “we can explore, too, how such imaginations have powerful effects upon our attitudes towards the world and upon our behavior. One of our (many) abilities as geography teachers is to unearth these taken-for-granted imaginations and subject them to questioning” (p. 46).

The concept of the geographical imagination seems academic and theoretical at times, but it can be quite practical as well. For instance, the concept has been used in tourism marketing and development (Chang & Lim, 2004), environmental protection, sustainable household practices (Davies, Doyle, &

Pape, 2012), and migration studies (Lin & Yeoh, 2010). Thus, mastery of this concept may help geography graduates apply the knowledge they gain in geography studies for the betterment of society. Hence, geographical imagination is an important disposition for geography students to acquire.

### **Issues in Revitalizing Students’ Geographical Imagination**

The language of geography has consisted of three main elements: literacy, numeracy, and graphicacy (Balchin & Coleman, 1967). These three elements form a unique approach for the study of geography. If these are the key communication elements in geography, then it is impossible for the geographical imagination to exist in isolation from these elements. Hence, before students can develop their geographical imaginations, a firm grasp of these three elements in the language of geography is essential. Thus, geography teachers should integrate IT appropriately in teaching the elements of literacy, numeracy, and graphicacy as well as in fostering of students’ geographical imaginations.

The key concepts in geography are space and place, scale and connection, proximity and distance, and relational thinking (Jackson, 2006). The mastery of these concepts represents foundational learning outcomes for geography students. These concepts, although they involve abstraction, can be taught systematically to geography students. Developing the geographical imagination, however, is different from learning geographical concepts. While geographical imagination is intuitive and spontaneous in nature, the other geographical concepts are relatively well structured and stable. Moreover, geographical imagination is interdisciplinary. The question arises as to how educators can foster geography

students' geographical imaginations effectively.

Spatial information and imagery about previously remote places is now available as a result of technological advancements. For instance, students readily can watch digital videos about tropical rainforests or the tundra regions on *YouTube*. They can gain access to information and images about international migration trends, or interact with computer simulations of landscape formations, plate-tectonic movements, tsunamis, or volcanic activities. All of these tools can assist students develop comprehensive understandings of geographical concepts, possibly leaving less room for imagination. Some believed that students in the pre-digital world tended to develop a different kind of geographical imagination from that developed by digital world students (Downs, 2014). One assumption is that the geographical imaginations of pre-digital world students were more creative and visionary than their digital world peers, as the information these students could receive was limited.

However, it also can be argued that the geographical imaginations of digital world students are more active than those of their pre-digital peers, and that IT can enhance the geographical imaginations of these students as a result of the ample information that is available through Web 2.0 technologies (O'Reilly, 2005). How then, can we foster students' geographical imagination in this digital world, so that they develop a real understanding regarding the nature, value and creative practice of geography? This is a thorny question, with an emerging concern that the advancement of geography may be hindered if future geographers do not have the propensity to think and imagine geographically.

Stoltman (2006) argued that geography education has undergone tremendous changes with the advances in IT. The amount of geographical information available to individuals has increased greatly. The options for organizing such geographical information have become more numerous and more efficient. These developments mean that students have greater opportunities to access and handle geographical information as they learn. Notwithstanding the numerous opportunities offered by the new technologies, there seems to be a growing need to look more closely at the social and personal affects associated with the use of IT (Sui & Morrill, 2004). Although there has been substantial research on the teaching and learning of geography, few studies have been completed regarding the fostering of students' geographical imaginations. This paper explores possible ways that geography teachers may harness IT to improve their students' geographical imagination.

### **Revitalizing Geographical Imagination with IT**

Recent advances in IT may help students to develop a geographical imagination that expedites their exploration of the world. For example, VGI (Fahy & Ó Cinnéide, 2009) and digital cartography (Scoffham, 2013) may engage students in activities that enhance geographical knowledge and foster their capacities for geographical imagination.

#### **Volunteered geographical information.**

Advances in Internet technology have led to a proliferation of information sources that have caused dramatic changes to quantity, accessibility, availability, and nature of geographical information. One significant change that has caught the attention of geographers is the easy accessibility of VGI. According to Flanagan and Metzger (2008), when the general public participates in the provision

of data on various digital geographical platforms, geographical data is increased dramatically. Public participation has been made possible by technological advances in networking and mobile communication (e.g., Wikipedia) that empowers the general public in producing useful, sharable geographical information (Hardy, Frew, & Goodchild 2012; Sui, 2008). Joint efforts between experts and non-experts in using geographical information systems seems like a natural outcome of emerging Web 2.0 technology that invites contribution from the public (O'Reilly, 2005; Wood, 2005). Using a common mapping platform, non-experts can upload photos and information easily onto platforms designed by geographical information system experts. For instance, individuals can upload and share their photos and geographical information on *Google Earth*, one of the most popular geographical information system platforms. Information about particular places that was previously unavailable now can be made available for reference. Moreover, as individuals from the community provide updated information, it is likely to be representative of the community.

There are several initiatives that involve VGI. One of these initiatives is community mapping. Maps have been commonly used in the study of geography, traditionally to abstract reality and show data in an objective manner. Maps have proven themselves very useful, and they are popular tools that are still used widely. Apart from their utilitarian value, maps have also been regarded as cultural artifacts that reflect the geographical imaginations and worldviews of mapmakers (Soini, 2001). The rapid development of information and communication technology has opened up new opportunities for the public to create and use maps. Community mapping has become a popular tool for individuals to show what they value in their

neighborhoods, and thus, to express their imaginations concerning their local communities. In the process of creating community mapping, individuals develop a sense of identity with their localities.

Fahy and Ó Cinnéide (2009) argued that community mapping serves as a repository of socially constructed knowledge. They reported on a community-mapping project where non-expert locals determined what information was recorded and thus available for public access. They argued that such community mapping projects could be used as tools to practice sustainable development. Teachers should encourage students to participate in community mapping projects, as this may help them to develop geographical imaginations regarding their local communities through connecting their experiences with the local environment from a spatial perspective. This practice also might be useful for the students' future studies of other communities at the local, national, or international levels.

Although VGI has enhanced geographical data and, in many cases, has made such information readily available, it also has created issues in terms of credibility and usability. Some of the information posted has not been verified and hence, the quality of available information is not assured (Flanagin & Metzger, 2008). Issues of credibility and reliability threaten the overall value of posted information. Thus, teachers are encouraged to introduce information literacy to their students. Geography teachers should develop students' skills in verifying geographical information. For example, verification of VGI depends on other individuals who know the place well and who report errors to the relevant geographical information system platform (e.g., *Google Earth*). Geography teachers also should inform students about the challenges of too much information and misinformation. Sui (2004) emphasized that as the lines

between computational, spatial, social and environmental dimensions become blurred as a result of the increasingly complex issues associated with the information age, the development of students' critical attitudes towards digital media is crucial. With this provision, using VGI to revitalize students' geographical imaginations seems to be a positive way forward.

**Digital cartography.** Maps, as essential aspects of graphicacy, have been important tools in the study of geography (Balchin & Coleman, 1967). Lydon (2003) described the importance of maps in geography, showing that they have the capacity to link knowledge, learning, and power. Maps attempt to capture specific spatial realities in objective manners, or to serve as cultural products that represent mapmakers' worldviews in a particular space and time. Maps are communication tools or records of geographical imagination. As Soini (2001) stated, maps can be a creative response to "the environmental perception and the geographical imagination of humans" (p. 225). In other words, maps can be objective and require a high level of accuracy and precision, or they may be subjective expressions that represent individuals' imagination or memory of geographical spaces. Cartography is the systematic study and practice of map-making, with this practice traditionally dominated by professional cartographers (Fahy & Ó Cinnéide, 2009). Not until recently, with the advance of IT, has transformational change come to this field of study.

