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Sincerely,
EJES, Team

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LABORATORY EXERCISE OR LECTURE: MIDDLE SCHOOL EDUCATION

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Abstract

A study was recently conducted in a suburban middle school regarding two teaching strategies. Ninety-three eighth grade *student*s were administered a pretest regarding classification as related to taxonomy. Thirty of the students conducted an inquiry lab concerning classification. They then participated in a class discussion regarding the material. The remaining thirty students first participated in a class discussion regarding classification, they then completed the laboratory exercise. A posttest was administered at the conclusion of the unit and a retention test was administered four months later. Statistical analysis through the use of t-tests indicates a statistically significant performance difference on the scores of the posttest. No significant difference was found when comparing the respective retention test scores.

Keywords: Inquiry, laboratory, taxonomy

Introduction

Laboratory Exercise or Lecture: What Should Come First in Science Classes?

How one learns best is a universal question which many have devoted their research lives to solving. Pedagogy is often taught with the idea that students have various learning styles such as auditory, visual, etc. (Dunn, et.al., 1995). Instructional variety in the classroom will help to address the various ways students learn such as the use of hands-on activities balanced with class discussions in order to best address the respective learning styles of their students in conjunction with preparing the students for evaluation. Standardized tests have become the evaluation procedure of choice with the advent of national and state standards therefore, teachers have the obligation to instruct in a manner that best results in increased learning by their students as measured by standardized tests.

In addition to learning styles, theories such as the use of inquiry in the classroom increased greatly during the decade of the 1960's thanks in

part to the launch of Sputnik, which caused a great deal of curricular concern in the United States. New science curricula were designed that stressed inquiry and process, using hands-on laboratory experiences as a means to facilitate learning. The resulting standardized test scores related to these curricula were analyzed in the 1980's comparing the results of students who had participated in the proper use of the inquiry science curricula (Shymansky, Kyle, & Alport, 1982; Shymansky, 1984). The achievement test scores of those original students increased and attitudes became more positive. Several of these programs (Science Curriculum Improvement Study, Science A Process Approach, Biological Science Curriculum Study) were successful in using the process approach in order to increase learning for a variety of age groups.

Further research results have indicated conflicting outcomes regarding pedagogical techniques. Odubunmi, Olagunqu and Balogun (1991) found that when comparing the lecture versus laboratory teaching method, the cognitive achievement scores of low ability students were significantly higher for pupils instructed using the laboratory activities. There was, however, no significant difference in test scores when comparing high ability students and teaching method. In another study, Staver (1984) tested traditional teaching-vs-inquiry based learning. This researcher concluded that the methods of teaching had no significant impact on students' test scores.

Calude, C., Calude, E., & Queen, M. (2012). Inductive Complexity of P versus NP Problem (Extended Abstract). *Lecture Notes in Computer Science*. (7445), 2-9.

Calude, C.S. ;
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Queen, M.S.

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Conversely, Saunders (1987) found that hands-on learning was more effective for student learning than was traditional lecture. It was also found

that supplementary inquiry activities had a significant positive effect on the achievement of females, indicating an interaction between gender and teaching strategy (Marshall & Dorward, 2000).

The study was conducted in Australia to determine whether inquiry or lecture is better for college students (Jones, Holland, & Oldmeadow, 2008). The participants included 49 college students. The same students were exposed to both the inquiry and the lecture method and the results indicated a significant improvement with the inquiry approach at the .001 level. They also found they could cover more content using the lecture method.

Another study was done at the collegiate level regarding the correlation between attendance at laboratory experiences and grades (Moore, 2008). This was a longitudinal study lasting for years and involving 1697 students. The researcher found that the students' respective grades declined progressively as the students missed one or more labs. Studies done with collegiate level students seem to indicate benefits of hands-on experiences and inquiry learning.

Saunders (1987) conducted his research in 4^{th} and 6^{th} grade science classes. His findings indicated hands-on learning was better for student learning than traditional lecture type learning. Additionally, Chang (1999) whose participants included 600 junior high school students, found that students in the inquiry-group instruction classes had significantly higher achievement scores than the students in the traditional group instructional classes.

These researchers exposed different respective groups of students to different teaching approaches, lecture vs. lab, and lecture vs. inquiry. This creates the need for a study where the same students, as opposed to different classes of students, are taught the same material using different methods. This eliminates the potential confounding variable, different groups of students. Each classroom of pupils may react differently to various learning methods. These researchers also used achievement and gender as variables. A study now needs to be conducted whereby a common variable, such as socio-economic status can be compared to achievement.

Research also indicates that even students who scored well on standardized tests are often unable to successfully integrate or contrast memorized facts with real-life applications outside the school room (Yager, 1991). Studies on authentic assessment showed that an educational intervention based on the theory of successful intelligence improved school achievement, both on performance assessment measuring analytical, creative, and practical achievements and on conventional multiple-choice memory assessment.

Educators are beginning to acknowledge the importance of honoring the principles of authentic assessment. These principles require teachers to

focus on approximating authentic real-world tasks in the subjects under study and on higher-order thinking skills, all while using assessment as a means for continual student improvement. This gives the student a better learning experience, and increases the chances that what they have learned will be of use to them beyond their current classroom. According to research, traditional assessment tools are often not helpful in assisting students to improve, to understand, or synthesize what they have learned (Wilson, 1994).

Findings from teacher questionnaires indicates that teachers feel that students achieve high scores in science knowledge and maintain or develop positive attitudes towards science when students are provided with opportunities that use real-world scenarios to make connections between what they learn in science class and what they do in life (Brunkhorst, 1992).

Method

The implications of the research data indicate a need for more research. Many different variables, such as socio-economic status, must be explored in order to determine what teaching procedure is preferable for any respective group of students. The population was seventh grade students in a suburban, middle to upper class environment.. The students had previously been randomly assigned to specific science classes, and the teaching strategy was randomly chosen for each class.

There were four classes randomly assigned to each condition. All four classes were taught in the same science classroom by the same teacher and included standard furniture for a lecture/lab setting. There were 26 standard-sized desks for middle school students evenly spaced throughout the room. In addition, there were lab stations for groups of four students. The materials for the laboratory exercise were spread evenly around the lab.These materials included are a variety of organisms from the animal kingdom. Examples included various lizards, shells, bones, etc., and other organic matter which represented many phyla. There is a teacher work station at the front of the room which includes a sink and a gas jet. The station was designed in order for the instructor to do a demonstration that the whole class can see. The station was therefore raised at a higher level than the student lab tables and was designed so the instructor would stand while doing a demonstration. Each teaching condition was designed to eliminate confounding variables such as a room change or change in instructor.

The teacher had previously taught several years and was working on her Masters degree. The teacher decided to incorporate both hands-on and lecture instructional procedures into the unit. She assessed content knowledge at two intervals during the experiment and compared the results. The students were assessed twice during the study. They were administered a

pretest, and a posttest. Pretests were administered one week before the beginning of the study. The posttests were administered on the day following completion of the study. Both the prestest and the posttest were worth 100 points.

Results were calculated from the scores of 60 high school students. The students were enrolled in a sophomore biology class in an urban high school. Sixty-five percent of the participants were on free or reduced lunches. The racial status was 60% minority.

One week before the unit on classification was taught, the student teacher administered a pretest to each biology section. This test assessed their pre-knowledge of the material that would later be presented. The students were taught the process of classification through the use of a lab before the lecture for two class sections, while the lecture was presented before the lab for the other two. Following one week's worth of teaching using lecture, lab, and review, a posttest was administered that dealt with the material that had been covered in the unit. The classes' posttest scores were compared to pretest scores. The number and percent change for each individual and each class was calculated. Totals were also calculated for the classes that had undergone the same respective procedure. Furthermore, a t-test was used to determine if there was a statistically significant difference noted between the performances of the classes based on whether they had lab or lecture first.

Further assessments were conducted to evaluate the amount of content retained by the participants. Three of the four classes included in the pre and posttests were given the assessment instrument four months after the posttests were administered. These scores were then compared with the posttest scores in order to determine whether the teaching procedure impacted the amount of content retained over time.

The content addressed in this experiment involved classification and Kingdoms. The student teacher designed an inquiry laboratory experience whereby the students constructed hypotheses regarding the relationships between a collection of artifacts. The students were given such materials as lizards, shells, bones, etc., and asked to classify them and justify their decisions. The student teacher also designed a lecture/class discussion regarding the evidence concerning classification and the characteristics used for classification. Two classes designed their own classification schema, then the student teacher led a class discussion regarding the content. The student teacher conducted a lecture/class discussion first with the two remaining classes, then those classes completed the inquiry lab. All students took part in both the inquiry lab and the lecture/class discussion with the only variable being whether they had lecture first or lab first.

Results

A t-test was run on the data in order to compare the lab first versus the lecture first teaching strategy. The two classes that were involved in a class discussion before the laboratory experience had statistically significantly higher (.05 level) posttest scores than those who were involved in an inquiry lab before the class discussions (see Table I). A t- test was also used in order to assess the results of the scores on the retention test. The class means decreased for every class resulting in no significant difference on the retention scores between the lab first and lecture first groups.

Table I. Means, Standard Deviations, and t-Value Regarding Lab First vs. Lecture First

Test	Group	Mean	SD	t
Pretest	Lecture First	12.6	2.70	
	Lab First	11.6	3.58	
Posttest	Lecture First	18.6	3.34	
	Lab First	16.6	4.5	9.5*

* significant at the .05 level

Conclusion

The implications of the results can lead to many future research questions. The results of the posttest indicate that it is better to lecture before having the students complete a laboratory experience. The results of the retention test indicate two things. First, there is no resulting significant difference over time between using an inquiry lab before or after a lecture on cognitive achievement as measured by the student teacher's instrument. Second, those that took part in the lecture/class discussion first, forgot more than those in the other group.

These results indicate that it is better to lecture before having the students do a hands-on experience when addressing the content in this unit in an urban high school in the southeast. Several confounding variables may potentially have caused these results. The students in the class that had the highest scores on the posttest and had a class discussion before the lab had higher class means than the other three classes on every test that had been previously administered during the year. Further research must be conducted in order to determine if there was an interaction between the respective classes and the teaching strategy. Another potential confounding variable was time of day. The two classes that had the class discussion first were later in the day than the two classes that conducted the lab first. Further research must be conducted in order to determine whether there was an interaction between the time of day and the teaching procedure.

A third area for further research involves the attitudes of the students. Perhaps they enjoyed discovering the material for themselves. This cannot be measured on a cognitive achievement test so future researchers could

administer both an instrument that measures attitude and an instrument that measures achievement.

Attitude may have also played a part in the decreases in scores on the retention tests. The students knew that they were not going to be graded on their performance on the retention test, whereas they knew that they were going to be graded on the posttest. Therefore they may have just guessed on the retention test resulting in the dramatic decrease in scores.

Teaching procedures are sometimes dependent upon the content being covered. Clearly the students can learn content that might be addressed on a standardized test by doing an inquiry experiment. The recent experiment conducted by a student teacher indicates that a lecture or class discussion strategy should be carried out before a laboratory experience. While every teacher has their own strengths and every class has its own personality, we believe we have students who can learn content through inquiry and lab experiences as well as through lecture, and in our opinion, students can learn better through a good lab experience versus a lecture.

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DEVELOPING SECONDARY EDUCATION COMPUTER SCIENCE TEACHERS' TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE

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Abstract

In the study herein the authors adopted the framework of technological pedagogical content knowledge (TPCK) and the approach of technology mapping in order to teach secondary education computer science teachers how to teach with technology. During a 15-hour teacher professional development program, teachers learned how to think about the educational affordances of different computer tools, and how to use them to make computer science content more understandable to learners. In addition, teachers learned how to think iteratively about technology, content, and pedagogy in order to design learning activities appropriate for learners' conceptual ecology. The study presents good examples of TPCK in practice by demonstrating teachers' actual instructional artifacts as these emerged through their participation in the teacher professional development program, as well as their evaluations of the program.

Keywords: Teacher professional development, Computer science teachers, Technological Pedagogical Content Knowledge, Technology Mapping

Introduction

In an era where new digital technologies are gradually revolutionizing all aspects of daily life, teachers are called once more to respond to the needs of the society and find ways to integrate these technologies in their classroom teaching. The challenge to respond competently to this call is highly demanding as teachers are expected to think beyond the box and learn new things in order to transform their existing classroom practices. A factor that greatly influences teachers' efforts and dispositions to teach with technology is directly related to their participation

in teacher professional development programs (Mouza, 2009). Therefore, ongoing research efforts regarding teachers' professional development in the educational uses of technology are fully warranted.

In accordance with this line of argument, the authors herein describe their effort toward designing and implementing a teacher professional development program for the educational uses of technology in teaching computer science content. The teaching of computer science has been traditionally teacher-centered, ignoring for the most part the interrelations among subject matter, pedagogy, and learners' alternative conceptions about the subject matter of computer science (Gal-Ezer, Vilner, & Zur, 2003; ACM K–12 Task Force Curriculum Committee, 2003; Hazzan, Lapidot, & Ragonis, 2001; Tucker, Deek, Jones, McGowan, Stephenson, & Verno, 2003). During the last few years, an effort has been systematically undertaken in many countries worldwide for the purpose of improving computer science education through the systematic integration of educational technologies (Kadijevich, Angeli, & Shulte, 2013). The emphasis is on approaching the teaching of computer science topics in learner-centered ways taking into consideration learners' misconceptions or difficulties in understanding computer science content, as well as teachers' difficulties in making the computer science content more teachable to the students.

Accordingly, the authors herein adopted the framework of Technological Pedagogical Content Knowledge (TPCK) and the approach of Technology Mapping (TM) (Angeli & Valanides, 2005, 2009, 2013) for the purpose of designing and implementing a 15-hour teacher professional development program for secondary education computer science teachers. The main research purpose of the study is to show good examples of TPCK in practice by demonstrating teachers' actual instructional lessons as these emerged through their participation in the teacher professional development program. Therefore, the authors herein provide examples of learning activities that the teachers designed with the use of educational technologies following the principles of the TPCK framework and the guidelines of TM, and also report on the teachers' evaluations of the specific teacher professional development program.

Teacher professional development in the educational uses of technology:

Educating teachers on how to effectively integrate technology in classroom practices for the purpose of improving education and reforming curricula has been one of the main and continual goals of national and international school reform efforts in various countries (International Society for Technology in Education, 2002; Kozma & Anderson, 2002; Pelgrum, 2001; NCEE, 2007; Mouza, 2009). A variety of approaches have been adopted over the years to prepare and support teachers in integrating

technology in classroom practices, although the results have not always been positive (Harrison et al., 2003; Rodrigues, 2003; Ertmer & Ottenbreit-Leftwich, 2010). A review of the literature also indicates that for the most part teacher professional development has focused on learning how to use various computer tools (NCEE, 2007). The main focus of the learning-how-to-use-tools approach has been on technical skills, and, despite the fact that basic computing skills constitute the cornerstone of computer literacy there have been serious reactions to this approach. The opposition is mainly based on the argument that skills-based courses are not enough for preparing teachers how to teach with technology or how to integrate technology in classroom instruction, simply because they are usually taught in isolation from a pedagogical context (Selinger, 2001; Grossman, Wilson, & Shulman, 1989; Mishra & Koehler, 2006).

The failure of teacher professional development programs to adequately prepare teachers to integrate technology in teaching and learning can be also attributed to various other factors (Cuban, 2000). According to Margerum-Lays and Marx (2003), one major contributing factor is the lack of a conceptual framework to systematically guide the integration of technology into teachers' practices. In view of recognizing that the knowledge base of the teaching profession is not adequately developed to effectively guide the integration of technology in teaching and learning, about a decade ago, researchers around the world set out to develop a conceptual framework to guide teachers' cognition about technology integration. Overwhelmingly, researchers agreed that teachers needed to develop a body of knowledge that has been referred to in the literature as Technological Pedagogical Content Knowledge.

Technological Pedagogical Content Knowledge (TPCK):

TPCK has been conceptualized as an extension of Shulman's (1986, 1987) Pedagogical Content Knowledge (PCK). PCK identifies the distinctive bodies of knowledge for teaching, and constitutes a special amalgam of content, pedagogy, learners, and context (Shulman, 1986). Shulman's (1987) conceptualization of PCK goes beyond teachers' knowledge of subject matter and pedagogy per se, and encompasses the dimension of how to teach and transform content into forms or representations comprehensible to learners, taking always into consideration learners' content-related difficulties. In the literature, there are two theoretical models about the conceptualization of TPCK - the integrative model proposed by Mishra and Koehler (2006) shown in Figure 1, and the transformative model proposed by Angeli and Valanides (2009) shown in Figure 2. The integrative view conceptualizes TPCK as an integrative body of knowledge defined by the intersections between content and pedagogy, content and technology, and

pedagogy and technology. In the transformative model, content, pedagogy, learners, technology, and context are regarded as significant contributors to the development of TPCK, which is regarded as a unique body of knowledge.

In more detail, the integrative view of TPCK, as depicted in Figure 1, is represented in terms of three intersecting circles, one for each distinct knowledge base, namely, content, pedagogy, and technology (Mishra & Koehler, 2006), while its subcomponents, i.e., technological content knowledge (TCK), technological pedagogical knowledge (TPK), and pedagogical content knowledge (PCK) are also clearly depicted in the figure. Empirical work by Mishra and Koehler and other researchers who adopted the integrative view of TPCK (e.g., Harris & Hofer, 2011; Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009; Chai, Koh, Tsai, & Tan, 2011) focused on identifying and measuring instances of TPCK's subcomponents, for example, TPK and TCK. So far, empirical findings from this line of research have been rather discouraging, because of the difficulty to clearly define the boundaries of the different TPCK sub-components (Archambault & Crippen, 2009; Graham, 2011; Voogt, Fisser, Pareja Roblin, Tondeur, & van Braak, 2012).

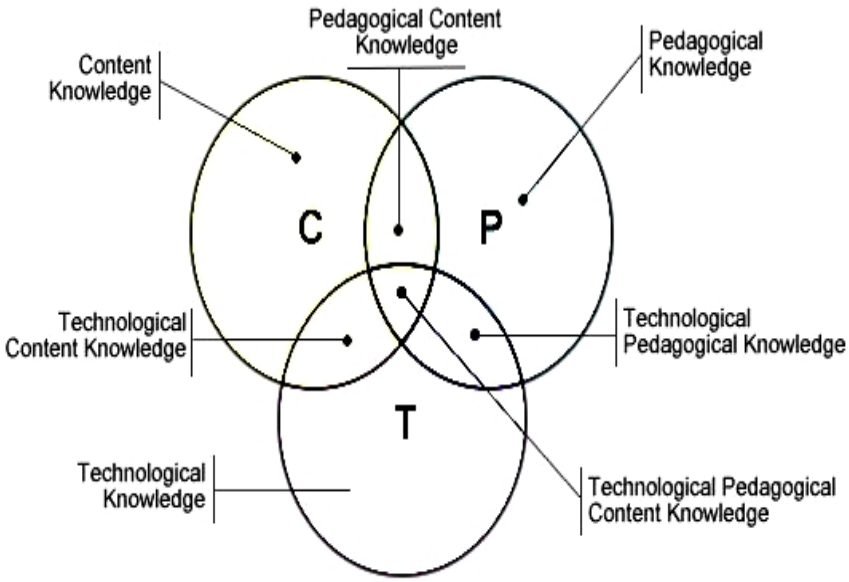

Figure 1. Integrative view of TPCK (adopted from Mishra & Koehler, 2006).

The transformative view of TPCK, as shown in Figure 2, is conceptualized in terms of five distinct knowledge bases, namely, content knowledge, pedagogical knowledge, knowledge of learners, knowledge of

educational context, and ICT knowledge (Angeli & Valanides, 2005, 2009). Based on the results of empirical investigations, Valanides and Angeli (2008a, 2008b) concluded that TPCK is a distinct body of knowledge that goes beyond mere integration or accumulation of the constituent knowledge bases, toward transformation of these contributing knowledge bases into something new and unique.

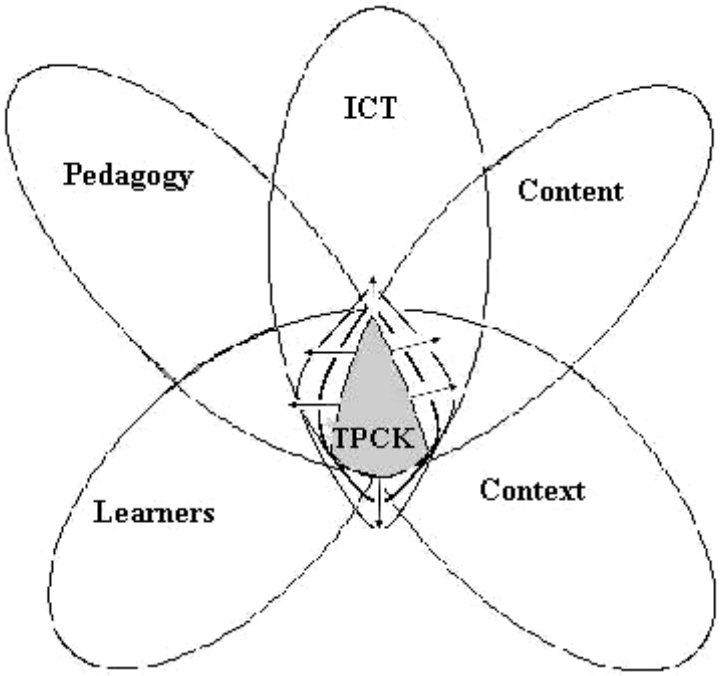

Figure 2. Transformative view of TPCK (adopted from Angeli & Valanides, 2009).

TPCK as a transformative body of knowledge is defined as knowledge about how to transform content and pedagogy with Information and Communication Technology (ICT) for specific learners in specific contexts and in ways that signify the added value of ICT (Angeli & Valanides, 2009). As illustrated in Figure 2, there are a number of individual knowledge bases that contribute to the development of TPCK; however, as it was found in a series of empirical studies, growth in the individual contributing knowledge bases alone, without specific instruction targeting exclusively the development of TPCK, does not result in TPCK growth (Angeli & Valanides, 2005; Angeli, 2005; Valanides & Angeli, 2006, 2008a, 2008b). Angeli and Valanides (2009) also proposed that TPCK, as a unique body of knowledge, is better understood in terms of competencies that teachers need to develop in order to be able to teach adequately with technology. A conceptualization of TPCK in terms of competencies has led to more robust and reliable ways of assessing learners' TPCK, bypassing measurement difficulties of the nature that researchers who adopted the

integrative view of TPCK reported in their studies (Archambault & Barnett, 2010; Cox & Graham, 2009; Graham, 2011; Niess, 2011). It is for this reason, that the Authors herein adopted the transformative view of TPCK as the theoretical framework of their study and concentrated on designing and implementing a teacher professional development program that focused on developing computer science teachers' TPCK competencies, such as:

1. Identify topics to be taught with technology in ways that signify the added value of technology tools, such as, topics that students cannot easily comprehend, or that teachers face difficulties teaching or presenting effectively in class. These topics may include abstract concepts (i.e., cells, molecules) that need to be visualized, phenomena from the physical and social sciences that need to be animated (i.e., water cycle, the law of supply and demand), complex systems (i.e., ecosystems, organizations) in which certain factors function systemically and need to be simulated or modeled, and topics that require multimodal transformations (i.e., textual, iconic, and auditory), such as, phonics and language learning.
2. Identify appropriate representations for transforming the content to be taught into forms that are pedagogically powerful and difficult to support by traditional means. These include interactive representations, dynamic transformation of data, dynamic processing of data, multiple simultaneous representations of data, and multimodal representations of data.
3. Identify teaching tactics, which are difficult or impossible to implement by other means, such as, the application of ideas in contexts that are not experienced in real life. For example, exploration and discovery in virtual worlds, virtual visits (i.e., virtual museums), testing of hypotheses, simulations, complex decision-making, modeling, long distance communication and collaboration with experts, long distance communication and collaboration with peers, personalized learning, adaptive learning, and context-sensitive feedback.
4. Select tools with appropriate affordances to support 2 and 3 above.
5. Infuse computer activities with appropriate learner-centered strategies in the classroom. This includes any strategy that puts the learner at the center of the learning process to express a point of view, observe, explore, inquire, think, reflect, discover, and problem solve.

Technology Mapping as an approach for developing teachers' TPCK:

According to Mishra and Koehler (2003) what stands between reality and the vision of teachers using technology in the classroom is not what teachers need to learn about technology, but how they are supposed to learn it in order to become competent to teach with technology. Teaching teachers how to use computer tools does not guarantee their pedagogical uses in the classroom. For example, training teachers to learn how to use software

packages "not only makes their knowledge too specific to be applied broadly, but it also becomes quickly outdated. Technology is changing so fast that any method that attempts to keep teachers up to date on the latest software, hardware, and terminology is doomed to create knowledge that is out of date every couple of years" (Mishra & Koehler, 2003, p. 102). Angeli and Valanides (2009, 2013) argued that Technology Mapping (TM) can potentially be an effective approach for developing the knowledge that teachers need to have in order to effectively teach with technology, namely, TPCK.

TM, as shown in Figure 3, was first introduced as an approach for developing teachers' TPCK in 2009 (Angeli & Valanides, 2009). TM was proposed as an instructional design approach for mapping tool affordances onto content and pedagogy in powerful and transformative ways, enabling teachers to develop complex and interrelated ideas between the affordances of technology and their pedagogical content knowledge. Angeli and Valanides (2009) argued that TM can engage learners in a process of developing technological solutions to pedagogical problems by aligning teachers' PCK with knowledge about the affordances and constraints of various computer-based technologies. Mapping refers to the process of establishing connections or linkages among the affordances of a tool, content, and pedagogy in relation to learners' content-related difficulties.

TM is a dynamic, situated and personal design process, which greatly diverges from traditional instructional design practices as teachers' instructional design decisions are guided by a body of knowledge that is highly situated in the context of their real classroom experiences (Moallem, 1998). As shown in Figure 3, context is an overarching factor in the process of designing learning with technology. The process of designing technology-enhanced learning is influenced by certain context-related factors, such as, teachers' beliefs about how students learn, teachers' practical experiences about what can and what cannot work in a real classroom, teachers' views about the role of technology in teaching and learning, teachers' adopted instructional practices, school's vision and educational goals. These context-related factors influence teachers' thinking about how technology is integrated in the classroom (Niess, 2005, 2011; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Abbitt, 2011). For example, if a teacher has deep-rooted beliefs in teacher-centered learning, then technology integration will most likely be teacher-directed (i.e., the teacher uses the technology to deliver information to students) and not learner-directed (i.e., the students use the technology to construct/represent meaning about something).

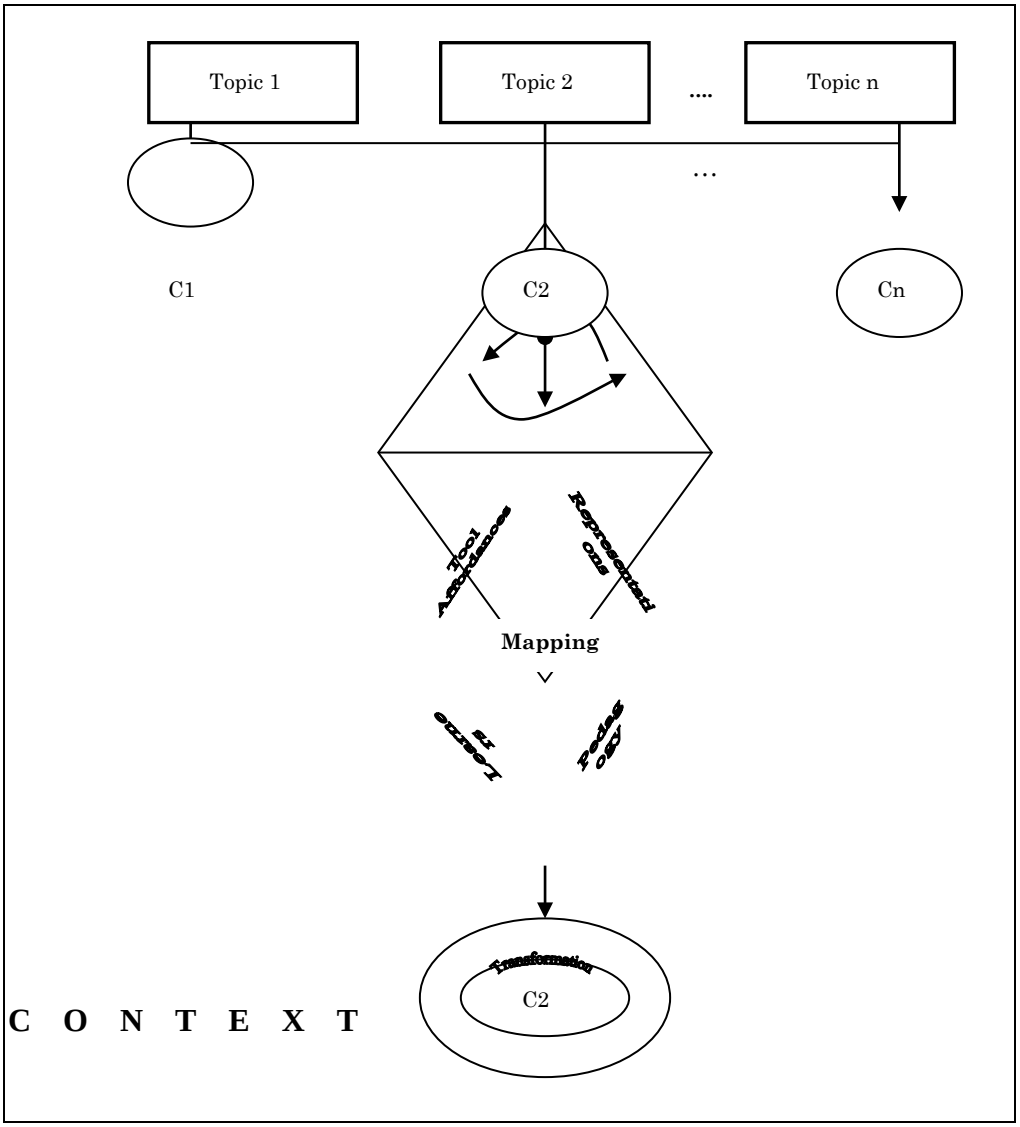

Figure 3. Technology Mapping (adopted from Angeli & Valanides, 2009).

TM allows teachers to bring experiences from their classrooms into the design process, and, specifically, experiences that are related to teachers' PCK, that is, teachers' understandings of their students' alternative conceptions and learning difficulties in relation to certain curriculum topics, as well as teachers' understandings of their own difficulties in making a specific content teachable and easily learnable for their students. According to the TM process depicted in Figure 3, teacher educators ask pre-service or in-service teachers to think about a content domain as well as particular topics within the domain, and, based on their experiences, to indicate their difficulties in making the most challenging aspects of the topics teachable to

students, in connection with students' content-related difficulties. Subsequently, for each topic, teachers associate relevant content (represented as C1, C2,…Cn in Figure 3) and tentative objectives based on learners' related alternative conceptions that need to be addressed. Then teachers are engaged in iterative decision making in order to think how to go about transforming the content with technology into representations that are more understandable to learners. In doing so, teachers need to first decide how tools can be used to transform the content into powerful representations (upper part of the diamond), how to tailor these representations for the specific needs of their students, and how to use technology in innovative ways to transform existing pedagogical practices in their respective classrooms (lower part of the diamond). Thus, at the heart of this iterative decision making is the notion of technology affordances.

Affordances are properties of the relationship between an agent and its physical environment. These properties allow and facilitate specific types of interaction. Gibson (1979, 1982) defined affordances as all action possibilities latent in the environment, objectively measurable and independent of the individual's experience, knowledge, culture, or ability to recognize them. Norman's (1988, 1990) conceptualization of affordances diverges from Gibson's conceptualization in that Norman defines an affordance as something of both actual and perceived properties. When actual and perceived properties are combined, an affordance emerges as a relationship that holds between the object and the individual that is acting on the object (Norman, 1990). From the literature on teachers' understandings of technology affordances, it is evident that (a) teachers do not distinguish between the technical functions of technology and the educational affordances of technology (Valanides & Angeli, 2006, 2008a, 2008b; Angeli & Valanides, 2005; Angeli, 2005), (b) teachers are not always aware of the cognitive processes involved in using the affordances of a particular technology (Yoon, Ho, & Hedberg, 2005), and (c) teachers' formation of mental models of technology affordances largely depends upon their training and their professional development (Krauskopf, Zahn, & Hesse, 2012). Based on these findings, going from knowing how to use a tool to knowing how to teach with a tool, or going from knowing about the technical functions of technology to perceiving the educational affordances of technology, does not occur automatically. Therefore, it becomes imperative that teacher educators make this process explicit during teacher training. A tactic that was used in previous research (Author) with good results, and also employed in the current study is that of aligning the educational affordances of a computer tool with its technical features. To further illustrate this point, the authors present Table 1 as it was used for the purposes of the current study. Table 1 makes explicit the connections between the educational

affordances of MS Excel and its technical features. The information provided in Table 1 is quite useful, as it provides teachers with a systematic and organized way to think about tools and their educational affordances. Similar tables were prepared for the tools Powerpoint and Mindomo, but due to space limitation they are not included here.