Balchin and Coleman (1967) studied the role of computers in cartography in the 1960s, identifying a number of barriers. At that time, university students attending cartography class used hand-drawing techniques to make maps. The available computing technology was not advanced sufficiently to process large amounts of

graphical data. Balchin and Coleman (1967) explained that, "graphicacy is the most neglected aspect. Digital computers are essentially numerate, and insofar as they master the other skills it is by numerate methods" (p. 120). Nearly 50 years later, the situation has changed greatly as a result of rapid advancement in computing technologies and the increasing networking powers of the Internet. Computers now handle 2-D graphical data and 3-dimensional models efficiently, and can be used to create maps instantly as most base maps are stored in digital form and thus, readily available. Students can then use these digital base maps to create specific maps as needed by applying additional geographical data (Sui, 2004). Students can create on-demand maps that previously would have required hundreds of hours of effort quickly. These developments advance the field of cartography and work to reduce barriers to acquiring the necessary techniques and skills for making maps. As Fahy and Ó Cinnéide (2009) stated, "in recent times maps have escaped the clutches of professional cartographers and are no longer the preserve of an elite discourse" (p. 168).

The process of creating a map can help cartographers reflect on the underlying reasons for producing desired maps. As Scoffham (2013) elucidated:

Maps of many different types and forms are the geographers' stock in trade; and they are not the dry, descriptive documents which they are sometimes thought to be. Every cartographer has to decide what to include, what to leave out, and how best to portray the information they have selected. On one level this means that maps can be regarded as highly imaginative representations of reality. At another level, the complexities of digital mapping and the analysis of spatial information, which is now available using

geographical information systems, represent cutting edge scientific thought. (p. 373)

In this sense, the motive for map making is driven by geographical imagination. At the same time, the process of creating the map is an expression of geographical imagination, with or without the aid of technology. Thus, cartographers' geographical imagination matters in map-making, and this imagination should be honestly reflected in the maps they produce. In making general maps, the practical skills involved are usually more important than imagination, as accuracy and precision are needed for representing the spatial distribution of geographical features and boundaries. In this context, "cartography has been defined as a factual science", and "the premise is that a map should offer a transparent window on the world" (Harley 1990, pp. 3-4; as cited in Sullivan, 2011). In the making of thematic maps, however, a particular theme or idea may overshadow the need for accuracy and precision. Population cartograms are strangely shaped maps used to represent topologically corrected ideas, and thus, inevitably distort the actual shapes and boundaries of the regions being mapped (Dorling, 2012b). This kind of cartogram contrasts sharply with topographic maps that typically demand accurate and precise representations of regions. Imagination is thus a relatively lesser factor in most topographic maps but a greater factor in most thematic maps.

With the affordable access to powerful IT, cartographers can take advantage of these technologies to produce a variety of topological maps provided that the necessary geographical data is available. Dorling (2012a) stated that children's geographical imagination develops over time. Thus, the ways in which individuals draw maps change over time. With access to powerful map-making tools, it is possible that individuals' geographical

imaginings can be more liberally reflected in the maps they produce. If digital cartography is integrated into school geography courses appropriately, then students' geographical imaginings likely will become more active and vivid over time.

## Discussion

IT is an important tool for fostering students' geographical imaginings. Advances in computing and Internet technology have made it possible for students to use VGI and digital cartography. These technological advances may change the ways students study geography. Through VGI, students will be able to interact with geographical data (Flanagin & Metzger, 2008). Using digital cartographical technology will enable students to be creative and produce sophisticated thematic maps that were not producible previously (Fahy & Ó Cinnéide, 2009; Scoffham, 2013). Students may have more time to think and reflect on their learning, rather than attending to the technicalities that were required in the pre-digital world (Downs, 2014).

There have been few studies on the effects of IT on the geographical imagination. However, it seems clear that there is a reciprocal relationship between IT and students' geographical imaginings. If used appropriately, IT may help students foster their geographical imaginings (Stoltman, 2006), with geographical imagination in turn helping to inform how IT can enhance geography information science (Sui, 2004). Clearly, more research exploring the ways that teachers can use IT effectively to foster students' geographical imaginings is necessary.

When studying the many different environmental challenges that the world is facing, students now can *see* instead of imagine the effects caused by natural

disasters in other parts of the world (e.g., earthquakes, tsunamis). The videos and pictures concerning natural disasters that students find on the Internet may provide them with new perspectives towards those disasters in terms of their scale and influences. As students access and gather more information about the world through the Internet, they develop a better understanding of the world. With ready access to relevant information, students are increasingly able to focus their imaginations on the complex socio-geographical concepts involved in asking questions and framing answers. Such skills and concepts require greater intellectual sophistication than is commonly supposed. For example, the energy crisis, global warming, privacy issues related to the emergence of VGI are complex, intricate issues that require geographical imagination in the search for solutions. The role of geography teachers is increasingly significant in fostering this sophisticated but essential skill in the study of geography. Professional development for geography teachers is

required so that they develop their awareness about how they can use IT to develop students' geographical imagination and nurture future geographers.

### Concluding Remarks

Undoubtedly IT plays a major role and has greatly affected the teaching and learning of geography. The infrastructure and hardware exist to facilitate 21<sup>st</sup> century learning. The question is, are educators ready? Teachers clearly play an indispensable role in shaping the future of geography. The provision of advanced technology is a necessary, but not sufficient condition for enhancing meaningful learning. School managers who are willing to allocate necessary IT resources, and geography teachers who are willing to design innovative and IT-enhanced learning activities in their geography classes, also are necessary for meaningful student learning and engagement.

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# IN-SERVICE TEACHERS' PERCEPTIONS OF THE DESIGN AND QUALITY OF MATHEMATICS VIDEOS IN THEIR ON-LINE LEARNING

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**Abstract:** *This investigation is part of a continuing education program in mathematics, directed at in-service teachers in lower secondary schools holding teacher certificates. Online mathematics lessons, offered through a distant education course, consisted of a combination of text and video podcasts. University educators' podcast development was guided by research-based design principles related to e-learning and multimedia instruction. The question arose as to whether in-service teachers enrolled in the course would perceive the podcast design as supportive for their learning. Using questionnaires, this study monitored how in-service teachers perceived podcast quality based on design dimensions. It sought to identify participants' preferences and their recommendations for video development improvement. Key factors for quality included podcast length and the speaker's narration. In-service teachers perceived the podcasts as being useful for their learning processes and indicated efficiency, enjoyment, and concentration as critical learning conditions.*

**Keywords:** design principles, distant education, video podcasts

## Introduction

Multimedia has become an important part of higher education and multiple studies have shown that video podcasts can be highly effective educational tools in university level courses across several disciplines (e.g., Moore & Smith, 2012; Kay, 2012; Vajoczki, Watt, Marquis, & Holshausen, 2010) including mathematics (e.g., Hsin & Cigas, 2013; Kay & Kletskin, 2012; Lloyd & Robertson, 2012; Loch, Gill, & Croft, 2012). Using mathematic videos as resources serves to reinforce content by explaining the subject, demonstrating how concepts and topics relate to each other, mediate screen or black/whiteboard based demonstrations, establish real-world applications and context, provide explanations of specific procedural problems, and present overviews and refreshers of theory (Bukhatwa, Porter, & Nelson, 2013; Kay & Kletskin, 2012). The research literature provides cognitive and non-cognitive considerations and recommendations for the effective design and implementation of educational video podcasts.

Learners need learning resources that they can engage with, with the assumption that they will learn mathematics well and have a rich learning experience when they are provided with resources that they like and want to learn from. In an online course, lecturers may provide video podcasts produced for distance education that incorporate research-based design features and quality content. While instructors aim for podcasts that are of high quality, they may not know which specific aspects of the design make learners feel satisfied or dissatisfied unless the design features are communicated to learners in context of real learning situations. As learners directly respond to the design, they can indicate if the design principles are met or not, to which degree and why, and make suggestions about whether the design approach should be modified or design criteria extended. The purpose of the study was to explore in-service teachers' perceptions of the quality of a sample of video podcasts produced by university educators for use in a continuing university education program in mathematics in

which these teachers were enrolled as students. The study also attempted to identify possibilities for improving the ongoing and further development of educational video podcasts for the teaching of mathematics.

The study is part of a research and development (R&D) project, aimed at developing video podcasts for on-line mathematics lessons that currently are dominated by text information. The video podcasts were all recorded and edited using screencasting software, and contained a mix of textual, visual, and vocal instructional elements, including text, mathematics formula, calculations, drawings, paintings, photographs, graphs, diagrams and tables, and recordings of dynamic graphic, animation and voice-over narrations. They were used to supplement and reinforce portions of a lesson rather than provide a complete presentation. Little research seems to have been done in this area, especially with respect to the use of online text mathematics lessons with edited screencast-based videos embedded in a tabloid fashion.

This paper is structured as follows. Firstly, the research question is presented. Secondly, the theoretical framework is described and a literature review provided. Thirdly, the methodology of the work is explained. Then, the results are presented, analyzed and discussed. Finally, some remarks on future work conclude the article.

### **Research Questions**

This investigation, as part of the R&D project, examined students' experiences with podcast design in a continuing university education mathematics online course. The course was directed at in-service teachers in lower secondary schools holding teacher certificates. Each online lesson contained text and video podcasts that comprised the majority of the

educational content. The for-credit course was delivered entirely online, and in-service teachers were learning at a distance. Video podcasts were developed following research-based instructional design principles, standards, and models. In-service teachers engaged with the video podcasts in a natural, authentic online learning situation. This work sought to gain participant feedback about how the design quality was perceived, in order to improve future video podcasts. Accordingly, the research questions were:

1. How do in-service teachers participating in a continuing university education program perceive the quality of video podcasts with respect to particular design principles?
2. How do in-service teachers' perceptions of the quality of video podcasts help improve further development of educational video podcasts for the teaching of mathematics?

### **Theoretical Framework**

The research literature provides cognitive and non-cognitive considerations and recommendations for the effective design and implementation of educational video podcasts.

### **Cognitive Design Principles**

The Cognitive Theory of Multimedia Learning (CTML; Mayer, 2001) is a theoretical framework that explains how multimedia benefits learners as well as provides design guidelines for the production of educationally effective multimedia materials. The theoretical framework incorporates earlier research about human memory and learning in the field of cognitive psychology. It draws on a number of well-established theories and models including Miller's (1956) concept of chunking, Baddeley and Hitch's model of working memory, Paivio's (1986) dual-coding theory, and Sweller's (Chandler & Sweller, 1991) theory of cognitive load.

Miller (1956) proposed that chunking mechanisms (i.e., the combining of a number of pieces of information into units) can increase individuals' abilities to extract information for recall. Baddeley and Hitch (1974) proposed that the visual and verbal processing of tasks can be performed concurrently as well as separately. Paivio (1986) complemented their model, claiming that nonverbal and verbal information are stored separately in long-term memory and can have additive memory benefits for recall. Chandler and Sweller (1991), based on research exploring the architecture and capacity limits of human working memory, suggested that instructional materials should be designed to reduce demands on cognitive load associated with the processing of unnecessary information. As cognitive load theory developed and more instructional effects were identified, evidence-based recommendations for instructional designers were developed with the intention of optimizing the use of working memory, notably when processing both visual and verbal sources of information (Clark, Nguyen, & Sweller, 2006; Sweller, Ayres, & Kalyuga, 2011).

CTML is based on three principles: the dual-channel assumption, the limited capacity assumption and, the active processing assumption (Mayer, 2003, Mayer & Moreno, 2003; Sorden, 2013). Mayer and his colleagues found evidence that the use of multimedia learning material (i.e., combined visual and auditory/verbal information) can reduce cognitive load imposed on working memory. The theory states that visual and narration information is processed in two separate channels of working memory and produces visual and auditory/verbal mental representations that integrate with prior knowledge to build new knowledge. Active learning requires learners to carry out the coordination of these cognitive processes.

CTML focuses on best practices related to the use of multimedia materials (e.g., Ayres, 2015; Mayer & Fiorella, 2014; Sweller, 2004). By carefully considering many of the design guidelines for educationally effective multimedia materials and supportive research-based principles outlined in CTML (Mayer, 2014), many of the pitfalls associated with multimodal learning may be avoided. For instance, understanding that the use of two or more modalities may be detrimental to learning if the instructional design splits learners' attention, is redundant or transient, or if the presented material does not match learners' prior knowledge. After 28-years of research, Mayer summarized the main principles of multimedia instruction.

Five principles relating to the reduction of extraneous processing involve coherence, signalling, redundancy, spatial contiguity, and temporal contiguity. Individuals' learning improves when:

- extraneous words, pictures, or sound are excluded,
- cues are added that highlight the main ideas and the organization of materials,
- animation and narration are used rather than on-screen text,
- corresponding printed text and pictures are presented close together rather than far apart on the page or screen, and
- corresponding graphics and narration are presented simultaneously rather than successively.

Three principles for managing essential processing include segmenting, pre-training and the modality principle. These principles suggest that people learn best when:

- multimedia lessons are presented as learner-paced segments rather than as continuous units,

- narrated animation includes training in the names and characteristics of main concepts, and
- graphics and narrations are used rather than on-screen text.

Two principles for fostering generative processing include personalization and voice principle and suggest that people learn better when:

- conversational style is used rather than formal style, and
- standard-accented human voice is used to present narration versus a mechanical (machine) voice.

These guidelines are built upon the multimedia principle (Cowan & Morey, 2007) that indicates that people learn more deeply from words and pictures than from words alone, and the bottom line principle that indicates that people learn better from multimedia messages when they are designed in ways that are consistent with how the human mind works.

### **Non-cognitive Design Recommendations**

Further recommendations resulting from research on university level education provide additional ways to make instruction video podcasts more sensory and emotionally interesting. These recommendations include:

- *Keep it short.* Consider the length of video clips and to keep them at the specified time or at the minimal possible length (e.g. Bergqvist, 2012; Guo, Kim, & Rubin, 2014; Medina, 2008; Sutton-Brady, Scott, Taylor, Carabetta, & Clark, 2009).
- *Talk to students fairly fast and with empathy.* Guo et al. (2014) found that video podcasts where instructors speak fairly fast, with high enthusiasm and personal feelings, were engaging. Hibbert (2014) found that the use of humor encouraged students and made the

videos compelling. To encourage students to extend greater engagement and effort, Guo et al. (2014) further recommended that a conversational rather than formal language style of voice be used. Consistent with the personalization principle of CTML, Mayer (2014) recommended narration in first (I, we) and second person (you) (Mayer, 2014).

### **Method**

The method section describes the procedures used for initiating, structuring, planning and receiving in-service teachers' feedback about video podcasts and the resulting recommendations. The assumption is that learners will have a quality learning experience when they are presented with quality video podcasts that they like and want to learn from. The study included a community of in-service teachers enrolled in a program of continuing university mathematics education on a national basis. The program was directed at teachers with teaching certificates who already worked as teachers. In order to explore how video podcast materials produced for the distant education settings can be improved, and thus university educators' teaching of mathematics, this study investigated how in-service teachers perceived video podcasts when used in a natural, authentic, online learning situation.

The study was conducted in the first semester of a one-year study program and used mainly open-ended survey data. The study also drew on the cognitive theory of multimedia learning and as well as links to research-based principles for the design of multimedia. The successive production of 53 video podcasts was guided upon research-based recommendations for effective multimedia design including:

1. *Establishing context.* Context was explained and connected to previous

mathematical knowledge and key concepts (Bransford, Brown, & Cocking, 2000; Kay, 2014).

2. *Content weeding*. Unnecessary information was eliminated (Clark & Mayer, 2008; Ibrahim, Antonenko, Greenwood, & Wheeler, 2012; Mayer & Morano, 2003).

3. *Layout and dynamics*. Layout was planned and space organized, including the appearance and disappearance of elements, segments, and callouts (Ibrahim et al., 2012).

4. *Visuals and narrating*. Relevant and clear visuals and animations were used with synchronized narration (Mayer, 2014).

5. *Voice and pace*. Conversational, relaxed tone and relatively quick narration was used (Guo et al., 2014; Kay, 2014).