Table 1. Educational affordances of MS Excel and technical functions

Educational affordances (sequenced from simple to complex)	Technical functions
1. Excel as a tool for organizing data.	File – New/Open/Close/Save/Save as/ Page setup/Print area/Print preview/Print/Send to. Edit – Cut/Copy/Paste/Fill/Clear/Delete/Delete sheet/Move or copy sheet/Find/Replace. Insert – Cells/Rows/Columns/Worksheet/Chart Pictures. Format – Cells/Row/Column/Sheet/Style. Review – Spelling and Grammar/Protect Sheet. Data – Sort/Text to columns/Group and outline.
2. Excel as a tool for providing context-sensitive feedback.	Insert – Function / SUM / IF Data – Data Tools/Data Validation/Setting … /Drop down list.
3. Excel as a tool for performing calculations.	View – Formula bar. Insert – Function / SUM / IF
4. Excel as a modeling tool.	All of the above as needed.

The teacher professional development program - Design and implementation:

During the period between the first week of February and the second week of March in 2014, a 15-hour teacher professional development (TPD) program, entitled "Contemporary Teaching Approaches with the Use of Technology for Teaching Computer Science Topics," was taught for the purpose of teaching secondary education computer science teachers how to teach with technology in learner-centered ways. The program was co-designed by all authors herein and was taught by the second author. The TPD program consisted of five three-hour seminars. The participants were 13 secondary education computer science teachers; eight women and five men. Four of the participants had five to eight years of teaching experience, eight of them had 10 to 15 years of teaching experience, and one of them was a veteran with 18 years of teaching experience. Six of the participants had teaching experience only with middle school (grades 7-9) students, one of them had taught only high school (grades 10-12) students, and the rest of them had teaching experience with both middle and high school students.

The TPD program consisted of three phases. Phase I put emphasis on principles of learner-centered teaching, targeting the development of participants' pedagogical skills through live lesson demonstrations by the

trainer in the form of microteaching experiences of three computer science lessons. Phase II of the program focused explicitly on TPCK as a framework for guiding the use of educational technologies in computer science teaching and learning, and TM as an approach for designing technology-enhanced teaching and learning. Phase III of the program consisted of a series of microteaching sessions during which each participant designed and taught a 20-min computer science lesson with the use of educational technology.

Initially, in Phase I, participating teachers were asked to complete an online questionnaire in order to answer a question about what topics from the secondary education computer science curriculum, according always to their subjective appraisal, are difficult to be taught by the teachers and difficult to be understood by the learners. Consequently, the teacher trainer taught a lesson about the Central Processing Unit (CPU) in three different ways following learning principles from behaviourism, cognitivism, and constructivism, respectively. The intention was to teach teachers about learning theories by immersing them first in teaching lessons that they could directly experience, and, afterwards, based on this experience, to discuss with them the tenets of each learning theory, and the influence of each theory on instructional design. The decision to teach about the CPU was intentional, because the related content is regarded difficult to teach and learn. This difficulty arises from the abstract nature of the content in terms of the intrinsic difficulty in understanding that the CPU is a complex set of electronic circuitry, and that it consists of a number of components that work together in some way and interact with memory (Author).

The first lesson was taught based on the tenets of behaviourism. The teacher trainer presented, in a teacher-centered approach, all relevant content information using a Powerpoint presentation. The mode of instruction was primarily based on the transmission model of teaching, and participants had to listen to the teacher trainer, take notes, answer the trainer's questions, and practice.

The second lesson was designed based on the principles of cognitivism. At the beginning of the lesson, the teacher trainer showed the electronic circuitry of the CPU using real hardware equipment, called attention to the different hardware components, such as, RAM, ROM, and VGA card, and explained their role. Then, he presented the participants with a semi-completed concept map, which contained some information about the CPU that he created using a concept mapping software, and asked them to work in groups of two or three (four groups were formed) in order to search the Internet and find relevant information for completing the concept map. Each group had to provide information related to the components of the CPU, such as Registers, Arithmetic Logical Unit, Control Unit, and CPU

clock. When all groups finished, a representative from each group presented their findings.

The third lesson was designed based on the tenets of constructivism, and relied heavily on the use of MS Excel for the purpose of simulating the functioning of the CPU in terms of the complex interactions among the different components, as well as the interactions with memory. Initially, the participants opened an MS Excel worksheet and had to demonstrate, by answering a number of questions, that they had (prior) knowledge of how data are converted to binary numbers, as well as knowledge about how data are stored temporarily in RAM before moving to the CPU for processing, which then return to RAM in the form of information to be eventually displayed on an output device like the monitor. After that, the participants were given a simulation to interact with (in MS Excel) that simulated in detail the interactions among the different CPU components and memory. As expected, the simulation created some cognitive conflict in those cases where initial conceptions differed in terms of how the participants thought the CPU was functioning. Then, learners were divided into three groups and worked collaboratively in order to study more carefully the functioning of the CPU using the simulation in MS Excel. Each group of participants interacted with all CPU components, such as the Registers, Arithmetic Logical Unit, and Control Unit, and at the end, a representative from each group presented and explained to the whole class the role of one CPU component, as instructed by the teacher trainer.

A discussion followed about the pros and cons of the design of each lesson, and implications about the educational uses of technology according to the tenets of each learning theory were discussed in depth and great detail.

During the second phase of the seminar, the instructors presented and explained the framework of TPCK as well as the approach of TM. It was pointed out that the TPCK framework, in its present form, constitutes a domain-general framework that describes the contribution of several knowledge bases to the development of a specific body of knowledge that teachers need to have in order to be able to teach with technology. The TPCK competencies were taught explicitly using as a reference point the integration of technology in each one of the three lessons that were taught during the first phase of the TPD program. The teacher trainer aimed at providing a balance between theory and practice so that teachers could develop a theory-based rationale about their teaching moving away from trial and error instructional decisions to more informed decisions based on theory.

The third phase of the TPD program was conducted in three consecutive meetings of three hours each. All participants were asked to consult first with the teacher trainer in order to jointly decide upon an appropriate topic from the secondary education computer science curriculum

to teach with technology. Then, they had to design and develop all related instructional materials and teach a 20-min lesson during the seminar. At the end of each lesson, a classroom discussion followed with comments and suggestions for possible improvement of the lesson. Finally, at the end of the TPD program, the teachers evaluated the content, the structure, and the teaching strategies of the program, and suggested recommendations for improvement.

Outcomes of the TPD program:

The teachers' views about the topics from the secondary education computer science curriculum that are difficult to teach and learn are presented in Table 2. As shown in Table 2, the teachers identified 13 topics and explained why they regarded these topics difficult to teach and learn.

Table 2. Topics from the computer science curriculum

	Topics	Why the topic is difficult to teach and learn
1	Computer architecture	Difficult to represent the overall architecture of the computer and show how all components communicate together.
2	Repeated structure in programming	Difficult to understand how the variables for the repetition structure in programming are set, and what role they play.
3	Identifiers (variables and constants) in programming	Difficult to use and declare identifiers (variables and constants) in programming.
4	Data, Processing, Information	Difficult to understand the differences among the three concepts. While these difficulties are not visible early on, they strongly manifest themselves during the teaching of some other computer science topics, such as, algorithms, spreadsheets and databases.
5	Communication protocol	Difficult to teach how two different digital devices communicate between them.
6	Introduction to algorithms	Difficult to write an algorithm.
7	Representation of data in computer language	Difficult to teach the relationship between electric circuitry and computer machine language.
8	World Wide Web (www) and Internet	Difficult to understand the differences between the Internet and WWW.
9	Bubble sort algorithm	Difficult to teach how to use two different counters for sorting a table. There is also a complexity related to teaching the procedure for exchanging the values of two variables with the use of an intermediate variable.
10	Operating systems	Difficult to teach how operating systems work and how the hardware communicates with the software.
11	Functions and procedures	Difficult to understand the differences between functions and procedures.
12	Repetition structures	Difficult to decide which loop structure to use.

	(While..Do or Repeat..Until)	
13	Main memory (RAM) and secondary memory	Difficult to explain the differences between the two types of memory, as there is a difficulty in representing them accurately.

Later, each teacher undertook one of the topics shown in Table 2, after consultation with the teacher trainer, and taught it in a 20-min microteaching session during the last phase of the TPD program. Due to space limitations, in the section below, the authors present the technology-enhanced lessons for only three of these topics, namely: (a) Computer architecture, (b) Introduction to algorithms, and (c) Bubble sort algorithm.

Topic 1- Computer architecture:

The teaching of computer architecture usually requires two 45-min teaching periods in eighth grade. The difficulty in teaching and understanding this topic is attributed to the fact that the architecture of the computer consists of several internal hardware components that communicate amongst them in some way that is invisible to the learner. The learning objectives of this lesson were defined as follows: (a) Report and explain the term computer architecture; and (b) Recognize the main parts inside a computer and explain their role. At the beginning of the 20-min microteaching lesson, the teacher showed a short video about the basic hardware components of the computer. Afterwards, the teacher discussed with the students (role played by the other teachers who participated in the TPD program) what was meant by the term computer architecture, and used as a metaphor an example from daily life to further explain the term, namely, the architecture of a house. For the technology-enhanced learning activities, the teacher used Mindomo, a concept mapping tool that allows users to insert images, video, audio, note fields, and to create hyperlinks and bookmarks. Additionally, the tool allows users to work collaboratively in order to create a joint concept map. Consequently, the teacher sent an online request to students via email inviting them to access an incomplete Mindomo concept map that was created specifically for the purposes of the lesson. Students worked in dyads and engaged in activities that included an exploration of the web via different links, in order to find relevant information for completing the concept map. Each group undertook a different task. For example, Group A dealt with power supply, the motherboard, and CPU. Group B dealt with RAM and ROM, Group C with expansion slots, Group D with expansion cards, and Group E with connected slots. When all groups finished their work, a completed concept map was created collaboratively. Each group presented to the class their part of the task. In essence, the collaborative online activity with Mindomo enabled the students to create a virtual

motherboard that they could use afterwards as a guide in order to assemble a real one.

At the end of the lesson, a debriefing session followed about the instructional design of the lesson and different points of view were expressed regarding the integration of Mindomo in the teaching of the lesson.

Topic 2 - Introduction to algorithms:

Learning how to write an algorithm constitutes a highly important topic for the field of computer science and the secondary education computer science curriculum as well. Algorithms are sets of instructions written in a step by step fashion that are followed in order to solve a problem. Algorithms can be expressed in the form of a high-level computer language, pseudo-code, verbal descriptions, and flowcharts. In the field of computer science, it is imperative for students to learn how to write algorithms, before learning how to write code using a computer programming language. Algorithms are usually taught in ninth grade and they are considered prerequisite knowledge for learning how to program. An approach that is usually used to teach students how to develop algorithms, prior to learning how to code computer programs, is flowcharting. A flowchart is a type of diagram that represents an algorithm, workflow or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. This diagrammatic representation illustrates a solution to a given problem.

The learning objectives of this lesson were defined as follows: (a) Define the cycle of Data-Process-Information in a problem; (b) Recognize the necessity and usefulness of flowcharts; (c) Recognize the different shapes of boxes that can be used for creating the flowchart of an algorithm; and (d) Create the flowchart for an algorithm. For the purpose of developing the technology-enhanced activities, MS Excel was used. Table 1 shows all information related to the educational affordances of MS Excel and its technical features. The information displayed in Table 1 was used as a guide for facilitating the construction of teachers' mental models concerning the educational utilization of spreadsheets in teaching and learning.

In more detail, at the beginning of the lesson, students (role played by the teachers in the program) were asked to open and execute a flowchart in Algo. Students were then instructed to interact with the flowchart in order to input some data and observe the result. Then, a discussion followed about the value of flowcharts in learning how to develop algorithms. Students were asked to continue interacting with the flowchart in Algo in order to discover the differences among the terms data, process, and information. Subsequently, students were instructed to work individually on a number of different activities in MS Excel. The activity shown in Figure 4 dealt with the cycle of data processing (i.e., Input Data, Process Data, Output Data)

and explicated the idea that a correct algorithm follows this cycle. Students were asked to apply the cycle of data processing by selecting an appropriate step. Upon a correct answer, students received positive feedback. Then, the students proceeded with two more MS Excel activities for more practice.

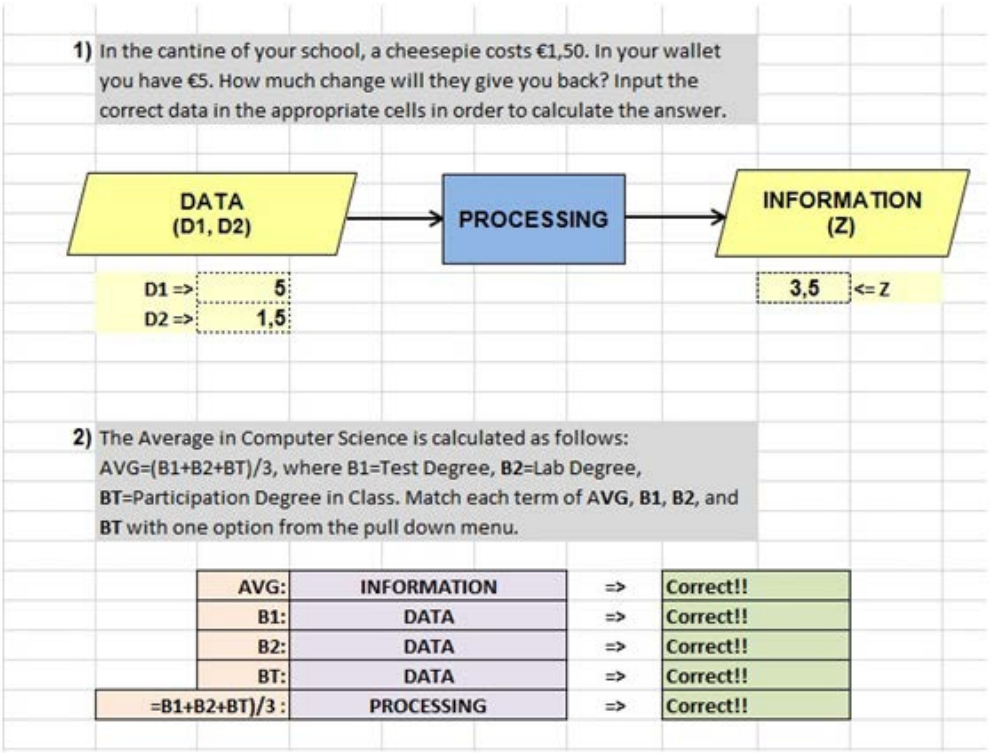

Figure 4. Data-Process-Output cycle.

Topic 3 - Bubble sort algorithm:

One well known algorithm in programming is the Bubble sort algorithm. It is a sorting algorithm that is used when there is a need to sort a two-dimensional array. Bubble sort is an algorithm about how to compare and exchange pairs of adjacent elements. The smallest element is always moved to the left of the array. The difficulty in teaching and understanding the algorithm is attributed to the fact that in order to successfully perform a bubble sort one needs to use two counters, and consequently the need for a double loop creates an additional degree of difficulty. Students usually face difficulties in understanding the values of the two counters, e.g., i and j. There is also a complexity related to teaching the actual procedure for exchanging the values of two variables with the use of an intermediate (temporary) variable. Bubble sort is usually taught in twelveth grade. The learning objectives of the lesson were defined as follows: (a) Describe the steps that are executed during the Bubble sort algorithm; (b) Demonstrate the

use of two different counters in order to be able to make the comparisons of all values in the cells; and (c) Write the actual code for the Bubble sort algorithm. Specifically, the teacher at the beginning of the lesson showed a short video about Bubble sort, and how it actually works. Then a discussion followed about the necessity to sort a two-dimensional array. Then the teacher, through the use of animated Powerpoint presentations (see activities shown in Figures 5 and 6), demonstrated increasingly all of the steps that are involved in Bubble sort. This way, students were able to see the swaping between cells and the series of comparisons that necessarily needed to be performed before a value was moved to its final position on the left side of the array.

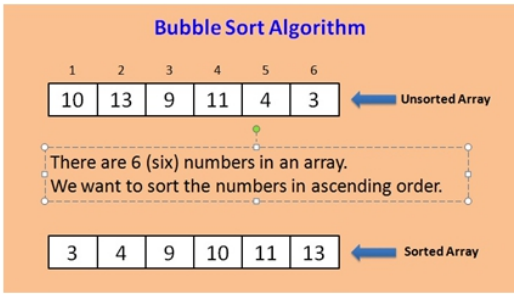

Figure 5. Bubble sort.

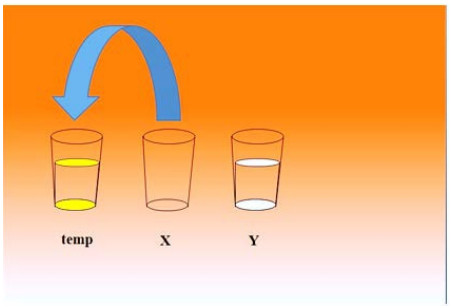

Figure 6. Using a temporary variable during Bubble sort

Evaluation of the TPD program:

At the end of the 15-hour TPD program, all 13 participating teachers evaluated anonymously the program through the use of an online questionnaire. The questionnaire included questions about the content and the structure of the program, and questions about the pedagogical practices employed by the teacher trainer. The outcomes of the evaluation were overwhelmingly positive for the design and the implementation of the TPD program. All thirteen teachers expressed their gratitude and satisfaction for the opportunity they were given to participate in the program, and felt that the framework of TPCK as well as the approach of TM equipped them with knowledge and skills about how to rethink the teaching of difficult computer science topics. In addition, all teachers expressed their positive remarks about the approach that was followed to teach them about the educational affordances of tools, and found especially useful the table format (e.g., Table 1) that was followed in order to think in a systematic way about the educational utilization of the tools. Participants were also very keen on how the seminar was taught using primarily the microteaching approach. First, they commented on the three lessons that the teacher trainer taught during

the first phase of the program. They felt they learned a lot about the practicalities of the learning theories and their applicability in classroom teaching in terms of specific teaching strategies and tactics. Then, they commented on how important was to observe other teachers teach in the program and share ideas about how to teach with computer tools. They noted that sharing lesson designs and materials for 13 different computer science topics (shown in Table 2) was extremely beneficial since they now had at their availability materials that they could adopt or adapt in their own teaching.

Succinctly, according to the participants' evaluative comments, the strengths of the TPD program were the following: (a) The continuous effort of the teacher trainer to make explicit the relationship between the technical features of the tools and their educational affordances; (b) The selection of topics that were chosen for the trainer led seminars as well as those for the participant-teachers' microteaching sessions; (c) First-hand knowledge in experiencing the added value of educational technology in teaching difficult and abstract computer science topics; (d) The repetitive demonstration of TM by the teacher trainer and the fact that the teachers themselves practiced the process extensively during the 15-hour program; (e) Theory-driven instructional design based on the TPCK framework and the approach of TM; and, (f) Extensive discussions and reflection about the microteaching sessions as carried out by the teacher trainer and the teachers themselves.

One suggestion for improvement expressed by the participating teachers is to include a fourth phase in future TPD programs in order to have each teacher apply what he or she learned in a real classroom setting. Undoubtedly, extending the TPD program to include a fourth phase will most likely add to the authenticity and the viability of the training in real classroom contexts, and can be the focus of future research efforts.

Conclusion

The authors recognize that the study described herein focused primarily on the cognitive domain of learning; that is on using technology to transform existing classroom practices in order to solve existing pedagogical problems that were directly related to the difficulty of the teacher to teach the content, or the difficulty of the learner to understand the content. They, however, recognize that the difficulties in teaching or understanding a particular content might not always be cognitive in nature. Therefore, it is the authors' conviction that in future research studies it will be valuable and promising to invest research time, effort, and resources for the purpose of examining TPCK and TM in conjunction with various facets of both the cognitive and the affective domains of learning, as these are exemplified by different content domains. This research direction will be beneficial as it will

allow the researchers to consider the specificity of TPCK within domains where affect plays an important role in teaching and learning, such as, for example, the fine arts (i.e., music, drama, and dance). Efforts toward this line of research will help the research community to further clarify the construct of TPCK and thereafter to design more effective teacher professional development programs for the development of teachers' TPCK.

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USING THE SCOUT METHOD IN HEALTHCARE SOFTWARE ENGINEERING

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Abstract

European universities are involved in a process of change to ensure they are more comparable, compatible and coherent systems of higher education inside the European Higher Education Area (EHEA). In addition, scouting takes more than 100 years educating young people around the world. This non-formal education is based on values and its method is near the same for more than 30 million people along more than 100 years. The main goal of this paper is to show the analogy and the relationship between the educational model proposed by scouting and the educational model proposed by the EHEA, as well as to present a real case study where the scout method has been implemented in a health care software engineering subject at the informatics and computer science school in the University of Malaga. Along this paper, educational models, their analogies and relationships will be presented. Finally, the case study will be presented, developed and evaluated.

Keywords: European space for higher education; scout method; Healthcare computer engineering education

European Higher Education Area

The European Higher Education Area (EHEA) was launched along with the Bologna Process (The European Higher Education Area., 2010) decade anniversary, in March 2010, during the Budapest-Vienna Ministerial Conference. As the main objective of the Bologna Process since its inception in 1999, the EHEA was meant to ensure more comparable, compatible and coherent systems of higher education in Europe. Between 1999 and 2010, all the efforts of the Bologna Process members were targeted to creating the European Higher Education Area, that became reality with the Budapest-Vienna Declaration of March, 2010.

In many respects, the Bologna Process has been revolutionary for cooperation in European higher education (Secretariat, 2009). Four education ministers participating in the celebration of the 800th anniversary of the

University of Paris (Ministers in charge for France, 1998) shared the view that the segmentation of the European higher education sector in Europe was outdated and harmful. The decision to engage in a voluntary process to create the European Higher Education Area (EHEA) was formalized one year later in Bologna, by 30 countries (Education, 1999). It is now apparent that this was a unique undertaking as the process today includes no fewer than 47 participating countries, out of the 49 countries that have ratified the European Cultural Convention of the Council of Europe (1954).

At its inception, the Bologna Process was meant to strengthen the competitiveness and attractiveness of the European higher education and to foster student mobility and employability through the introduction of a system based on undergraduate and postgraduate studies with easily readable programs and degrees. Quality assurance has played an important role from the outset, too.

However, the various ministerial meetings since 1999 have broadened this agenda and have given greater precision to the tools that have been developed. The undergraduate/postgraduate degree structure has been modified into a three-cycle system, which now includes the concept of qualifications frameworks, with an emphasis on learning outcomes. The concept of social dimension of higher education has been introduced and recognition of qualifications is now clearly perceived as central to the European higher education policies. In brief, the evolution of the main objectives of the Bologna Process can be seen hereby (Zgaga, 2006).

The Sorbonne Declaration was signed in 1998, by the ministers of four countries, namely France, Germany, United Kingdom and Italy. The aim of the Declaration was to create a common frame of reference within the intended European Higher Education Area, where mobility should be promoted both for students and graduates, as well as for the teaching staff. Also, it was meant to ensure the promotion of qualifications, with regard to the job market.

The aims of the Sorbonne Declaration were confirmed in 1999, through the Bologna Declaration, where 29-30 countries expressed their willingness to commit to enhance the competitiveness of the European Higher Education Area, emphasizing the need to further the independence and autonomy of all Higher Education Institutions. All the provisions of the Bologna Declaration were set as measures of a voluntary harmonization process, not as clauses of a binding contract.

As follow-up to the Bologna Declaration, there have taken place Ministerial Conferences every two years, the ministers expressing their will through the respective Communiqués. With the Prague Communiqué, in 2001, the number of member countries was enlarged to 33, and there has also taken place an expansion of the objectives, in terms of lifelong learning,

involving students as active partners and enhancing the attractiveness and competitiveness of the European Higher Education Area. Also, the participating ministers committed themselves to ensure the further development of quality assurance and development of national qualification frameworks. This objective was correlated with the lifelong learning one, as it is considered an important element of higher education that must be taken into consideration when building up new systems. Also, it is important to mention that the topic of social dimension was first introduced in the Prague Communiqué.

The following Ministerial Conference took place in Berlin, in 2003, thus the Berlin Communiqué enlarging the number of countries to 40 members. The main provisions of this Communiqué dealt with an expansion of the objectives, in terms of promotion of linking European Higher Education Area to European Research Area, as well as the promotion of quality assurance. Another important aspect that the Berlin Communiqué stated referred to establishing the follow-up structures supporting the process in-between two Ministerial meetings. This arrangement established the Bologna Follow-up Group, the Board and the Bologna Secretariat. With this Communiqué the Ministers also agreed that there should be created a national follow-up structure in each of the participating countries.

The Bergen Communiqué, of 2005, underlined the importance of partnerships, including stakeholders – students, HEIs, academic staff and employers, together with the further enhancing of research, especially with regard to the third cycle – doctoral programs. Also, this Communiqué stressed the ministers' will to provide a more accessible higher education, together with an increased attractiveness of the EHEA to other parts of the world.

With the London Communiqué, of 2007, the number of participating countries was enlarged to 46. This Communiqué focused on evaluating the progress achieved by that time, concerning mobility, degree structure, recognition, qualifications frameworks (both overarching and national), lifelong learning, quality assurance, social dimension, and also set the priorities for 2009, these being, mainly, mobility, social dimension, which was defined here for the first time, data collection, employability, EHEA in a global context and stock taking. For 2010 and beyond, it was stressed that there is the need for further collaboration, seeing it as an opportunity to reformulate the visions and values.

In the Leuven/Louvain-la-Neuve Communiqué, of 2009, the main working areas for the next decade were set, with emphasis on: social dimension, lifelong learning, employability, student centred learning and the teaching mission of education, international openness, mobility, education, research & innovation, as well as data collection, funding of the HE and

multidimensional transparency tools. These main working areas show a new orientation of the Bologna Process, towards a more in-depth approach of the reforms, thus ensuring the completion of the Bologna Process implementation. Another change, in terms of internal arrangements, referred to the Bologna Process Chairing procedure: from a previous situation where the Bologna Process had been chaired by the country holding the EU Presidency, to a situation according to which the Process is being chaired by two countries: both the country holding the EU Presidency and a non-EU country, named in alphabetical order, starting from July 1st, 2010.

The following Ministerial Conference took place only one year after the aforementioned, more precisely in March 2010. It took place in Budapest-Vienna and it was an Anniversary Conference, celebrating a decade of the Bologna Process. With this occasion, there took place the official launching of the European Higher Education Area, which meant that, in terms of a common European framework for HE, the objective set in the Bologna Declaration was accomplished.

However, the existence of the European Higher Education Area in itself did not mean an achievement of all the objectives agreed upon by the ministers involved in the Bologna Process. Therefore, we can now say that the Bologna Process and the European Higher Education Area have entered a new phase, namely the consolidation and operationalization one, especially in light of the very different reactions to the Bologna Process implementation across Europe.

Also, starting with the Budapest-Vienna Ministerial Conference, the EHEA has been expanded to 47 countries; the most recently admitted being Kazakhstan. The main message of the Bucharest Ministerial Conference, which took place on 26 - 27 April 2012 and was attended by 47 European ministers responsible for higher education, states that Higher education reform can help to get Europe back on track and generate sustainable growth and jobs. The Ministers agreed to focus on three main goals in the face of the economic crisis: to provide quality higher education to more students, to better equip students with employable skills, and to increase student mobility. The 47 countries adopted a new European strategy to increase mobility with a specific target that at least 20 percent of those graduating in Europe in 2020 should have been on a study or training period abroad.

Besides the Ministerial Conferences, there are also Bologna Policy Forum organized, which were so far coupled with the EHEA Ministerial Conferences.

The first Bologna Policy Forum was organized in Leuven/Louvain-la-Neuve in 2009 and it was attended by the 46 members of the Bologna Process, at the time, as well as a wide range of third countries and NGOs. The main issues agreed upon by the participants were the following: the key

role that HE plays in the development of the society, based on lifelong learning and equitable access at all levels of society to learning opportunities, the importance of public investment in higher education, in spite of the economic crisis, transnational exchanges in higher education should be governed on the basis of academic values, advocating a balanced exchange of teachers, researchers and students between countries, in order to promote fair and fruitful "brain circulation", as an alternative to brain drain.

The Second Bologna Policy Forum took place in Vienna, in March 2010, and it was attended by the 47 members and the eight consultative members, as well as third countries and other relevant NGOs. The main topics of discussion included in the Second Bologna Policy Forum Statement refer to the manner in which higher education systems and institutions respond to the growing demands and multiple expectations and the balance between cooperation and competition in international higher education. This Forum's Statement also included some possible concrete feedback to be taken up by the participants, such as nominating contact persons for each participating country which will also function as liaison points for a better flow of information and joint activities, including the preparation of the next Bologna Policy Forum at ministerial level. Also the need for supporting global student dialogue was acknowledged.

As far as implementation is concerned, progress over the years has been uneven, as can be seen from the various stocktaking exercises. This shows that the reforms of the Bologna Process must still be furthered, in order to ensure more comparable, compatible and coherent systems of higher education in Europe.

If by 2010, the main aim of the Bologna Process was to put in place a European Higher Education Area, as stated in the Leuven/Louvain-la-Neuve Communiqué, the main priorities for the next decade are:

- Social dimension
- Lifelong learning
- Employability
- Student-centered learning
- Education, research and innovation
- Mobility
- Data collection
- Multidimensional transparency tools
- Funding.

Therefore, the Bologna Follow-up Group set up the following working groups for the 2009-2012 period:

- Social dimension
- Qualifications frameworks
- International openness

- Mobility
- Recognition
- Reporting on the implementation of the Bologna Process
- Transparency mechanisms,
- And the following networks:
- EHEA Information and Promotion Network;
- Network for Experts in Student Support in Europe – NESSIE;
- Network for National Qualifications Frameworks Correspondents.

Now, after the launching of the European Higher Education Area, the Bologna Process moves towards a new phase, a more in-depth one, focusing on a reduction of the implementation discrepancies in the countries forming the EHEA.

The next milestone of the European Higher Education Area has been marked at the EHEA Ministerial Conference, which took place in Bucharest, Romania, on 26-27 April 2012. The Third Bologna Policy Forum, which was organized in conjunction to this Ministerial meeting contributed to further the debate on the progress of the European Higher Education Area on the global scale. It was attended by members and heads of delegations from 47 EHEA countries and 19 non-EHEA countries along with representatives of international organizations from the field of higher education.

The overarching theme of the third Bologna Policy Forum was "Beyond the Bologna Process: Creating and connecting national, regional and global higher education spaces". The third edition of the Bologna Policy Forum focused on creating and connecting national, regional and global higher education spaces, while deepening the discussions on the following four topics reflecting on future approaches for dialogue in this context:

- Public responsibility for and of higher education within national and regional context;
- Global academic mobility: Incentives and barriers, balances and imbalances;
- Global and regional approaches to quality enhancement of higher education;
- The contribution of HE reforms to enhancing graduate employability;

The participants stated that the BPF concept should be further enriched and taken forward in order to maximize its potential for policy dialogue. In this sense, an evaluation of the Bologna Policy Forum was organized immediately after the event with all participant delegations.

The Aims and Method of Scouting

The Scout method is the informal educational system used by Scouting. Non-formal education is the organized educational activity outside the established formal system that is intended to serve an identifiable learning clientele with identifiable learning objectives" (UNESCO).

The Scout Method is a system of progressive self-education through (Scouting an Educational System, 1998):

- A promise and law.
- Learning by doing.
- Membership of small groups (for example the patrol), involving, under adult guidance, progressive discovery and acceptance of responsibility and training towards self-government directed towards the development of character, and the acquisition of competence, self-reliance, dependability and capacities both to cooperate and to lead.
- Progressive and stimulating programs of varied activities based on the interests of the participants, including games, useful skills, and services to the community, taking place largely in an outdoor setting in contact with nature.

The aim of Scouting is character training with the goal of helping participants become independent and helpful, and thereby become "healthy, happy, helpful citizens". The Scout method uses appealing games in the primitive outdoors to generate challenges which a Scout learns to solve by himself. Through the training and the example of the leader, Scouts are taught independence, leadership, the ambition to learn by himself/herself, and a moral code with positive goals. According to founder Robert Baden-Powell (Baden-Powell, 1908), the Scout method works naturally and unconsciously: naturally in the way that it follows the natural impulses of the Scout, and unconsciously because the Scout is not aware of the education. Hands-on orientation provides a practical method of learning and helps the Scout build confidence. Activities and games provide a fun way to develop skills and provide contact with nature and the environment when pursued in an outdoor setting. Scouts learn in small groups to build unity and a brotherly atmosphere. Developing the characteristics of responsibility, self-reliance, self-confidence, and readiness, the Scouts eventually learn collaboration and leadership skills. An attractive program of varying activities expands a Scout's horizons and bonds the Scout even more to the group.

The Scouting program has three specific objectives, commonly referred to as the "Aims of Scouting." They are character development, citizenship training, and personal fitness. The methods by which the aims are achieved are listed below in random order to emphasize the equal importance of each (The World Programme Policy, 1990).

Ideals: The ideals of Scouting are spelled out in the Scout Oath, the Scout Law, the Scout motto, and the Scout slogan (World Scout Bureau, 2011). The Scout measures himself against these ideals and continually tries to improve. The goals are high, and, as he reaches for them, he has some control over what and who he becomes.

Patrols: The patrol method gives Scouts an experience in group living and participating citizenship. It places responsibility on young shoulders and teaches boys and girls how to accept it. The patrol method allows Scouts to interact in small groups where they can easily relate to each other. These small groups determine troop activities through their elected representatives.

Outdoor Programs: Scouting is designed to take place outdoors. It is in the outdoor setting that Scouts share responsibilities and learn to live with one another. It is here that the skills and activities practiced at troop meetings come alive with purpose. Being close to nature helps Scouts gain an appreciation for God's handiwork and humankind's place in it. The outdoors is the laboratory for Scouts to learn ecology and practice conservation of nature's resources.