6. *Personal addressing*. Narrators addressed students with energy, enthusiasm, familiarity, and openness (Guo et al., 2014; Mayer, 2014).

7. *Guiding attention*. Critical elements and relations were identified visually and emphasized on the screen (e.g., by temporarily spot-highlighting, using different colours or contrasts, circling, sketching, calling out, or zooming: Mayer, 2014).

8. *Step-by-step*. Worked-examples were presented in a step-by-step fashion with key elements briefly explained (Kay, 2014).

9. *Video length*. Video clips were kept short (Bergqvist, 2012).

10. *Investing in editing*. Post-production included the removal of background sounds including breathing, clearing of throat, the inserting of short, silent pauses, and the hiding of pointers where not needed (Guo et al., 2014).

Video podcasts were recorded using the screencasting software *Camtasia* (v.7) and media-rich power point slides, with recordings edited before uploading and organized on the course web page. Each podcast was developed with stand-alone

instructions created for and implemented in a particular online lesson, along with a PDF-copy of the power point presentation. For one topic only, two series of podcasts were offered each with a clickable, two-level, table of contents.

Throughout the semester, weekly surveys were used to provoke in-service teachers' reflections about their video podcast experiences. Continuously collecting and monitoring participants' responses improved the ongoing development of the videos and provided key data for future studies.

## Participants

The analysis included data gathered from 14 in-service teachers (7 male and 7 female), over a half academic year (2013). The in-service teachers worked in schools (mainly grades 8-10) and ranged between 26.8 years to 56.1 years of age (mean = 42.2 years). Participants attended Algebra and Number Theory (15 ECTS) as the first part of the Year 1 mathematics program delivered entirely online.

## Setting

The online environment for the course is considered the project setting. The course was delivered using the university's learning management system (LMS), *Fronter*. Content and activities were arranged across nine online lessons provided as a multimedial text consisting of an introduction, table of contents, learning goals, and followed by chapters of different topics in the subject area. A digital text-video format (Engebretsen, 2006) was chosen with clickable video thumbnails integrated in the body text in a tabloid fashion. Chapters included tasks and exercises as well as quizzes and surveys created in the LMS test tool and links to external resources.

## Data Collection

A series of seven online questionnaires was conducted, each asking the in-service teachers to respond to two video podcasts of their choice, except for one survey addressing only one podcast. In the first part of the questionnaire, every podcast associated with a particular lesson was identified by its thumbnail, title, and time-stand. Participants were asked to determine (1) whether the content or subject area was new or known (i.e., new to me, somewhat familiar, well known), (2) degree of time spent viewing the podcast (i.e., not seen, partially seen, completely seen, seen more than once), and (3) whether they planned to review the podcast (will not rewatch, expect to rewatch later, don't know).

In part two, the in-service teachers were asked to describe the quality of each video podcast in relation to the impact of specific design features (e.g., voice and graphics, length and chunking of information) and their motivation and learning. Lastly participants were invited to suggest what could be done to improve the podcast's quality with respect to supporting the learning process. Feedback was gathered along 10 dimensions:

*First impression.* Consider your impression of the podcast.

*Special point-out.* Consider what you think is special about this podcast.

*Duration.* Consider the length.

*Content delivery.* Consider the quality of content delivery.

*Dosage delivery.* Consider the quantity of content delivery.

*Voice delivery.* Consider the quality of voice delivery.

*Graphic delivery.* Consider the quality of graphic delivery.

*Conditions for learning.* Consider the podcast's contributions to your learning conditions.

*Learning process.* Consider the podcast's impact on your learning process.

*Potential for improvement.* Consider what could be done to improve the quality of the podcast for supporting the learning process.

The LMS test module was used for collecting and processing responses. Settings required response entries for each question and the exclusion of multiple submissions. The opening time for each survey paralleled the deadline for required tests and assignments related to particular lessons. Participation was voluntary and respondents were not anonymous so that their responses could be studied over time. Permission was obtained to use participants' data for research purposes, with names encoded in numeric form.

## Data Analysis

Responses to close-ended questions were organized and coded into major categories using *Microsoft Excel*. The open-ended responses were classified by coding. Coding was mainly guided by the research questions, and along the themes in the questionnaire. Coding included identifying and classifying positive and negative and statements concerning the video podcast, the integration of video podcasts in the learning process and perceived learning outcomes, and recommendations. These organized lists were exported to *Google Drive* for further formatting, reading, and analysis.

The frequency of a theme was used to identify it as a key factor for quality and, if ranked as either moderate or higher, as a recommendation for further development. Rankings of the theme's influence on learning were categorized by the researchers using the following ordinal scale (where numbers neither do indicate equal intervals between scales nor absolute quantities): 0=not identified, 1=very low influence, 2=low influence, 3=moderate influence, 4=high influence, and 5=very high influence.

## Results

On average, 14 participants responded to 2.5 questionnaires (35.7%), 10 (71.4%) responded to at least one questionnaire, and two responded (14.3%) to all the questionnaires. In total, 64 video podcast responses were submitted (Table 1), with participants selecting 22 podcasts (38.6%) in total in their responses. Eight of the podcasts were considered short (1-5 minutes), nine were considered moderate

(6-15 minutes), and five were considered long (more than 15 minutes). Of these five, two consisted of a series of podcasts. Overall, selected podcasts consisted of topic presentations (95.3%) and examples (4.7%). None of the selected podcasts contained worked examples. The podcast length and the speaker's narration were identified as key factors for perceived quality being ranked on average as holding "high influence" and "moderate influence", respectively.

Table 1  
*Frequency of In-Service Teachers' Podcast Selections*

Length	n	Content			Total
		PT	PE	WE	
Short	8	19	2	0	21
Moderate	9	23	1	0	24
Long	5	19	0	0	19
Total	22	61	3	0	64

*Note.* Length: Short = 1-5 minutes, Moderate = 6-15 minutes, Long = more than 15 minutes  
*Key for Table 1:* Presentation topic (PT); Presentation Example (PE); Worked example (WE)

### Length

In-service teachers described the length of podcasts in both the short and moderate categories as "fine", "OK", "fitting", "suitable" and "tolerable", with one exception. One participant found one of the podcasts too long (8:36 min), indicating that she was familiar with the topic presented, perceived the content to be easy, and found the podcast to be somewhat boring.

In-service teachers' feedback differed with respect to podcasts categorized as long. Several of the longer podcasts were perceived as too long, regardless of whether or not the topic was known or considered interesting. For example, one presentation that was 23:48 minutes in length and only slightly segmented was reported to be too long by five out of the

six in-service teachers who responded to it. "I had to rewind the podcast when slipping out of it", one of the participants complained. Another suggested splitting the podcast. By contrast, another topic presentation 21:51 minutes in length, was considered to be of suitable length by all those who responded to it.

In-service teachers appreciated the orderly arrangement of podcast collections for the two, podcast series (21:53 and 50:34 minutes respectively). They made the following comments about length: "Ok", "Fine", "OK - but too long", and indicated how they were used, "[Too] much [to watch], if you are not looking for specific themes, but good for watching the whole [series]". Thus, participants indicated that video podcasts should not be too long if in-service teachers were to enjoy them.

## Narration

Although respondents were not asked directly about whether the pace of certain podcasts were appropriate, 14 (23.0%) of the total 61 podcast responses related to pace, with four of the 10 in-service teachers (40.0%) mentioning pace in at least one survey response. Slowing the pace was recommended for four (28.6%) of the 14 podcast responses. In one instance, the respondent was unfamiliar with two of the topics, while in another two of the topics were “a little known”. The remaining comments indicated that the overall pace of the podcast was appropriate or better (slower) than in previous podcasts. Respondents unfamiliar with the topic preferred a slower pace, sometimes in order to facilitate note taking. Responding to the participants’ feedback, the narrator attempted to maintain a slightly slower pace where new, complex content was to be introduced in subsequent podcasts.

Overall, the native-speaker’s narration was ranked highly for clear pronunciation, appropriate tone of voice, and proper intonation. However some critique occurred. For example, one participant commented that single words were a “distracting annoyance”, “taking the focus off from learning”. Three of the total responses referred to the pronunciation of the mathematical term “ $x^2$ ”, pronounced as “x [i: 'ɑ:ndə]”. The narrator, coming from a certain region of Norway, pronounced the term with a non-present “r” compared to how it is spoken in the rest of the country: “x [i: 'ɑ:ndrə]”. For that reason, pronouncing the words “correctly” was indicated as a potential area for improvement. The second criticism of the narration came from the first survey and related to parts of a screencast video where text was read out. Participants suggested, “expanding the narration beyond the text on the screen” as an area for improvement.

## Other

The design and quality of the video podcasts were perceived to be acceptable and attractive and were described as “clean and organized”, “neat and tidy”, “clear layout, friendly and serious tone”. In-service teachers’ main response to the quantity of content delivery in the video podcasts was “suitable”.

Participants indicated, without exception, that the use of video podcasts was welcomed, offering variety and motivation for learning. According to the open-ended questions about the learning process, in-service teachers made positive comments about using video podcasts in learning mathematics, “good for preparation of assignments”, “useful as a summary”, “works well as repetition”, “fruitful to see examples” and “informative”. More general positive comments were also provided, with these positive comments reflecting three categories related to efficiency, enjoyment, and concentration.

**Efficiency.** In-service teachers commented that video podcasts were effective for learning. Participants’ comments included, “I like to both see, hear and record simultaneously for effective learning” and “The videos are effective for learning”.

**Enjoyment.** In-service teachers also made specific reference to video podcasts as enjoyable. Typical comments included, “Videos are very useful and enjoyable! They facilitate learning a lot. Makes me sure that I have read is correct” and “Enjoyable to learn something new”.

**Concentration.** In-service teachers made specific reference to video podcasts helping them maintain their focus and concentration. Participants’ stated, “The videos are so interesting that I manage to stay concentrated” and “I keep concentration”.

## Discussion and Conclusions

In this study, we, the researcher-educators, developed video podcasts following guidelines based on research. Then we explored in-service teachers' self-reported experiences using self-selected video podcasts. In general, podcasts appeared to support the in-service teachers in their abilities to stay on task. As part of our study, we wanted to understand participants' perspectives and understandings so that we could make informed decisions with respect to ongoing podcast development. We wanted to develop video podcasts from which in-service teachers wanted to learn mathematics, which in turn, would ultimately improve the overall quality of mathematics teaching. The findings of this study are very important for the entire R&D project, and will form a basis for future project work.

In-service teachers appeared to respond fairly positively to the quality and design of the video podcasts including voice and graphic delivery, and length and chunking of information. At the same time, the in-service teachers identified and described obstacles that they experienced when using video podcasts as part of their learning including perceiving some videos as being too long, narrator mispronunciations, and the verbatim reading of materials.

Participants also encouraged specific design improvements that, from their perspective, would improve the capacity of the podcasts to provide better learning support. In-service teachers' perceptions about the quality of the video podcasts helped address certain adjustment challenges including how to keep the video podcasts user friendly thus improving further development of educational podcasts for the teaching of mathematics. We noted the following recommendations for further video podcast development:

- Keep video podcasts at the minimal length possible.
- Avoid dialectical words or phrases that may - even slightly - differ from the audience's.
- Avoid reading exactly what is written on the screen - even minor paragraphs.
- Narrate in a serious but friendly voice.

The researchers will take the recommendations drawn from the study and encompass them into the list of guidelines. These recommendations also may be of interest to other university teachers developing educational podcasts and seeking to enhance their instruction. It is also worth noting that efficiency, enjoyment, and concentration were central conditions for these in-service teachers when they learned mathematics through video podcasts.

In-service teachers' consistent responses in the subsequent questionnaires strengthen the internal validity of the study. There are similarities between our findings and previous research conducted by Kay (2014) and Mayer (2014) and upon which our podcast development was guided. These similarities in findings offer some degree of transferability and strengthen the external validity of the findings. We acknowledge that while the open questions used as part of the questionnaire allowed respondents to elaborate their responses, it also required more time to complete. This may be a limitation of the study resulting in the obtainment of a smaller number of responses or less extensive responses.

## Future Work

A new questionnaire and in-depth interview was proposed to be held in the semester following this research study, focusing on participants' learning experiences using video podcasts embedded in online lessons. Questions

posed will explore why and to what degree efficiency, enjoyment, and concentration are perceived to be central conditions when

learning mathematics through video podcasts, conditions that were pronounced responses in the current study.

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## GRADUATE STUDENTS' OPINIONS OF PROFESSORS' COMPETENCIES IN GRADUATE SCHOOLS OF EDUCATION

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**Abstract:** *The quality of teacher education is closely related to the quality of teacher educators. High quality teacher education requires that teacher educators possess relevant knowledge and skills, professional experiences, and commitment. It also can be assumed that the quality of graduate-level education influences the quality of teacher education since educational departments train future teacher educators. The purpose of the study is to investigate graduate students' opinions about their professors' competencies in terms of facilitating learning, measurement and evaluation, advisement, subject area knowledge, and communication skills. A qualitative research design using in-depth interviews was used to capture graduate students' opinion about graduate educators' competencies. Students' opinions about their professors' competencies were classified under the themes of subject area knowledge, facilitating learning, advisement, measurement and evaluation, communication, and expectations. Findings were discussed under these themes.*

**Keywords:** teacher educators, competencies, Graduate School of Education

Teacher educators' competencies have been critiqued as lacking and may negatively affect teacher education programs. Since the quality of teacher education programs is closely related to the quality of teacher educators, preparation of teacher educators requires serious attention (Zeichner, 2005). High quality teacher education requires that teacher educators demonstrate required knowledge and skills, professional experiences, and commitment. Teacher educators' beliefs about students and their responsibilities to teaching and colleagues also are important (Imig & Imig, 2007). Teacher educators should focus on *how* to teach as well as *what* to teach since subject area knowledge has a strong impact on the teaching professions and teacher expertise (Darling-Hammond,

2006). Teacher educators also should consciously consider their role in teacher education programs and examine their practices as they relate to being role models for their students (Zeichner, 2005). The fundamental responsibility of teacher educators is to provide strong foundational knowledge for teacher candidates while guiding them through their professional development (Smith, 2005).

It also can be assumed that the quality of graduate-level education influences the quality of teacher education since educational departments train future teacher educators. While educating tomorrow's citizens is the responsibility of all those in the field of education, it is especially so of teacher educators and

teachers of teacher educators (Cutchet, 2008, p. 15). While there are many conceptualizations of teacher educators' work across different countries, teacher educators can be generally defined as, "Teachers of teachers, engaged in the induction and professional learning of future teachers through pre-service courses and/or the further development of serving teachers through in-service courses" (Murray, Swennen, & Shagrir, 2009, p. 29). Similarly, Koster, Brekelmans, Korthagen, and Wubbels (2005), define teacher educators as "someone who provides instruction or who gives guidance and support to student teachers, and who thus renders a substantial contribution to the development of students into component teachers" (p.157).

Becoming a teacher educator is not easy, with the transition from being a teacher to becoming a teacher educator seemingly the most challenging and difficult part of this process (Murray & Male, 2005; Swennen, Shagrir, & Cooper, 2009). Facilitation of this transition should be the primary responsibility of educators involved in graduate-level education (EGE). To achieve this, EGEs need to be competent in various areas. However, there seemingly is limited research exploring EGE competencies in the field.

Some countries have set standards for teacher educators. For instance, the Standards for Master Teacher Educators of the Association of Teacher Educators (ATE, 2007) lists competencies across eight fields including, teaching, cultural competency, scholarship, professional development, program development, collaboration, public advocacy, and teacher education profession. The Dutch Association of Teacher Educators (VELON, 2007; as cited in Murray et al., 2009) set similar standards. Arguably, these standards can be viewed as essential competencies for all teachers across all levels of education, with educators

requiring competencies in learning facilitation, measurement and evaluation, advisement, subject area knowledge, and communication.