Advancement: Scouting provides a series of surmountable obstacles and steps in overcoming them through the advancement method. The Scout plans his/her advancement and progresses at his/her own pace as he/she meets each challenge. The Scout is rewarded for each achievement, which helps him/her gain self-confidence. The steps in the advancement system help a Scout grow in self-reliance and in the ability to help others.

Association with Adults: Boys and girls learn a great deal by watching how adults conduct themselves. Scout leaders can be positive role models for the members of their troops. In many cases a Scoutmaster who is willing to listen to children, encourage them, and take a sincere interest in them can make a profound difference in their lives.

Personal Growth: As Scouts plan their activities and progress toward their goals, they experience personal growth. The Good Turn concept is a major part of the personal growth method of Scouting. Children grow as they participate in community service projects and do Good Turns for others. Probably no device is so successful in developing a basis for personal growth as the daily Good Turn. The religious emblems program also is a large part of the personal growth method. Frequent personal conferences with his Scoutmaster help each Scout to determine his/her growth toward Scouting's aims.

Leadership Development: The Scout program encourages young people to learn and practice leadership skills. Every Scout has the opportunity to participate in both shared and total leadership situations.

Understanding the concepts of leadership helps a boy accept the leadership role of others and guides him toward the citizenship aim of Scouting.

Uniform: The uniform makes the Scout troop visible as a force for good and creates a positive youth image in the community. Scouting is an action program, and wearing the uniform is an action that shows each Scout's commitment to the aims and purposes of Scouting. The uniform gives the Scout identity in a world brotherhood of youth who believe in the same ideals. The uniform is practical attire for Scout activities and provides a way for Scouts to wear the badges that show what they have accomplished.

The Analogy between EHEA and the Scout Method

The Scout Method provides an educational framework based upon how young people develop naturally. It provides an environment which responds to:

- their need for action, challenge and adventure;
- their desire to explore, experiment, and discover;
- their natural capacity for inventiveness and resourcefulness;
- the need to feel acknowledged, respected and appreciated as individuals;
- their need for close supportive relationships;
- their capacity for idealism and their need to make sense of the world;

Following, we will show a set of teaching parameters used to evaluate the quality of the university education and their values in the traditional university, the EHEA and the scouting.

Size of the Group: Traditional University uses a large group (one hundred or more students) in a big classroom. However, the EHEA believes it is better to use smaller groups and recommend less than 50 students in theory lesson class and 25 in practical one. It sounds interesting that scouting promotes learning by "living in small groups" as one of the principles of the Scout method.

Knowledge Evaluation: Traditional University requires lectures or exams to evaluate Knowledge, Skills, and Abilities. The EHEA prefer along semester evaluations because while end-of-semester evaluations provide a quantitative analysis of class instruction, they may provide little direct feedback and they can be influenced by punctually personal moments. On that way, the Scout method believes each activity done has to be evaluated and celebrated.

Teaching Method: Traditional University uses the master class as the main way to teach. In the opposite side, the EHEA goes in the way of a curriculum based on team-oriented, project-based, and learning-by-doing.

And the Scout Method provides an educational framework based on learning-by-doing and long-life-learning.

Workload: Workload in the traditional University means how many hours the teacher is in the classroom. The EHEA takes the point of view of the students. So, the workload will mean how many hours a medium student will be working. This new measure takes into account lessons time, studying time, researching time, group meeting time, etc. One of the aims of Scouting is to offer attractive and fascinating activities to the children to be taken in their free time and which means no workload for them.

Curricula Model: The curricular model used in the traditional University is based on knowledge, so they try to establish what the student has to know. The EHEA focus its curricular model in competences, so they try to establish what the student is able to do. And finally, the model used by scouts is centre in values, what it means how we want the people be.

A Real Experience

A real experience has been developed during last year. It has taken the principles of scout method (living in small groups, team-oriented, project-based, learning-by-doing, and long-life-learning) and applied for the Healthcare Software Engineering subject development and implementation.

This is a first semester (from September to February) in the third year of the grade. It is 6 ECTS subject what it means 150 hours working time for a student where 60 hours are in-person class. The main goal of this subject is to offer a general view about software developing in the field of healthcare system such us Electronic Health Records, Clinical decision support, telemedicine, etc.

The list of topics is as follow:

1. Healthcare system Design.
2. Hospital Information Systems.
3. Electronic Health Records Design.
4. Medical Equipment and Applications.
5. Clinical decision support.
6. Information Security.

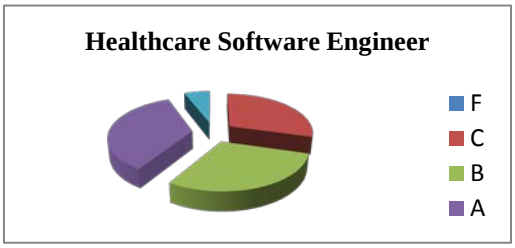
There were 17 students in the group what it allowed learning by “living in small groups” (Size of the Group). The evaluation process has been taken along the course by a set of weekly practice at the laboratory, a researching work in small groups (4 people), knowledge weekly tests and a final exam (Knowledge Evaluation). The laboratory practices were a project-based and learning-by-doing project where the students have had to develop a small hospital information system step by step improving it each week (Teaching Method). This way, the students have had to work day by day in

an attractive project related to they want to work in the future (Workload and Curricula Model).

After the semester ended the results of the case study where amazing. All the students passed the subject and all of them were very happy with the method used.

The official Scores have been:

Mark	Number of Students
Not presented	0
Fail (F)	0
Pass (C)	5
Pass (B)	5
Pass (A)	6
Pass (A++)	1



Conclusion and Future Work

Along this paper, the reader can see how the model proposed by the EHEA in the 21st century goes on the same way that the scout models proposed one hundred years ago (in 1907).

We think that the real experience has been highly positive and very motivating, and we also think that the scouts groups could work together in a symbiosis with the university in order to prepare the future students that will go to the university as "healthy, happy, helpful citizens" and then those students could return to the scouts groups as leaders and returning the values they got.

As future work, we are going to continue using the scout method as the methodology used in several EHEA subjects. We think it could be very interesting that an agreement will be sign among the university and the scouts groups in order to include the work as voluntary that a lot of students do in the scouts groups as a part of their university curriculum, as well as offering the scouts activities to the university community in two ways: in one hand to the students for working as voluntaries and in other hand to the children of the university community (teachers, students, maintenance service, etc.).

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LEVELS OF SELF-ESTEEM IN SOCIALLY MALADJUSTED UNDERAGE MALES – PRE AND POST THERAPY IN A CORRECTIVE INSTITUTION FOR JUVENILE OFFENDERS

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Abstract

The text is a report on the research which was undertaken in a corrective institution for underage criminals. The starting point is one thesis: one of the sources of criminal activities is low self esteem and unsettled picture of yourself. The feelings of social rejection and lack of acceptance, hostile attitude to the world - they are closely related to self – esteem. The results of presented research shows that it can be changed as a result of therapeutic and educational programs.

Keywords: Juvenile delinquency, self – esteem, an effective juvenile rehabilitation model, cognitive –behavioral therapy, juvenile criminal's cognitive system, effectiveness of social rehabilitation process

Introduction

The Młodzieżowy Ośrodek Wychowawczy (MOW – Juvenile Education Centre) is a corrective institution for socially maladjusted minors between the ages of 12-18, which offers education and care, as well as therapy and the pursuit of personal interests. It is an open institution, meaning that a number of resident assignments are conducted outside the centre. Placing a minor in an MOW entails an educational measure which changes the individual's place of abode and frequently takes them out of their original environment. The aim is to separate the minor from their pathological family environment and /negative peer influence. At the beginning, minors placed in an MOW (on the basis of a Family Court decision) reject the opportunity for change residence and study in such a centre might offer. For this reason, they are provided with exceptional educational and psychological care in this difficult period of adaptation, with the staff taking all legal precautions to minimalise the risk of minors absconding. It is of paramount importance for the further rehabilitation process that a resident becomes aware of why he is in a centre, what future

options finishing the school will offer, and simply that they are encouraged to want to be there and to have the motivation to change. This is of course an extremely difficult task which naturally does not always succeed, hence genuine instances of absconding from an MOW, after which the individuals involved are apprehended and brought back to the Centre. They have, however, been instances, where, after four weeks of absence as a result of flight, a resident is crossed off the register . Reasons for a resident being crossed off the MOW register:

1. change of educational measure employed
2. eight-week absence in the centre caused by the individual's flight
3. individual being placed in a penal institution or remanded in custody
4. reaching the age of 18 - when, having attained maturity, an individual must leave the Centre, with the court being able to extend the period until an individual finishes a given school year.

Self –esteem as a factor in regulating the behavior of socially maladjusted.

The main personality factors are; self-esteem, self-evaluation and self-acceptance. They are linked to each other. Self – esteem occurs together with various chronic inclinations and dispositions that in some cases constitute the personality structure. They can function as behavior regulations (Dymkowski 1995). In one of the first longitudinal study (Reckless; Dinitz; Kay 1957) comparing delinquent and non-deliquent boys , it was proven the relationship between a positive self-concept and crime. This theory posits that high self-esteem serves to protect one from future episodes of deviant behavior. So, we can say that low or lower self-esteem is one of the risk factors of the crime. A negative self-concept or self-esteem is conductive to the development of delinquent behavior. Behavior may be/ or is an expression of one's self concept. Hence, if a person has a low opinion of him/herself, this would likely be reflected ina wide array of negative behaviours that would include depression, alcohol abuse and criminality (Walters 1990 p.36-37).

The main research questions:

Research Question 1: What is the level of self-esteem of the residents? – first and second study (comparison)

Research Question 2: How the level of self-esteem is correlated to the level of general aggression?

Research Question 3: Are the methods of treatment – in social rehabilitation process - effective?

Research Question 4: Is the cognitive – behavioral therapy an effective way of working with socially maladjusted?

Type and place of research

The research in question assumes a division into control and study groups. The former was made up of pupils of post-secondary schools from the town of Malbork, the latter of residents of Juvenile Education Centre no. 1 in the same town. The study in both groups was conducted twice (in the years 2011-2013) with the application of the same procedure and research tools 12 months apart. In the period between the first and the second assessment some of the residents of the MOW in Malbork underwent a course of individual cognitive and behavioural therapy. Moreover, while at the Centre, the individuals participated in a number of cultural and sports activities in which the educational aspect was always foregrounded. Additionally, the research conducted includes an overview of the MOW's function as a corrective institution and an attempt to answer the question if all the factors contributing to the "specific organisational culture" of this institution have any bearing on the effectiveness of the rehabilitation process. The study was conducted in only one centre in order to eliminate the effect of factors outside the researcher's control, such as interactions between pedagogical staff and residents. Moreover, with fifty-four such centres in Poland, each creates its own specific culture and atmosphere which cannot be overlooked as regards the effect they have on the effectiveness of the work conducted there, as each employs different rehabilitation methods and techniques.

Table 1. The individual cognitive-behavioral therapy

Researchers studying social competence have been interested not only in specific social skills but also in the types of social-cognitive processes that might underlie individuals' behavioral choices. A variety of theories propose that individual differences in social information processing skills may help explain why people confronted with the same social situation may choose to act in very different ways (Nangle,Hansen,Erdley, Norton;2010). To start working with a juvenile, we have to identify his distinct set of beliefs : concerning themselves, the world and their own future. This is the main task of the therapy. The second is – to exchange some of them into more socially adaptable.

29 boys from experimental group attended individual session which lasted 12 weeks. Each boy has two sessions a week (2x45 mnutes). The process of psychological changing was based on fundamental thesis of cognitive – behavioral therapy.

There are many arguments for using the cognitive – behavioral therapy in social rehabilitation process. Below are some of them: this kind of therapy doesn't take o lot of time, the rules are simple and clear for the

patients, the patients can feel changes quite quickly. The outline of the therapy will be described in the further part of this article.

The number of participants in the study underwent a change in both groups, for the reasons mentioned earlier in the group of minors, whereas the group of pupils was reduced by 14, with those missing having moved to other schools in the following school year. **All boys who were at this time in the institution took part in this research, they agreed to be tested.**

Hypotheses:

The research assumed the following hypotheses which were reviewed in the first and second study: (analyzed issue is so extensive that allowed the identification of the following hypotheses) Below, there are sixteen detailed hypotheses:

1. The level of self-esteem of the residents in the first study is related to the length of their stay in the Centre; the longer the stay, the higher the self-esteem level.
2. As to the various aspects of self-esteem: acceptance, goals, emotionality, efficiency, failure, opinion of others - there will be disparities between residents and pupils - in study I.
3. In the group of residents, the level of general aggression is higher than in the group of pupils. This concerns studies I and II.
4. The group of residents will display a lower level of general self-esteem in the first assessment in comparison to the level of general self-esteem in the group of pupils.
5. The level of the residents' general self-esteem on the first assessment will rise in comparison to the second assessment.
6. In the group of pupils, the level of general self-esteem on the first and second assessment will not change.
7. Residence in the Centre, i.e. the entirety of rehabilitation activities undertaken by the Centre, results in a positive change in the residents' behaviour e.g. no attempts to break out, better school results, no punishable acts committed, involvement in sports and cultural activities.
8. The level of the residents' general aggression on the first and second assessment will be higher than in the group of pupils.
9. The level of general aggression of the residents undergoing therapy will fall, in contrast to the individuals from the group not involved in therapy.
10. The level of general aggression in the group of pupils will remain steady i.e. there will be no significant differences between the first and second assessment.

11. Substantial differences will surface between the group of pupils and the group of residents as to various forms of aggression tested with the Psychological Inventory of Aggression Syndrome.
12. The general indicator of residents' aggression measured post-therapy will be lower than pre-therapy.
13. The rise in the residents' self-esteem goes hand in hand with a fall in the general aggression indicator.
14. As the residents' self-esteem rises, there will be fewer instances of absconding and leaving the Juvenile Education Centre.
15. The group of residents undergoing therapy will display the anticipated changes in behaviour to a greater degree than the group of residents without therapy.
16. In the opinion of residents, positive changes in their behaviour will be perceptible to their wider family environment as much as to themselves.

Research methods

Both groups, experimental and control, underwent the same research procedure in the first and second assessments.

Particular stages of research, spread over a period of time, were the same in both studies.

The following assessment tools were used:

Self-esteem Questionnaire

The questionnaire was constructed for the purpose (by the author of this article) of the study and standardised by testing a group of 500 individuals between 16-18 years old, i.e. corresponding with the target group. Out of 65 questions, independent arbiters selected 50, which in their opinion referred to self-esteem and changes relating to it. The 50 questions thus selected were included in the first version of the questionnaire and, after statistical analysis had been conducted, the 34 remaining questions formed the final version of the questionnaire. As a result of further statistical analysis (factor analysis) six factors were singled out:

1.Self-acceptance, 2. Goals and tasks to be completed, 3. Other's opinion, 4. Emotionality, 5. Failure, 6. Efficiency of action

Table 2. The Psychological Inventory of Aggression Syndrome by Zbigniew B. Gaś

The theoretical basis for the construction of the inventory was an understanding of aggression syndrome as informed and uninformed tendencies, directed inwards as well as outwards and manifested or merely latent.

IPSA comprises 10 scales, of which each in turn contains several statements. These are rather short, clear and easily understood, which is important when it comes to the study of socially maladjusted minors, whose mental agility is not as acute as that of individuals in the mental norm.

EAS Temperament Survey – Buss & Plomin

Polish adaptation by Włodzimierz Oniszczenko.

The questionnaire, which diagnoses temperament as a collection of inherited personality traits in the form of content categories, is self-descriptive in nature, with the version for adults characterised by a simplicity of structure, clarity and a relatively small number of statements, important when it comes to conducting a study with centre residents.

The questionnaire comprises five scales: emotionality, fear, anger, activity and sociability.

During the course of the study, the changes in the behaviour of each resident were assessed twice. The assessment was carried out by the Permanent Team for the Assessment of the Resident's Condition made up of tutors, teachers, a psychologist, an education specialist and a social worker, i.e. people directly involved in working with minors. The assessment was carried out on the basis of the specially prepared behaviour assessment sheet, with the behaviour of each boy individually assessed as to various aspects of and the changes in the rehabilitation process specified. Fifteen statements, each on a five-point scale, allowed for the allocation of a specific number of points to reflect the general assessment of behaviour. The results, i.e. the first and second measurements, were compared against each other and could fall in a bracket of 15 (minimum value) to 75 points (maximum value).

Outline of the therapy towards modification of cognitive schemata regarding self-image and self-esteem for residents of Juvenile Education Centre no. 1 in Malbork.

The main aim of the therapy is a change in the perception of one's self, abilities and skills, as well as a perception of one's environment, and restructuring or creating new cognitive schemata concerning the 'self' to replace those most detrimental to the minors' behaviour as a whole. A change in the convictions concerning the 'self' is the key element in the therapy, and is based on the assumptions of cognitive therapy, including Beck's therapy assumptions (Kratochvil, 2003).

Many researchers attribute significant regulatory functions to the structure of the 'self', which are, on the one hand, very often reduced to the function of self-appraisal, and on the other, to the motivational- or behavioural-modifying function. The manifestation of the self-appraising function signals the emergence of evaluative opinions and emotions about

one's self, and the motivating function – the emergence of the motivation to satisfy one's own needs.

In minors with certain malfunctions there exist so-called automatic thoughts, which appear very quickly, outpacing and giving rise to emotional states. Therefore, the ability to recount automatic thoughts leads to the understanding of emotional states and related malfunctions. Beck's research and observations prove that the content of automatic thoughts is very similar in persons who display certain malfunctions. For that reason, in minors diagnosed as socially maladjusted, a fixed group of such thoughts concerning their own selves can be singled out. These will constitute the starting point for individual therapy.

The change in the cognitive functioning of the individuals taking part in the therapy also encompasses the assumptions which lie at the basis of the atomatic thoughts i.e. cognitive schemata, dysfunctional conduct and the general rules for assessing one's own life and directing one's own actions. During therapy, answers are sought as to the reasons why automatic thoughts concerning the 'self' remain persistent. In co-operation with the patients, ways can be sought for assessing and valuing their own selves and their relations with others .

I presume that the dysfunctional assumptions will assume the structure of categorical statements constructed according to the zero-one rule. My experience so far shows that they will contain statements such as: everone, no-one, always, never etc. As in Beck's psychotherapy, I adopt the assumption that the cognitive schemata which lead to dysfunctional behaviour in minors may be modified if they become more accessible to the residents' consciousness. Furthermore, the change in cognitive schemata is also possible as a result of a change in a minor's ways of converting information and of work on habitual errors in thinking and perception. It is all the more important that the malfunctions in one's thinking should uphold what has been encoded in cognitive schemata and lead to a position whereby the patient's automatic thoughts are accompanied by the conviction that they are sure and steady.

Therefore, together with a resident I will be working on his ways of interpreting, drawing conclusions and merging particular fragments of knowledge about himself, as all this will boost his objectivity and result in a more accurate and realistic perception of his own self and the outside world, and will contribute towards the modification of cognitive schemata. The additional aim of the therapy is to teach the patient how to make proper use of the feedback received from third parties

Discussion of results

At the beginning of a discussion of the results, reference needs to be made to the general research problem of the article in question, which concerns means of therapeutic action directed at socially maladjusted minors in order to raise the level of general self-awareness and, as a result, change the ways in which they perceive themselves, their abilities and the reality around them. This method of action will also lead to an improvement in the general functioning in the minors and, most importantly, working on their 'cognitive levels' is more likely, in the author's opinion, to lead to permanent changes in the boys' behavior. The results presented in the previous chapter additionally constitute an analysis of the indicators of effectiveness of the very process of rehabilitation, with the rather wide spectrum of these indicators allowing for a deep analysis of the actions undertaken and, by means of evaluation, for the selection of the most effective of these. It should be noted that an individual approach towards socially maladjusted minors should also be employed when it comes to assessing the effectiveness of a particular institution's actions. The effectiveness of the rehabilitation process may be analysed on two planes: internal and external. The former concentrates on the changes in the minors' behavior during their stay in the Juvenile Education Centre. The most important determinant of internal effectiveness is the number of attempts at absconding or leaving in a given period of time, which has been addressed in detail in the present article. External effectiveness relates to the functioning of the residents outside the centre, during holidays or leave, and after release, which is much harder to research as it requires the involvement of many institutions nationwide (with residents coming from all over Poland) but also indicates a possible area for future research.

Numerous studies confirm the thesis that the way we perceive ourselves defines our style of action. As literature the world over still devotes very little attention to the subject of transformations of the image of 'self' and the resulting change in behavior (Misiewicz 1999), such research initiatives are extremely valuable.

What poses a significant problem when conducting research among maladjusted individuals residing in Juvenile Education Centres or other institutions, even more isolated, is the size of the sample. With long-term studies, from one, two or three years in duration (if a change is to be observed), there emerges the problem of the dwindling number of individuals, for example, due to them leaving the centres as a result of having reached the age of eighteen. These persons may stay at their own request, which also constitutes a determinant of the effectivity of ongoing action, but they are not obliged to do so by court order, as in the case of minors. This aspect of the study of individuals undergoing rehabilitation, in

its broadest sense, is described by H. Misiewicz (1999) who has conducted research in a group of drug addicts currently in an addiction treatment centre. In this case, the change in the number of samples available is beyond the researcher's control.

On establishing that one of the aims of the rehabilitation process employed in the MOW is a rise in residents' self-esteem, it has at the same time been assumed that the image of their own selves will undergo transformation. Presupposing, after J. Reykowski (1992), that the image of oneself plays an important part in the process of regulating behavior, it was expected that alongside a rise in residents' self-esteem, their general functioning will also improve, including a fall in the level of aggression.

Conclusion from the research conducted

1. residents and pupils differ as to the level of general self-esteem.

In view of the results obtained, one may categorically confirm the validity of the above statement. The considerations of social maladjustment have been widely described in the literature of the subject, therefore this work does not discuss the issue in detail.

In the course of a child's interaction with the environment, many experiences are gathered which form the basis for his or her social functioning. For the child, the environment mostly means the family environment provided by parents or guardians. For a small human, it is this first environment and the experiences which happen within it that have an impact on his or her entire life in the future. It is here where, apart from existential needs, the small child's mental needs are satisfied, including the need for safety, love, belonging, acceptance and appreciation.

Due to its stability of environment, the family offers the child support and provides mental equilibrium, which in turn creates appropriate conditions for the correct development of the child's personality. Should this equilibrium be disturbed for some reason, it exerts decisive impact on the child's development. In the case of socially maladjusted minors, it is family environments which display pathological traits, in particular: alcoholism in one or both parents, a family member's criminal record, multiple change of partners and family disintegration, as well as mental diseases or disorders in parents. Research concerning the reasons for social maladjustment points to the statistically significant relationship between family disintegration and the phenomenon in question. Given such conditions, it becomes impossible to fulfil parental obligations appropriately and to satisfy the child's needs, which has a definite influence on the development of the child's personality, resulting in a number of disorders, including the distabilisation of the self and a distorted self-image. Lack of positive reinforcement, distorted emotional ties or even rejection, all result in minors from such environments

seeing themselves only in the negative aspect, as individuals who cannot do anything, have a lack of talent and are ugly or unwanted. All this shapes the socially maladjusted minors' self-esteem, a fact confirmed by the research conducted, in contrast to pupils who, assuming they come from so-called normal, undistorted families, display markedly higher self-esteem in comparison to their socially maladjusted peers.

2. residents will display a higher general aggression rate than pupils.

Analysis of results shows that the research hypotheses have been fully confirmed. Modern theories based on the results of empirical studies consider some forms of deviant behavior, including aggression, as a result of a long-term process, the beginning of which can be traced back to the early stages of development (Urban 2000).

The first measurement taken prior to therapy indicated a statistically significant difference in the level of general aggression in the groups of residents and pupils. This difference was also present after the second measurement and, despite the fact that the general aggression indicator was reduced in MOW residents, both in the groups undergoing therapy and those not, it was still higher than in the group of pupils. Residents' aggressive behavior is conditioned by a multitude of factors, some simply being acquired means of reacting to accumulated emotional tension or an answer to frustrating stimuli, which may in fact be neutral but may be perceived as threatening due to the distorted 'self', which results in violent reactions, often disproportionate to the initial signal which causes them.

3. there is a link between the level of general self-esteem and aggression rate in both residents and pupils.

As a way of assuming an attitude towards this statement, *The Self-Assessment Questionnaire* was prepared, standardised and adjusted to the cognitive abilities of the residents and adjusted to their deficits, with a view to eliminating the risk of misunderstanding of the questions or of causing tiredness. Too many questions directed at individuals with lower cognitive predisposition and unaccustomed to systematic intellectual activity may lead to a random selection of answers.

The functioning of individuals with lower self-esteem may be characterised as to the following mental symptoms: negative attitude towards self, hypersensitivity, anxiety, emotional tension, low motivation for action, feeling of worthlessness and lack of faith in one's abilities, and such social symptoms as: difficulty in forming interpersonal relations, multiple conflicts with the outside world and lack of trust towards others . Judging by the above descriptions, the relationship between self-esteem and general aggression level does not seem surprising. According to the author's predictions, the results of the research and the analysis conducted on the basis of it have confirmed the existence of such a relationship. A stable and

positive image of the 'self', derived from self-esteem, is a basis for forging vital regulatory mechanisms (Reykowski 1992), which decide over adaptation to the prevailing social conditions.

4. residents and pupil groups differ as to particular aggression rates measured with the IPSA Questionnaire.

The studies conducted in the groups of residents and pupils (first and second measurements) point to the existence of differences between these groups as to aggression indicators measured with the IPSA Questionnaire. The differences are statistically significant , also when it comes to particular IPSA scales. The most parallel value in both groups is displayed by the scale concerning indirect aggression, not openly revealed. The data may be interpreted based on a number of elements. Firstly, the testees belong to the same age group, are under significant peer pressure and use the same technological advantages such as mobile phone or internet. Secondly, as teenagers they are very open to the influence of others and readily adopt the behaviour of third parties.

Moreover, all the individuals attend school and consequently function within the framework of certain conditions and rules set out by school regulations and are well aware of the fact that acts of irritation, anger or aggression will be met with instant punishment from the teaching staff. Therefore pupils tend to resort to communicating such information or signals under the guise of other kinds of behaviour. It should be stressed that among the pupils constituting the control group certain changes appeared on the second measurement which could possibly be linked to 'emotional development' and the stabilisation of emotions, with the 'self' and the pupils' own identity going through the process of formation. The changes mentioned concern the following IPSA scales: *IV - unconscious aggressive tendencies, VI – indirect aggression.* Some changes also occurred as to scale III – *hostility towards the world around,* the roots of which should be sought in the so-called adolescence crisis and a number of rebellious and oppositional behaviours towards the adult world.

At this point I would also like to mention the critical attitude of some researchers towards the method described. Despite the unquestionable usefulness of the IPSA Questionnaire, over several years some critical voices have come to the fore and led to the development of a revised version of this tool. Mutual relationships between the results in particular scales of both versions of the test were examined, and the correlation indicators between the IPSA scales and the IPSA II factors were measured. It emerged that in both cases there was high convergence of the factors tested. Hence, the application of both IPSA and IPSA II seems justified, as long as the limitations of the first version are considered, as in this case where analyses were conducted on raw scores without converting them to sten scores.

5. the rise in self-esteem influences a shift in perception and quality of perception of he phenomena of the outside world.

In line with H. Markus' concept (1980), also considered in the present article, the schemata concerning the 'self' are cognitive and therefore function like other cognitive schemata (Oleś 2005). Therefore, all in-coming information is evaluated through the 'self', with the alleged marked preference for the information which verifies the self-schemata already in place (Pervin 2002), hence the tendency to distort the information about oneself. Low self-esteem is conducive to the absorption of negative information about oneself, which confirms the existent 'self' schema, but at the same time, such people are in desperate need of positive information about themselves. This in turn translates to unclear self-knowledge which renders an individual, and especially a young one, very susceptible to external influences. Lower self-esteem results in certain motivational deficits, with this kind of individual longing for praise , yet more willing to believe criticism. Overt caution, uncertainty, and fear of further failure paralyse the activity of those with lower self-esteem. For that reason, a rise in self-esteem, which in this work is treated as the function of self-image, will open the 'self' schemata to another, previously unperceived, information concerning one's own person as well as the surrounding world.

In the case of the residents who participated in the therapy with the aim of rebuilding their cognitive schemata concerning the 'self', a positive change in the 'outlook' was observed during the course of the present pedagogical work, which manifested itself through heightened activity in the local environment, participation in certain tasks alongside peers from external education institutions, improvement in interpersonal contacts and a more optimistic view of the future. The above observations are still in need of a research tool to collate them and create a starting point for further analysis but this may pose a scientific challenge for both the author of the article as well as for others with an interest in the issue.

6. residence and rehabilitation in the Juvenile Education Centre no. 1 in Malbork leads to *positive* changes in the behaviour of underage socially maladjusted boys

J. Reykowski's regulatory theory of personality (1992), quoted several times in this work, formulates personality as a system where the main aim is to exchange information with the outside world and to process it in order to obtain the information necessary for acting within the surrounding world. On arrival at the MOW, this most important 'system' created by the young persons' emergent personality is veering off in the wrong direction. Residence in the centre involves a number of phases, the first of which – very important for the resident's further rehabilitation – is the phase of adaptation to the new situation. Considering the fact that the socially

maladjusted minors are individuals with lower self-esteem, which does not encourage their facing up to new challenges or situations, this stage proceeds with a number of certain difficulties, a situation which calls for highly individualised rehabilitation, and most importantly – thorough diagnosis. As soon as the resident feels safe in the centre, naturally not in the sense of physical danger but emotionally, then the core stage of rehabilitation may begin. It might be worth mentioning that Juvenile Education Centre no. 1 in Malbork holds regular research on the feeling of safety, with special emphasis on newcomers. The positive changes in the residents' behaviour reveal themselves in a number of aspects: starting from hygienic habits, the culture of eating and clothing, so-called organic work, through to a marked rise in school results, completion of a certain study cycle and a choice of vocation, which allows the residents to find their place in today's difficult job market.

During the course of the school year every resident undergoes a detailed *diagnosis* twice, on the basis of which pedagogical staff develop individual rehabilitation plans or evaluate those already in place. What constitutes a significant indicator of the positive changes observed in the minors' behaviour is the negligible percentage (against the Centre's entire community) of punishable acts committed in the local environment while on holiday or on leave, despite the increasing frequency of such breaks with each new school year.

7. cognitive-behavioral therapy conducted with the residents – individual sessions, allowing for each resident's resources and tailored to his needs and skills – results in a rise in general self-esteem.

In tandem with the emergence of a large range of social pathologies commenced the search for methods of reducing them. There were high hopes for scientific psychology and psychiatry, especially such trends as psychoanalysis and behaviourism, and in the last decades – cognitive psychology (Urban 2000). The theoretical model of the cognitive-behavioral therapy has been presented by many authors (f. ex: Beck 20110) Therefore here I will discuss only those aspects of the therapy which refer to socially maladjusted minors, with the main focus on the effects achieved or achieveable.

The main rule of the therapy in question is: thoughts, emotions, behaviours and physiological reactions are all elements of one system, with a change in any given part of this system resulting in changes in the remaining parts (Curwen; Palmer; Ruddell 2006). Behavioural dysfunctions, at the heart of which lie emotional deficits, are closely linked to the negatively distorted view of the 'self' and the surrounding reality. The cognitive-behavioural therapy conducted with the residents concentrated, in line with

the main premise of this trend, on two elements of thinking: automatic thoughts and the underlying convictions. The author of this work has devised a programme of such therapy for MOW residents, which was subsequently assessed by two experts – therapists who work with adolescents on a daily basis. Their opinions, albeit with a number of comments, were generally positive. The programme will undergo further evaluation and alteration, with the acknowledgment of the experience gathered so far.

A statistical analysis has confirmed the author's assumptions relating to the positive changes which emerge in the course of the therapy, indicating at the same time that the changes were significant and relatively stable in character.

The results obtained allow for the assumption that this therapeutic trend suitably fulfils its tasks as regards changes in the self-esteem of socially maladjusted minors. They are also closely linked, by working with cognitive resources to achieve a permanent restructuring in the 'self' schemata and a rise in self-esteem, with the behavioural correlate – i.e a change in behaviour. In the author's opinion, the behavioural trend itself, based on the strengthening or weakening of certain reactions, will only cause some 'local' changes i.e an improvement in behaviour during the stay in the MOW. The real effect of the rehabilitiation work, though, will be its permanence and reinforcement in the family environment or elsewhere, wherever the resident starts his adult life, without trespassing on established moral and legal boundaries.

8. in the group of pupils the level of self-esteem and the general aggression indicator will remain the same.

On the basis of the results obtained, the research hypotheses concerning the above issue can be fully confirmed. In the group of pupils who acted as a reference point for the analysis of the research problem of socially maladjusted individuals, the level of general self-esteem as well as the aggression indicator did not change during the course of the research. This does not mean, however, that these elements have reached a critical point and will not undergo any change. Self-esteem is a collection of convictions and opinions about oneself and is also described as the attitude towards oneself as a result of previous experiences (Hattie 1992). The period of adolescence is characterised by a great changeability and fluctuation of emotional states, at the root of which lies the inability to comprehend one's own feelings and reactions. It is a stage marked by the search for models, personal identity and place in life, hence the fluctuating self-esteem during this period, very often with just one event being able to cause a sharp drop or rise.

The group of pupils, whose average age was 17 years and 4 months, was characterised by a decidedly higher level of intellectual and emotional

maturity than that of the residents. The time interval between the first and second study was 12 months. Undoubtedly, with time elapsing, changes occurred within the group, relating to the process of maturing and learning, but they were not significant enough to seriously affect the variables studied. This is totally in line with the author's expectations, set out according to the knowledge of human developmental psychology and the course of particular stages in life.