In the past, researchers have attempted to define teachers' and teacher educators' competencies. Some of these studies focused on in-class teacher behaviors that examined common teaching styles and practices. For example, Senemoğlu (1994) found that undergraduate-level educators tended to transmit knowledge to students and expected them to demonstrate the same knowledge rather than encouraged them to think creatively and analytically. They also tended to use evaluation processes for grading purposes only instead of using them as a part of the learning process.

According to Şen and Erişen (2002), the most common teacher educators' behaviors included knowledge of concepts and subject area. In addition, only a few teacher educators demonstrated planning and preparing for class, effective use of teaching-learning strategies, and effective measurement-evaluation skills, confirming earlier work with undergraduate students. Senemoğlu (1987) found that the most commonly observed teacher behavior reported by undergraduate students was the provision of scientifically correct information, while the least frequently observed behavior was the examination of student learning levels. Undergraduate students expected their teachers to have relevant subject area knowledge as well as be good scientists, facilitators, communicators, problem solvers, and objective evaluators of the learning process (Ergün, Duman, & Kınca ve Arıbaş, 1999).

In this study, we examined competencies of EGEs since these competencies are believed to influence the quality of teacher education. The purpose of the study was to investigate the opinions of graduate

students enrolled in education programs about their professors' competencies in terms of facilitating learning, measurement and evaluation, advisement, subject area knowledge, and communication. It is assumed that the findings of this study will provide insights and suggestions about how to improve the training of graduate students enrolled in graduate schools of education.

### **Method**

King, Keohane, and Verba (1994) indicated that qualitative research designs provide explanatory and descriptive inferences based on empirical information derived from participants' observations and perceptions. Therefore, qualitative research design was used to capture graduate students' opinion of EGEs' competencies in terms of subject area knowledge, facilitating learning, measurement and evaluation, advisement, and communication. Data was derived through in-depth interviews.

### **Participants**

The participants in this study consisted of 14 graduate students who attended education programs across two universities located in Ankara, Turkey. Seventy-one percent of the sample identified as female ( $n = 10$ ) and 29% identified as male ( $n = 4$ ). Eighty-five percent were enrolled in doctoral programs ( $n = 12$ ), while 15% were enrolled in master's programs ( $n = 4$ ).

### **Data Collection and Data Analysis**

A semi-structured interview was developed for data collection in order to examine graduate students' opinions about their professors' competencies. The following steps were completed as part of interview development, data collection, and data analysis.

1. An in-depth relevant literature of professor competencies was completed in order to specify the focus of the interview.
2. Seven interview draft questions were prepared. These questions were revised and verified by the suggestions of three subject area experts, a Turkish field expert, and a measurement-evaluation expert. An interview form consisting of 5 questions was finalized based on these experts' recommendations. The final interview form consisted of two parts, with the first part consisting of demographic questions and the second part consisting of questions examining students' opinions of their professors' competencies.
3. Participants completed individual interviews lasting about 20-30 minutes. Interviews were audio recorded with the participants' permission. The recorded interviews were transcribed and content analysis was used to analyze the data. Content analysis involved the systematic classification and inference of written, illustrated, or other types of data in ways that allowed the researchers to derive meaningful patterns (Tavşancıl, & Aslan, n.d. p. 2).
4. Data analysis consisted of content analysis processes as described by Elo and Kynagäs (2008, p. 110). Researchers read the interview transcriptions twice independently in order to gain a rich sense of the data set and identify data codes. These codes were then combined and grouped in order to develop themes. The themes were reviewed and revised and classified based on the codes, with five themes emerging: subject area knowledge, learning facilitation, advisement, measurement and evaluation, communication and expectations. Participant quotes were identified and used to support the themes.
5. The researchers examined the qualitative data and engaged in critical

discussion with a subject area expert in order to ensure internal validity. Three subject area experts examined the codes. The codes were further revised based on feedback from these experts.

6. Two subject area experts examined the qualitative data in terms of reliability. Miles and Huberman's (1994, p. 64) formula consisting of dividing the number of conciliations by the total number of conciliations and reconciliations was used to determine the reliability. The inter-rater reliability was 0.85.

### Findings

Graduate students' opinions of their professors' competencies were

classified under the themes of subject area knowledge, learning facilitation, advisement, measurement and evaluation, communication, and expectations.

### Subject Area Knowledge and Learning Facilitation

Table 1 shows the frequency of students' opinions about their professors' subject area knowledge and learning facilitation competencies. Within the subject area knowledge theme, six students indicated problems with professors' competencies

Table 1  
*Graduate Students' Opinions about Professors' Subject Area Knowledge and Learning Facilitation Competencies: Theme, Code, and Frequency Data*

Themes	Codes	Frequency N=14
	Expert in subject area	4(29%)
	Lacks subject area expertise	6(43%)
	Possesses updated knowledge	5(36%)
Subject Area Knowledge	Lacks updated knowledge	6(43%)
	Answers questions	2(14%)
	Has difficulty answering questions	6(43%)
	Provides different perspectives and provides information sources	1(7%)
	Does not present different perspectives	1(7%)

	Does not present empirical research	2(14%)
Learning Facilitation	Leaves teaching responsibilities to students	4(29%)
	Uses teacher-centered approaches	1(7%)
	Uses practice-oriented teaching process	2(14%)
	Uses theory-oriented teaching process	3(21%)
	Requires students to understand knowledge	2(14%)
	Does not require students to understand knowledge	6(43%)
	Engages in unstructured and unplanned course processes	1(7%)
	Guides students in their learning	4(29%)
	Does not guide students in their learning	4(29%)
	Provides surface and improper homework	1(7%)

with respect to answering questions, possessing updated knowledge, and lacking subject area expertise. As one participant explained:

Our professors tend to lack expertise in their field generally. I don't see them putting any effort to develop and update their knowledge. They don't follow scientific periodicals and they don't bring new developments into the

class. Most of the time, they teach and act in a traditional way. In general, most of our professors are not competent academically. I find only one professor competent in the department, since she creates opportunities for me to ask questions and answers my questions satisfactorily. I find the rest insufficient. I don't think that they put any effort to renew,

update, and develop themselves.  
(Participant #3)

On the other hand, some of the participants indicated that some professors were keen on their self-development. Five students stated that professors updated their knowledge and four students stated that professors were competent in their subject area knowledge. As one participant explained:

I think that our professors' competencies of subject area knowledge are okay. I assume that they follow developments in the field at the national and international levels and that they bring new and updated issues and materials into our class. In this way, they enhance our learning capacity and they enrich our learning environment. They share new significant materials about the field with us and facilitate critical thinking. They have always introduced new publications and guide our developments in the field.  
(Participant #1)

Two participants stated that the reason why professors' do not produce sufficient research is due to their lack of subject area knowledge. One of the participants explained this situation as follows:

Examining the publications of the professors, it is difficult to see single-authored and quality works. However, someone who has subject area of knowledge and expertise can produce quality work. Therefore, I find most of the professors incompetent. (Participant 9)

Within the theme of learning facilitation, participants indicated problems in different areas. Six students indicated that professors were not successful at facilitating students' understanding. Four

students indicated that professors left teaching responsibilities to students and did not guide them in their learning. One of the participants mentioned challenges in all three areas:

Most of graduate courses consist of student presentations. I think that this is a loss for students since they do not have opportunities to discuss critically and consider topics from multi perspectives. For these reasons, professors cannot guide students and help them understand the knowledge.  
(Participant #2)

However, four participants stated that professors guided them, two of the participants stated that professors helped students understand knowledge, and two of them indicated that professors mostly emphasized practice oriented teaching.

I think that professors are good at teaching. Our professors used to gain our attention in the class and motivate us towards the course. Our professors brought different methods, practices, and experiences to the class that provided us with a chance to observe different systems. Most of the courses were practice oriented. My professors were always guiding and mentoring me in my progress. They always helped me understand knowledge and taught me how to engage in problem solving processes to overcome problems in my life. In short, they became a model for our development. (Participant 13)

### **Advisement and Measurement-Evaluation**

Table 2 shows frequencies of students' perceptions on their professors' competencies in the areas of advisement, and measurement and evaluation.

Table 2

*Graduate Students' Perceptions of Professors' Advisement, Measurement and Evaluation Competencies: Themes, Codes, and Frequency Data*

Themes	Codes	Frequency N=14
Advisement	Does not allocate time	2(14%)
	Is cooperative	1(7%)
	Is not cooperative	1(7%)
	Provides feedback	1(7%)
	Solves problems and supports students	9(64%)
	Does not solve problems and does not support students	2(14%)
	Uses principles of scientific study	2(14%)
	Leaves students alone	2(14%)
	Does not care about students' interests	2(14%)
Measurement-Evaluation	Is objective	4(29%)
	Is subjective	9(63%)
	Uses different measurement techniques	2(14%)
	Does not inform students about evaluation criteria	2(14%)
	Engages in process evaluation	3(21%)
	Engages in product evaluation	3(21%)

In the advisement theme, two participants found that their professors were problematic in terms of caring about students' interests, leaving them alone, solving problems, and supporting students. One of the participants explained that professors do not allocate time for students, help them solve their problems, or support them:

I don't think that professors allocate enough time for us. I don't feel that I am on their agendas. We always face and overcome our problems, but they tend to talk about why we make mistakes. I don't think that my professors advise me properly. (Participant #5)

On the other hand, nine participants found professors to be competent in assisting students in solving their problems and supporting them. In addition, two participants viewed professors as engaged in scientific research and one thought that professors provided feedback and cooperated with students. One of the participants expressed his opinion as follows:

My professor has always been actively involved in my learning process. Whenever I ask question she always provided relevant answers and solutions. When needed, she always assisted, guided, and supported me. She always encouraged me to study deliberately in order to improve the quality of my thesis. I have asked so many questions and my professor supported me so well that I couldn't have had a more fruitful dissertation writing process. My professor answered my questions appropriately and this helped my academic progress. Moreover, my professor was good at conducting scientific research and ethics and this improved my research capacity. (Participant 9)

In the measurement and evaluation theme, nine participants expressed problems about their professors' grading subjectivity, two participants indicated that their professors did not inform them about evaluation criteria, and three participants discussed their reliance on product evaluation. One of the participant described professors' measurement and evaluation competencies as follows:

I don't believe that all professors act objectively. When I disagree with a professor on a specific issue, the professor tends to...grade me negatively. In addition, objectivity fails since the professors do not announce the evaluation criteria to us. This led us to think that the evaluation system might be subjective. If we knew the criteria before, we would have been better prepared for the evaluation. (Participant #5)

However, four participants stated that professors were objective, with two participants stating that professors used different measurement techniques, and three participants indicating that professors conducted comprehensive evaluations of process. One of the participants explained as follows:

I have never thought that my professors were acting subjectively during my graduate studies. They have always been objective. Evaluation included our exams but also our entire learning process. In this way, our real learning level was measured. In addition, we, as students, also participated in the evaluation process. (Participant 13)

## **Communication and Expectations**

Table 3 lists participants' perceptions of their professors' communication competency and expectations.

Table 3  
*Graduate Students' Opinions about Professors' Communication Competency and Expectations: Theme, Code, and Frequency Data*

Themes	Codes	Frequency N=14
Communication	Encourages students' self-expression	1(7%)
	Does not encourage students' self-expression	2(14%)
	Demonstrates jealousy and engages in gossip	2(14%)
	Is cooperative	3(21%)
	Demonstrates positive/effective communication	7(50%)
	Demonstrates broken communication	7(50%)
Expectations	Demonstrates competency of subject area knowledge	14(100%)
	Implements scientific research principles	4(29%)
	Combines theory and practice	6(43%)
	Engages in interdisciplinary study and cooperation	6(43%)
	Encourages positive class environment	3(21%)
	Provides guidance	7(50%)
	Demonstrates effective/positive communication	7(50%)
	Assumes responsibility for teaching	4(29%)

Seven participants reported problems with their communications with professors, and two students expressed that they had challenges with self-expression, jealousy, and gossip. One of the participants described problems with professors' communication as follows:

There is an invisible barrier between students and professors. Most of the time students don't feel comfortable. Most people pretend to be fine in order to continue their relations, but they are not sincere in reality. This effects the communication negatively. Also, the communication among professors is problematic. Conflicts among professors are reflected in their students. Therefore, gossip and jealousy occur in the institution. (Participant #3)

On the other hand, seven participants viewed professors' ability to communicate as satisfactory. Three participants stated that professors are good at cooperation and one participant indicated that she could express opinions in class easily and freely. One of the participants described her professors' communication competencies as follows:

I think that my professors' communication competencies with students and their colleagues are fine. They have good relations with everybody. I witnessed effective communication in the classroom throughout my entire graduate studies. We were able to ask questions and share opinions with our professors. Our professors communicated effectively with everybody and worked collaboratively with others. (Participant 13)

Fourteen participants expressed that they expected their professors to improve and update their subject area knowledge. In

addition, six participants said that they expected their professors to merge theory and practice while teaching, with one participant providing the following explanation:

I expect a proficient educator to have in-depth subject area knowledge and follow the updated developments in the field that he or she is studying. In addition, it is important that effective experiences should be integrated into practice constantly. Knowledge should be presented practically. (Participant 11)

In addition, six participants stated that they expected their professors to cooperate and study in interdisciplinary areas, conduct product and process evaluations, be objective, care about diversity, and provide feedback about the learning process. One of the participants expressed his opinion as follows:

Subject area knowledge is important but lack of measurement competency can affect the learning process negatively. Measurement and evaluation should be completed through the use of different methods. The measurement and evaluation process should not only focus on the output but also the process. Professors should be fair to all students and provide feedback for everything completed. Also, professors should know about individual differences and use appropriate methodologies based on students' needs. Professors should rescue themselves from traditional standardized implementations. (Participant 10)

Moreover, seven students stated that they expected their professors to advise students while communicating with them and four students indicated that they expected their professors to take teaching responsibility and actively engage students in the

learning process. One of the participants expressed his wishes from his professors as follows:

Professors should always be with students and guide their students. Of course, the professors should not assume all the responsibility, but they need to take some responsibility for teaching students necessary knowledge and competencies. Professors should be patient and let students feel that they are always with them. They should always have alternative plans and programs and guide their students effectively. Also, professors should create an effective learning environment in a way that student will learn eagerly while having fun. (Participant 8)

### **Discussion and Conclusion**

This study investigated graduate students' perceptions about their professors' competencies in terms of subject area knowledge, learning facilitation, measurement and evaluation, advisement, and communication. The findings of the study indicated that most graduate student participants believed that their university professors needed to improve their capacities in terms of subject area knowledge, learning facilitation, measurement and evaluation, and communication. Most students indicated that their professors did not possess sufficient subject area knowledge or competence in answering questions. Five students perceived their teachers to possess sufficient subject area knowledge and four students perceived their professors to be sufficient in updating their knowledge.

Some of the students asserted that their professors did not help them in understanding the nature of science and that the learning process was mostly theory based. These results are parallel to Senemoğlu's (1994) findings that undergraduate instructors tended to

transmit knowledge to students and expected them to demonstrate the same knowledge instead of encouraging them to think creatively and analytically. The findings here also parallel those of Şen and Erişen (2002) who found that few instructors demonstrated effective use of teaching-learning strategies.

While some students indicated that their professors were not supportive in solving their problems and did not consider their interests, most students responded that their professors were supportive in solving their problems. Teacher educators have an important role during the learning processes that is completely different from the traditional role of the lecturer and the support they offer should be adjusted to the specific problems their students experience (Korthagen & Kessels, 1999).

Some students indicated that there was a negative and ineffective atmosphere among some professors in the department, and this negatively affected the communication between students and professors. This is concerning as future teacher educators' development in part, is supported through their professors' guidance that requires effective communication. As formal and interpersonal communication are essential skills for effective performance of faculty members (Colbeck, Cabrera, & Marine, 2002), faculty development programs that focus on fostering interpersonal communication skills should be implemented in universities.