The main indicators of marked consistency in aggressive behaviour at any given period are particular tendencies in reactions, certain motivational systems and/or variations in organised cognitive-affective structures of the individual (Frączek, Zumkley, 1993), the role of which is highlighted by the present author. Of course, these personality variables cannot be considered as features which work independent of external conditions. The individual differences in aggressive behaviour and the permanence of this aggression depend on how external information is processed (Frączek; Zumkley 1993). Therefore in the group of pupils, whose correct level of socialisation may provide a basis for collision-free functioning within society, significant differences as to the aggression indicator did not surface, and for that reason one may conclude that the indicator remained the same.

By treating the 'self' schemata in the same manner as other cognitive schemata subject to the same laws, the positive image of oneself also determines the positive reception of outside phenomena, directs the selection of information and thereby regulates human behaviour and decides over the form any reaction will take. The currently increasing interest in methods of effective rehabilitation is not only related to the fact that today's youth are more difficult that in the past. Such a trend, a very uplifting one in my opinion, emerged as a result of an understanding of the importance of and necessity for this kind of action and that properly selected and applied actions will bring about measureable outcomes, observable on a national scale.

The intensive socio-economic transformations observable in Poland after 1990, and the sudden, albeit expected, opening of borders have to a large degree accelerated and intensified the demoralisation process and a large number of antisocial behaviours in minors, as well as adults, who then became models for their children.

Conclusion and further research perspective

The analysis of results in the context of the main subject of this work i.e the possibility of change in the self-esteem of socially maladjusted boys, and through this – a permanent improvement in their general functioning, allows for the formulation of some optimistic final conclusions and the specification of the conditions for an expected change to occur, both of

which have been satisfied in the case of Juvenile Education Centre no. 1 in Malbork.

First, highly individualised work with the minors, based on a multidimensional diagnosis and analysis of the resident's family situation, second, active cooperation with parents, involving carers and home environments in the entire process of rehabilitation, opening up to the outside world and reaching out beyond the walls of the centre, third, selection of staff compatible with the needs of the institution, accounting for the predispositions and the so-called 'soft' skill competencies of the candidates, fourth, creating and implementing unique therapeutic programmes, in response to the residents' emotional and cognitive deficits, as well as evaluating and altering them in addition to testing their effectiveness on the basis of the most recent methods of statistical analysis.

The most important is to bring the child to the institution as soon as possible, because the delay can increase the level of demoralization

The theoretical assumptions and numerous practical solutions presented in this work indicate that there exists a multitude of rehabilitative actions, which are, crucially, becoming more and more tailored to the resident's personality type, while stressing the undeniable significance of a diagnosis formulated in an interdisciplinary manner. The present case study focuses solely on the psychological aspects of social maladjustment, yet does not omit the biological and genetic aspects of this phenomenon, which are also taken into consideration in such a diagnosis. The idea of 'diversified treatment', although a cornerstone of modern rehabilitation, does not boast too many empirically confirmed rules. The present work and the research conducted in connection with it constitute a step towards changing this situation. The crux of rehabilitation activity – as part of open rehabilitation – is planning and implementation that activate the minors' potential (Konopczyński 2006). What is needed, therefore, is individual 'made to measure' methods of working with residents, which decidedly increase the effectiveness of the actions undertaken.

For centuries, with adults invariably being their next of kin, juvenile delinquency has constituted an integral part of adult criminality, and shaping and replicating these models served as the dominant method of education.

Ideas from many directions are currently emerging towards a solution to this problem, which, despite the passage of time, has lost none of its validity. Penal law is being stiffened and new institutions and centres are coming into being to nip juvenile delinquency in the bud. Very often, these are purely theoretical considerations, without the backing of theoreticians or experience with this type of youth. Therefore, to my mind there is a great need for further research and analysis into the already existing therapeutic

programmes and rehabilitation activities, which should be considered in the context of a particular institution's entire course of activity.

Measurement of the therapy's effectiveness should take into consideration the perspective of all sides concerned with its outcome, i.e. the evaluations of the therapist, the patient, his relatives and the institutions which benefit from the potential effects of the treatment.

Cognitive-behavioural therapy programmes developed in rehabilitation institutions are systematically evaluated and supplemented with conclusions from other studies as well as observations and analyses of juvenile behaviour. More attention is being paid to the involvement of parents and carers who constitute an important group of programme beneficiaries. In fact, what is most important is the permanence of the resulting change in juvenile behaviour and its transplantation to another ground, the ground of independent adult life, as it is beyond doubt that such change does occur within the framework of the rehabilitation activities conducted in an MOW. Moreover, a growing number of Polish studies on how socially maladjusted minors live and think, as well as ways of correcting these, contribute to a rise in the effectiveness of the actions employed.

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Table 1: Framework of research

Study I	
experimental group	control group
87 people residents of MOW no. 1 in Malbork	90 people pupils of post-secondary schools

Study II		
experimental group		control group
54 residents 25 people in therapy	29 people without therapy	76 people pupils of post-secondary schools

source: author's idea

Table 2: Results of the statistical analysis for particular factors in the scale.

Factor	**Cronbach's α – for the entire scale**
SELF-ACCEPTANCE	**,8728**
GOALS AND TASKS TO BE COMPLETED	**,7716**
OTHERS' OPINION	**,7544**
EMOTIONALITY	**,740**
FAILURE	**,8308**
EFFICIENCY OF ACTION	**,8376**

source: author's own analysis

GENDER DIFFERENCE IN RURAL URBAN EDUCATION IN NEPAL

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Abstract

Using Nepal Living Standard Survey (NLSS 2003/04), this paper attempts to explore find the differences in education between men and women in urban and rural Nepal. Result shows that the urban populations have higher education compared to rural. Average years of schooling in urban Nepal were more than two times for both men and women; the gap in years of schooling between men and women is smaller in urban area compared to rural. In both rural and urban areas, the differences in education between men and women were smaller among the younger age group while it was higher for the older age groups. Probit model shows that the gender and location (urban/rural) area are significant determinants of schooling.

Keywords: Education, Nepal, Rural, Urban, Gender

Introduction

Nepal is an agrarian country and about 66 % percent of the populations are dependent on agriculture for their livelihood, income and employment. Poverty in Nepal is a deeply entrenched and complex in nature with 31% of Nepalese living below the poverty line (Economic Survey 2007). Several studies have found that both literacy and educational attainment are important determinants of individual and household welfare (Rahut 2007). Literacy and education affect the poverty level and the pace of economic development in a country.

Women are overworked, discriminated and have little time to participate in formal education; in addition to an onerous workload, their work is undervalued. Among poor household in Nepal, investment in education particularly in women's education is not perceived as good investment because in Nepal women go to their in-law's house after marriage. Rural poor household also need immediate income while return to

education accrue after long period and only beyond certain level of education. Although women invest more time in subsistence and domestic work than men, they are viewed narrowly "as reproducers, not producers" and often have marginal control of how they spend their time. (UNIFEM 1995: 18).

Major contribution of this study is it attempts to explore educational difference by gender and location; the results of the study would help policy makers in formulating policies to reduce gender difference in education and also rural-urban difference in education. Paper would provide for formulating the policies for scaling up and out the adoption of new technology for increasing level education which in turn has significant affect in poverty reduction and development of the country.

Educational Development in Nepal

Nepal is small land locked country situated between two giants, China to the north and India to the south, east and west. According to the 2001 census (2001) the total population of the Nepal is 23.4 million and the population of Nepal was estimated at 29.51 million in 2008. Of the total population about 80% are living in rural areas and the rest are urban area. Nepal is a multi-religious, multi-ethnic, multi-lingual and multi-cultural society, which plays an important role in schooling of the children.

Education in Nepal is structured as school education and higher education. School education includes primary level of grades 1-5, lower secondary and secondary levels of grades 6-8 and 9-10 respectively. Pre-primary level of education is also available in certain areas. Six years of age is the prescribed as the age for admission into grade one. A national level School Leaving Certificate (SLC) Examination is conducted at the end of grade 10. Grades 11 and 12 are considered as higher secondary level. Higher Secondary Education Board (HSEB) supervises higher secondary schools which are mostly under private management. Previously these grades were under the university system and were run as proficiency certificate level. Though some universities still offer these programs, the policy now is to integrate these grades into the school system.

Higher education consists of Bachelor, Masters and PhD levels. Depending upon the stream and subject, the Bachelor degree level may be of three to five years' duration. The duration of the Masters degree level is generally of two years. Some universities also offer M Phil and post-graduate diploma program.

Legally, there are two types of school in the country: community and institutional. Community schools receive regular government grant whereas institutional schools are funded by school's own or other non-governmental sources. Institutional schools are organized either as a non-profit trust or as a

company. However, in practical terms, schools are mainly of two types: public (community) and private (institutional). A third type of school is the schools run by the local people enthusiastic towards having a school in their localities. They do not receive regular government grants and most of them do not have any other sustainable financial source. Supported and managed by the local people, they can be thus identified as the real community schools.

After the Rana Regime was over thrown in 1951, great effort made to establish the Nepal's Education System; the National Education Planning Commission was established in 1954, the National Education Committee in 1964 and the National Education Advisory Board in 1968. All these efforts were undertaken to upgrade the Nepal Education System. Education of Nepal has only recently started to develop. Nepal education has suffered a lot during the Rana Regime when education was suppressed; after that, education was given only to the aristocratic people of the society. New Education System of Nepal was established in 1971.

As a part of the five year plan, it was established to address individual needs, and the needs of society as a whole to mark national development. The main objective of the education system of Nepal was to develop midlevel managers and skilled man power. Universal Primary education with emphasis on the Nepali middle class was the main agenda. In 1980, there was an increase in private schools. Free school education policy and education for all became the slogan in the 1990's. Nepal's education system is based on the pattern of United States. It has received much help while forming the curriculum. From Grade 1- 5 is considered primary education while, 6-8 secondary and 9-10 upper secondary. The classes 11 and 12 are together considered higher secondary. A school leaving Certificate is granted to students after passing class ten. Education, Science, Humanities are the streams offered after for Higher Secondary and a certificate is issued after exam. Technical schools are also there.

Literacy Situation of Nepal

Although Nepal has been undertaking various literacy programs since 1956, large majority of Nepalese population are still illiterate. The number of illiterates has increased due to non-enrollment and high dropout rate of girls and disadvantaged children at primary schools. The growth of literacy does not even correspond to the growth of population in the country. The population growth rate is estimated at 2.25% per year while the literacy rate growth is only at the rate of 1% per year.

Table 1 : Literacy trend in Nepal, 1980-2001

	1980	**1990**	**1998**	**2001**
6+population	12,180,000	15,148,000	18,047,000	19,255,805
Literacy rate (%)	23%	39%	48%	53.7%
Literate population	2,801,400	5,907,720	8,662,560	10,348,428
Illiterate population	9,378,600	9,240,280	9,384,440	8,787,413

Source: Literacy Watch Bulletin No. 5, NRC-NFE

According to 2001 census (see Table 1), the total literacy rate of the people aged 6 and above of Nepal was only 53.7%. The literacy rate of women (42.48%) was lower than the national average. The literacy rate of the 10-14 age group and 15-19 age group is comparatively high, being at 78.6% and 74.27% respectively. This is, however, far from satisfactory. The literacy rates of women in both the age groups are very low. The literacy rate of various age groups is given in Table 2.

Table 2: Literacy rate among various age groups, 2001 (in percentage

Age Group	Total	Literacy rate	
		Men	Women
8-9	66.4	70.34	62.27
10-14	78.6	83.7	73.2
15-19	74.27	82.5	66.15
20-44	51.74	67.66	37.82
Nepal (6+)	53.7	65.08	42.48

Source: Census Report, CBS, 2001

Nepal is a male-dominant country and women have always less chance to study. The barriers to women participating in education are rooted in socio-cultural, economic and political realities that vary by community and even by family (Pennells, 1998). When families choose which children will or will not be educated, or which will have better educational opportunity, sons are preferred. Educating a son is investing in his ability to look after his ageing parents while educating a daughter is considered a no-return investment. When she marries, she becomes another family's asset. Both the opportunity and cash costs of education lock girls out of schools. The majority of girls in Nepal are daughters of subsistence farmers living near or below the poverty line. Eldest daughters often provide care to most of the sibling. Farm and domestic work also pull girls out of school. Although tuition and books are free in public schools, other forms of student fees may be prohibitive.

Hypotheses (Research Question)

- In Urban areas the education differences between younger men and women are likely to be smaller than the differences in rural areas.

- Literate parents are less likely to not send their children to school (In other words, literate parents are more likely to send their children to school).
- Rich household are less likely to not sent their children to school while poorer household are more likely to not send their children to school.
- Rural household are more likely to not send their children to school as compared to urban household.
- Male headed household are less likely not to send their children to school (in other words male headed household are more likely to send their children to school).
- Children in the mountain are less likely to go to school as compared to terai children (plain).
- Children whose parents are self in non-farm are more likely to go to school.

Data and Survey Methodology

The survey used a two pronged approach: a nationally representative cross-section survey to estimate trends and level of socioeconomic indicators and its different geographic regions; and a smaller panel survey to track exact changes experienced by those previously enumerated household during last eight years.

A household survey approach developed by the World Bank and applied in more than 50 developing countries is used here. Data were compiled for the current study regarding education, sex, age group and their educational activities in Rural and Urban areas. Different activities have been done to get the appropriate and representative data for the research such as, innovative data management techniques, including pre-coded questionnaire, field based data entry system, filed verification, extensive trainings and supervision of field workers. Inclusion of panel households concurrently with nationality representative sample households and collecting of information over a complete cycle of 12 months were partitioned into three pre-scheduled phases.

Sample frame

The 2001 population census of Nepal provided a basis for this survey's sample size. The size of each ward (as measured by number of households) was taken as a unit of sample frame. Some larger wards were divided into smaller units (sub-wards) of clearly defined territorial areas supported by reliable cartography while some of the smaller wards with fewer than 20 households were appended to neighboring wards in the same

VDC.[1] The resulting sampling frame consisted of 36,067 enumeration areas (wards or sub-wards) spread over 3 ecological zones[2]. This results in 5 development regions, 75 districts, 58 Municipalities and 3,913 Village Development Committees (VDCs) of the country. The sample frame was sorted by district, VDC, Wards and sub-ward and districts were numbered from geographical east to west.

Stratification

The total sample size (4,008 Households) was selected in two stages: 12 households in each of 334 primary sampling units. The sample of 334 PSUs was selected from six strata using probability proportional to size sampling with the number of households as a measure of size. The number are all multiples of 12 with the intention of implementing a two-stage selection strategy with that many households per PSU in the second stage. Within each PSU 12 households were selected by systematic sampling from the total number of households listed.

Methodology

According to National Living Standard Survey (NLSS, 2003/04), 38 % of population aged 6 years and older is literate in Nepal. According to 2001 census, the total literacy rate of the people aged 6 and above of Nepal was 53.7% and literacy rate of men and women are 65.08 and 42.48% respectively. This paper uses the Nepal Living Standard Survey Measurement (NLSSM), 2003/04 to analyze education patterns, education differential between rural and urban areas, between men and women and among the age groups in Nepal. The Nepal Living Standard Survey Measurement (NLSSM) 2003/04 has been carried by the Central Bureau of Statistics and it is comprehensive survey containing wide range of individuals and household variables including level of education between man and women in rural and urban areas. This paper does not use complicated econometric model rather simple descriptive statistics to analyze the education differentials.

[1] VDC in Nepal is lower administrative part of its local development ministry. There are 75 districts in Nepal. Each district has several VDCs. There are 3913 VDCs in Nepal And each VDC has nine villages.

[2] Three ecological zones are Mountains in the north (altitude 4877 to 8848 meters), Hills in the middle (altitude 610 to 4876 meters) and Tarai in the south. Mountains make up 35 percent of total land area of the country, while Hills and Tarai 42 percent and 23 percent respectively.

Data

This paper uses the Nepal Living Standard Survey (NLSSM 2003/04) to explore the difference in education between male and female and urban and rural areas in Nepal. Two stage-stratified sampling has been used to select a nationally representative sample and population survey of 2004 has been used as the basis for sample selection. The Nepal Living Standard Survey 2003/04 enumerated 4,008 households from 334 primary sampling Units (PSU) in the cross sectional sample. The survey has a wide range of variables pertaining to the age, sex and their educational status in rural and urban areas. Data were collected through sample survey methods through personal interview of the households.

For this research, data has been compiled on the educational attainment of men and women in rural and urban areas. Information on literacy and educational status of the household members who are older than 5 years has been extracted and used for the analysis. Schooling/level of educational attainment, past enrollment/drop outs and current enrollment were captured to cover the proposed hypotheses. People were divided into three age groups namely the oldest group whose age were greater than 50 years, the Middle age group with an age between 30 to 50 years and the youngest group were below 30 years. The education attainment for different age group has been analyzed by gender and location (urban and rural areas). Educational status is categorized into three groups as never attended school, attended school in past and currently attending school.