Most students indicated that their professors were not objective, with three students indicating that their professors used product-based evaluations only. These results parallel Şen and Erişen's (2002) findings that only a few teacher educators demonstrated effective measurement-evaluation skills. Similarly, Senemoğlu (1987, 1994) indicated that the least demonstrated behavior by university

faculty involved examining student learning levels, underlining university faculty's use of evaluation processes for grading instead of as part of the learning process.

Students also indicated their expectations about professors' competencies. The most expected professor behaviors involved possessing subject area knowledge and updating this knowledge. These results are parallel to Bhargava and Pathy's (2011) findings where student teachers ranked knowledge of subject matter and effective communication skills as the most important teaching competencies.

Another highly ranked expectation was that professors should combine theory and practice in their teaching processes. Even though as many teacher educators identified disconnections between theoretical knowledge and teachers' practical work in classrooms (Grossman, Hammerness, & McDonald, 2009), it is important to combine theory into practice in the teaching profession. Combining theory into practice can produce meaningful learning for all students and provide them with role models about how to combine theoretical knowledge into practice.

Students also noted that professors needed to be competent in encouraging student

involvement, using scientific principles, working collaboratively and in interdisciplinary areas, using various methods for evaluation, providing feedback about student learning, and guiding students by establishing positive communication. These results parallel Ergün et al.'s (1999) findings that university students expected their teachers to be competent in subject area knowledge, good scientists, good learning facilitators, good communicators, good problem solvers, and be objective when evaluating their performance.

In summary, graduate students expected their professors to be competent in terms of subject area knowledge, learning facilitation, measurement and evaluation, advisement and communication. Since these graduate students are future teacher educators, they deserve quality role models and quality education. EGEs have the potential to positively influence the whole education system. Positive behavioral change among students would start by implementing effective teaching strategies. Therefore, professors should always attempt to develop their professional skills to improve their teaching skills. Through these efforts, teacher education may no longer be viewed as a "haphazard" process (Willemse, Lunenberg, & Korthagen, 2005, p. 214).

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## PUBLICATION GUIDELINES

The journal (*JISTE*) publishes articles by members of the International Society for Teacher Education (ISfTE). Exceptions are made for a non-member who is a co-author with a member, or who is invited to write for a special issue of the journal, or for other special/specific reasons.

- Articles submitted to *JISTE* must be written in English, following manuscript guidelines (see below) and will be anonymously reviewed by referees. Each article must pass the review process to be accepted for publication. The editors will notify the senior author of the manuscript if it does not meet submission requirements.
- Articles are judged for (a) significance to the field of teacher education from a global perspective, (b) comprehensiveness of the literature review, (c) clarity of presentation, and (d) adequacy of evidence for conclusions. Research manuscripts are also evaluated for adequacy of the rationale and appropriateness of the design and analysis. Scholarly relevance is crucial. Be sure to evaluate your information. Articles should move beyond description to present inquiry, critical analysis, and provoke discussion.
- Articles pertaining to a particular country or world area should be authored by a teacher educator from that country or world area.
- All manuscripts accepted for publication will be edited to improve clarity, to conform to style, to correct grammar, and to fit available space. **Submission of the article is considered permission to edit to article.**
- The final decision to publish an article rests with the associate editor(s).
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- Writing and editorial style shall follow directions in the *Publication Manual of the American Psychological Association* (6<sup>th</sup> ed., 2009). References MUST follow the APA style manual. Information on the use of APA style may be obtained at [www.apa.org](http://www.apa.org).

### Manuscript Guidelines

- Manuscript length, including all references, tables, charts, or figures, should be 3,000 to 5,000 words. **Maximum length is 6,000 words.** Shorter pieces of 1500-3,000 words, such as policy review or critique papers are welcomed.
- All text should be double-spaced, with margins 1 inch (2.5 cm) all around and left justified only.
- Paragraphs should be indented using the “tab” key on the keyboard. No extra spacing should be between paragraphs.
- Tables, Figures, and Charts should be kept to a minimum (no more than 4 per article) and sized to fit between 5.5 x 8.5 inches or 14 x 20 cm.
- Abstract should be limited to 100-150 words.
- Include four or five keywords for database referencing; place immediately after the abstract.
- Cover page shall include the following information: Title of the manuscript; name(s) of author, institution(s), complete mailing address, email address, business and home (mobile) phone numbers, and fax number. Also on the cover page, please include a brief biographical sketch, background, and areas of specialization for each author. Please do not exceed 30 words per author.

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Reviews of books or other educational media are welcome. Either the review or the item reviewed must be by a current member of ISfTE. Reviews must be no longer than 1000 words.

### **Annotation of Recent Publications by Members Submission**

ISfTE members may submit an annotated reference to any book which they have published during the past three years. Annotation should be no longer than 150 words.

## **SUBMISSION REQUIREMENTS**

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## **Future Issues and Submission Deadlines**

### **2017 (Volume 21, Number 1)**

*Theme – Emancipating and Transforming Teacher Education for a Better Education System* is the theme chosen by the conveners of the 37<sup>th</sup> seminar for ISfTE held at Kruger National Park in South Africa, April 2016. For *JISTE* publication, participants (including those from the Distance Paper Group) are invited to revise their seminar papers, attending carefully to the manuscript and publication guidelines, and submit them to the journal for consideration. Book reviews on the theme are also invited.

Deadline for submission has passed. Publication by May/June, 2017

### **2017 (Volume 21, Number 2)**

*Theme – Global citizenship education* was the theme chosen by the conveners of first Asia-Pacific Regional ISfTE conference, held in Kuala Lumpur, November 2016. For *JISTE* publication, participants are invited to revise their seminar papers, attending carefully to the manuscript and publication guidelines, and submit them to the journal for consideration. Other members of ISfTE are similarly invited to submit articles for this issue. Members are encouraged to co-author articles with their students or colleagues who may not be members of ISfTE. Some articles in this edition

could have been submitted for the 21.1 edition of JISTE.

***Deadline for Submission: April 1, 2017 – Publication by December, 2017***

**2018 (Volume 22, Number 1)**

**Theme** – *Education: Teaching and Learning for the Future* is the theme chosen by the convenors of the 38<sup>th</sup> seminar for ISfTE held at Aarhus University, Denmark, April 2017. For JISTE publication, participants are invited to revise their seminar papers, attending carefully to the manuscript and publication guidelines, and submit them to the journal for consideration. Book reviews on the theme are also invited.

***Deadline for submission: September 15, 2017 – Publication by May/June 2018***

## Front Cover

These institutions' logos appear on the front cover of this issue: Montclair State University along with its PRISM program sponsored the ISfTE seminar in 2015. The other three institutions – Aarhus University, Hong Kong Baptist University, and Weber State University – support JISTE with their on-going sponsorship. If other institutions would like to participate, please contact the journal's editor, Karen Berg Petersen.

**Montclair State University** is just across the Hudson River from Manhattan, New York City. Initiated in 1908, MSU began life as a two-year teacher training college with 8 faculty members, 187 students, and a first graduating class of 45 students. In 1924 the institution became Montclair State Teachers College and developed a four-year (Bachelors of Arts) program in pedagogy becoming the first US institute to do so. 1958 saw it merge with Panzer College to become Montclair State College and then a comprehensive multi-purpose institution in 1996. April 27, 1994, and in the same year the school became Montclair State University. It currently offers masters and some select doctoral degrees.

**Aarhus University** is the second oldest university in Denmark. It is also the largest university in the country with over 43,000 students. It offers programmes in both undergraduate and graduate studies. Although the main campus is in the city of Aarhus, Denmark, the university has small campuses in Copenhagen and Herning.

**Hong Kong Baptist University** was founded by the Baptist Convention of Hong Kong in 1956 as a post-secondary college and became a fully-fledged university in 1994. It now boasts eight faculties and schools and an academy offering a wide range of undergraduate and postgraduate programmes to around 8,400 students.

**Weber State University** in Ogden, Utah, United States, was founded in 1889. It is a coeducational, publicly supported university offering professional, liberal arts, and technical certificates, as well as associate, bachelor's, and master's degrees. Currently, over 25,000 students attend the university.