Total respondents were categorized into three age groups on the basis of generation period youngest, middle and oldest age groups were below 30 years, 31 to 50 years and 50 years above age groups respectively.

Empirical Analysis.

Data were analyzed with the help of tabular and statistical methods of analysis to find out the results based on hypotheses. SPSS 16 type of software is used to analyze the data to get the appropriate results and probit regression model is run for hypothesis testing.

Probit Model

I also conducted a simple econometric analysis to find the determinants of the school dropout and level of schooling. (see table A.5 and A.5 in Appendix). This paper seeks to estimate the why children of school going age are not in school in Nepal by using probit model. The probit model directly yields an estimate of the probability of the occurrence of an event. This probability can be interpreted as the measure of the risk of non-schooling that have direct relevance to the keeping the children in school and in long run on poverty alleviation. Here we have used only the school going

aged children for the analysis (i.e between the age of 7 and 15 years and the rest were dropped from the analysis.

$Y = 1,$ if children between the age of 7 and 15 are in school or 0 Otherwise

The probability of children not being in school $\left[\Pr(Y=1)\right]$, is derived using the following equation:

$$\Pr(Y=1) = \Phi\left[\sum_{k=1}^{K} \beta_k X_k\right] \rightarrow (2)$$

Since the response is a binary outcome, the two events derived from disjoint sets are complementary and the probability associated with the alternative event (children being in school) is represented by:

$$\Pr(Y=0) = 1 - \Phi\left[\sum_{k=1}^{K} \beta_k X_k\right] \rightarrow (3)$$

Taking the partial derivative of the above equation with respect to the independent variable X_K, the marginal effect is obtained:

$$\frac{\partial \Pr ob(Y=1)}{\partial X_k} = \Phi\left[\sum_{k=1}^{K} \beta_k X_k\right] * \beta_k \rightarrow (4)$$

The probability of the *i*th children being not in school, $P_i = P\left(Y_i = 1\right)$, depends on a set of explanatory variables, $X_{i1}, ..., X_{ik}$.

$Y_i = \alpha + \beta X_i + \varepsilon \rightarrow (5)$

ε = Random error term

Result and discussion

Result from Descriptive Analysis

Table 3: Educational status in Nepal

Educational Status	Overall		Men		Women	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Years of schooling at National Level	3.20	4.19	3.99	4.44	2.47	3.80
Year of schooling in Urban Nepal	5.39	5.06	6.35	5.13	4.45	4.81
Year of schooling in Rural Nepal	2.37	3.46	3.05	3.74	1.75	3.06
Years of Schooling for population <=30 yrs old	3.53	4.06	4.01	4.14	3.09	3.93
Years of Schooling for population between 31 yrs to 50 yrs	3.43	4.77	5.24	5.13	1.85	3.77
Years of Schooling for population above 51 yrs	1.36	3.45	2.32	4.28	0.39	1.89

From the above table 3, overall mean of years of schooling is 3.20 years. Year of the schooling of the men and women are 3.99 and 2.47, respectively. It means men have spent more years in school than have women at the national level and it is much higher than last ten years for both men and women. Literacy rate is increasing day by day for men and women as well. Men and women literacy rates of the country stand at 63 and 39 % respectively (NLSS, 2004). Here, we have found much difference between men and women.

Years of schooling of men and women in urban area are 6.35 and 4.45, respectively. It means men are more aware for education and they attended schools almost 2 years more than women. It also means than parents are likely to prefer to keep their son more in school than the female children. Years of schooling of men and women in rural areas are 3.05 and 1.75 respectively. Men spent many more years in school than the women in both urban and rural areas. There are dramatic differences between men and women in both areas. Years of schooling in urban area were more than twice that in rural areas (Victoria, 1998) for both men and women. There are major differences between rural and urban education. Yet most education reform efforts have been heavily urban oriented (Bloodsworth, 1993). Bloodsworth revealed that some of the conditions often associated with rural schools are: poverty, reform, generated problems stemming from the promotion of national standards and assessment, failure to consider basic inequities among schools, an unwillingness on the part of the rural students to seek individual recognition or to engage in individual competition, and the diversity of cultures within rural areas. It is suggested that in order to improve rural education the unique needs of rural schools and the characteristics of rural students must be understood and addressed. He argues that rural education must be based on academically demanding rural, not urban standards.

Years of the schooling for the under 30 years old population of men and women are 4.01 and 3.09 years, respectively. Between 31 to 50 years of the population of men and women are 5.24 and 1.85 years respectively. And 51 and above aged population of men and women are 2.32 and 0.39 years respectively. This indicates average years of Nepalese female have improved significantly and this suggests that the discrimination against female has declined. This is something that the country could celebrate on women's right.

People in urban areas have attended more years in school than rural areas. The years of schooling of the urban population are almost twice the rural population. Youngest people have attended more years in school than the older two age groups, this means that the parents are likely to be aware of the impact of education. In comparison between the three age groups, we have found the youngest people have small differences in both urban and

rural areas. Men have attended more schools than women in both urban and rural areas.

Bowlby (2005) revealed the rural-urban gap in education, and argues that students in rural Canada are falling behind their urban counterparts. High school dropout rates are higher in rural areas. During the 2004/2005 school year, the rural dropout rate (16.4 %) was nearly twice as high as the urban dropout rate (9.2%) in Canada.

Table 4: Years of schooling of different age groups in urban and rural areas

Years of Schooling of the population	**Urban**	**Rural**
Years of Schooling for population <=30 yrs old	6.765	3.673
Years of Schooling for population between 31 yrs to 50 yrs	6.394	2.006
Years of Schooling for population above 51 yrs	2.763	0.591

Above table 4 shows that years of schooling for youngest, middle and oldest people in urban areas were 6.765, 6.39 and 2.763 years respectively. Years of schooling for youngest, middle and oldest people in rural areas were 3.67, 2.006 and 0.591 years respectively. Here, we found that youngest people have higher education than other oldest people in both urban and rural areas. Differences among youngest, middle and oldest people in urban rural areas were 3.092, 4.388 and 2.172 respectively. It means education differences between urban and rural area is smallest between youngest people as compared to middle age group.

Rahut (2003) revealed in rural Nepal the marginal effect of the number of years of education is large because the average years of schooling of the head of household is quite small (1.8 years) as compared to urban Nepal (5.6 years). Hence, those people who have higher education tend to get better opportunities and have comparative advantages. There are large numbers of educated people in urban Nepal.

Table 5: Years of schooling of men and women in urban areas

	Urban	
Years of schooling	**Men**	**Women**
Years of Schooling for population <=30 yrs old	7.216	6.319
Years of Schooling for population between 31 yrs to 50 yrs	8.365	4.474
Years of Schooling for population above 51 yrs	4.604	0.922

Above table 5 shows years of schooling of men and women in urban areas for different age groups. Years of schooling of men in urban area for youngest, middle and oldest groups were 7.216, 8.365 and 4.604 years respectively. Years of schooling of women in urban area for youngest, middle and oldest groups were 6.319, 4.474 and 0.922 years respectively.

Differences of youngest, middle and oldest people were 0.897, 3.891 and 3.682 years respectively. Here, differences in education years between men and women is smallest among the younger people and is larger for two

older age groups. This suggests that there is positive development in terms of female education and this is in line with Millennium Development Goal MDGs of providing equal opportunity to the female child.

Table 6: Years of schooling of men and women in rural areas

Years of schooling	Rural	
	Men	**Women**
Years of Schooling for population <=30 yrs old	4.430	3.008
Years of Schooling for population between 31 yrs to 50 yrs	3.606	0.671
Years of Schooling for population above 51 yrs	1.112	0.059

Table 6 shows that years of schooling of men in rural areas for youngest , middle and oldest age groups were 4.430, 3.606 and 1.112 years respectively. Years of schooling of women in rural areas for youngest, middle and oldest age groups were 3.008, 0.671 and 0.059 years respectively. Youngest people have higher education than do the other two older groups. Both men and women have higher education in youngest generation.

In the rural areas the average years of education of oldest, middle and youngest aged male population are 1.112, 3.606 and 4.430 years. The average years of education of oldest, middle and youngest aged female population are 0.059, 0.671 and 3.008 years. This shows that the education level in the rural areas for both male and female are increasing. During the initially years of development the average years of education of male increased faster than that of female but in recent decades we find that the increase in the average years of education of female was higher. This indicates that the Nepalese female children got better education in recent years.

Urbanization shows a positive effect on men school attendance and a negative effect on women school attendance (Jayachandran, 2002). This paper also shows that the education of both men and women in urban areas is much higher than the rural areas, so this indicates that urbanization has positive influence on the schooling and education in Nepal. This supports our hypothesis that the urban children are more likely not to drop out form school.

The differences in years of schooling between men and women in urban areas for the youngest, middle and the oldest population group were 0.897 years, 3.891 years and 3.682 years respectively while the differences between men and women in rural area for the youngest, middle and oldest age groups were 1.422 years, 2.935 years and 1.053 years respectively. We found that the difference in years of schooling between men and women for the youngest group is least in both urban and rural area. We also found that the differences in years of schooling for both male and female population in

both rural and urban areas are smaller for younger generation compared to the older generation, this suggest that the gender education disparity is declining and is an indication that the gender discrimination is being drastically reduced. However, the gender education disparity for the urban population is much lower than the rural population.

Result from Econometric Analysis

Based on the economic theory, the analysis uses the literacy dummy of the household, years of education and gender of the household head. It also uses the household size to capture the effects of the number of children in the house, and gender dummy of the children. In order to capture the effect of the location, we used the rural dummy, developmental regions dummy and ecological belt dummy. In order to capture the effect of the wealth of the household, we use the proxy variables like quality of the roof, types of toilets etc.

Like and other literature, this paper finds that the literate head are more likely to send their children to school as compared to the illiterate head. In developing countries like Nepal and India gender discrimination against female child is widely talked about, so we used the gender of the children to find that female child are less likely to go to school as compared to the male child. The wealth of the household as measure by the quality of housing (types of roof) and types of toilet also plays an important role in the schooling of the children. It is found that the richer households are more likely to send their children to school while the poorer household are more likely to not to send their children to school.

The rural dummy variable shows that the children in the rural areas are more likely not to go to school as compared to the children in urban area. From above analysis we found men have higher education than women in both areas. Demographic surveys (MoE Country Report, 1998) show that 40% of girls get married before they reach 15 years of age. Marriages of 10 or 12-year olds are not uncommon. With few exceptions, marriage ends their schooling. This adds to the cycle of maternal illiteracy that diminishes the chance of their daughters being schooled. Studies show that maternal illiteracy is a significant factor, far more than paternal illiteracy, in depriving daughters of schooling (UNICEF. 1996). Negative attitudes held by both sexes toward girls' education, especially among illiterate parents, have been well documented. Some groups fear that an educated girl will have a harder time finding a husband. Others believe that co-ed classes or walking more than short distances to school compromise their daughters' reputations and marriage prospects. In urban areas, teasing and risk of abuse or kidnapping are disincentives to girls schooling. The rampant absenteeism of teachers, often leaving classes unsupervised, increases parental anxiety. Schools are

seldom girl-friendly. Many have no women teachers to act as role models. Few men teachers have had gender sensitization training to equip them to nurture the participation of girls or to validate girls' life experience within the classroom. The majority of primary schools have no toilets or running water. Class times often conflict with household or sibling care duties. Few schools have ECD programmes to free older sisters of their child care obligations. Hours of daily sibling care, domestic and farm work reduce girls' attendance and leave girls less time than boys to study, contributing to underachievement and dropout (Pennells ,1998). Women are overworked and have precious little time to participate in literacy programs (UNIFEM, 1995:18). In addition to an onerous workload, their work is undervalued. Education is not perceived as an efficient investment in increasing the cash, crop yields or other benefits they bring to the family. Although women invest more time in subsistence and domestic work than men, they are viewed narrowly "as reproducers, not producers" and often have marginal control of how they spend their time.

Marks (2009) revealed the modernization theory and changes over-time in the reproduction of socioeconomic inequalities in Australia that modernization theory argues that, as societies industrialize and further develop, the influence of social background and other ascribed characteristics on educational and subsequent socioeconomic outcomes declines, while achievement in the education system becomes more important. The effect of education on occupational attainment has increased more strongly among men than women. It was found that the effects of socioeconomic background on education specific government policies aimed at increasing equality of opportunity in education (Paterson & Iannelli 2007). In contrast, declines over time in the overall (linear) relationship between socioeconomic background and educational attainment were found in most developed countries (Rijken, 1999). Gender inequalities in education have largely been reversed. In contrast to the late 1970s and early 1980s, a substantially higher percentage of young women than young men completed school and attend university (Fullarton et al. 2003, Marks et al. 2000b). Decline and reversal of gender differences in education have also occurred in many other countries (Blossfeld & Shavit 1993, OECD 1996, 35, 320-321).

Reason for not attending school

According to the National Living Standard Survey (NLSS, 2003/04). (see tables in Appendix A1), There are several reasons for not attending school in Nepal. Reasons are absence of school, schools too far from the home, help at home, parents did not wanting children to attend, children not willing to attend and other reasons. Overall, 21.2 percent of the population never attended school. Among those who never attended school, 33 percent

reported “parents did not want” as the primary reason. Other reason included “help at home” (20.3 percent), “too expensive” (19.3 percent), “not willing to attend” (13 percent) and “school far way” (3 percent).

Table A.2 shows that reason for not attending school of men for ‘too expensive’ is almost double in urban area than women in rural area. For women in rural areas, they found double the number for “parents did not want” is higher than men in urban area.

In comparison between men and women in urban and rural area, there are much differences have found among those who have never attended school. (table A 2, Appendix). The responses of “too expensive” (27 percent) is the most cited reason for men in urban area while “parents do not want” (38.4 percent) (table A3) is the dominant reason for women in rural areas, and it is more than double that for men in urban areas. The vast majority of parents did not want them to go to school for women in rural area, that would be the pattern of traditional society in rural area. We see that 12 percent of men have never attended school as compared to 30.1 percent of women.

Pennels (1998) revealed that the barriers to women participating in education are a maze of socio-cultural, economic and political realities that vary by community and even by family. When families choose which children will or will not be educated, or which will have better educational opportunity, sons are preferred. Educating a son is investing in his ability to look after his ageing parents while educating a daughter is considered a no-return investment. When she marries, she becomes another family’s asset. Both the opportunity and cash costs of education lock girls out of schools. The majority of girls in Nepal are daughters of subsistence farmers living near or below the poverty line. Eldest daughters often provide most of the sibling care. Farm and domestic work also pull girls out of school. Although tuition and books are free in public schools, other forms of student fees may be prohibitive.

Reason for dropouts

According to National Living Standard Survey, 2003/2004, table A 4 shows that distribution of the primary reasons for leaving school who attended school in the past. We found that 32 percent of those dropout cites “poor academic progress” while 27% report “help at home” as the primary reason for leaving school. Cost of the education is not the critical factors for dropping out of school as only 12 percent indicated “too expensive” to be the factor for dropping out of school.

Conclusion

The conclusion drawn from the study is that the urban people have higher education than rural area. Years of the schooling in urban area was more than twice (Victoria, 1998) for both men and women and the differences in education in urban area is smallest than the rural area. The differences in education between men and women were smallest among the younger age group, and the differences for the two older age groups were large in both urban and rural areas. Nepal is men dominant country so women have always less chance to study than men due to some existing traditional society in rural area and urban people are more likely to adopt the modern patterns.

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Appendix

Table A.1: Reason for not attending school for all population 6-24 years old that has never attended school in percentage.

		Reason for not attending school							
	Who have never attended school	Absence of school	Too expensive	To far	Help at home	Parents did not want	Not willing to attend	Other reason	Total
Urban	8.2	0.0	27.6	0.0	15.8	33.8	10.0	12.7	100
Rural	23.5	1.5	18.8	2.9	20.5	32.8	13.1	10.6	100
Nepal	21.2	1.4	19.3	2.7	20.3	32.8	12.9	10.7	100

Source: NLSS 2003/2004

Table A.2: Reason for not attending school for Men population 6-24 years old that has never attended school in percentage.

		Reason for not attending school							
	Who have never attended school	Absence of school	Too expensive	To far	Help at home	Parents did not want	Not willing to attend	Other reason	Total
Urban	4.3	0.0	45.4	0.0	11.7	6.3	17.4	19.2	100
Rural	13.2	1.9	25.5	3.7	15.2	18.5	19.4	15.7	100
Nepal	11.9	1.8	26.6	3.5	15.1	17.8	19.4	15.9	100

Source: NLSS 2003/2004

Table A.3: Reason for not attending school for Women population 6-24 years old that has never attended school in percentage.

		Reason for not attending school							
	Who have never attended school	Absence of school	Too expensive	To far	Help at home	Parents did not want	Not willing to attend	Other reason	Total
Urban	12.4	0.0	21.2	0.0	17.3	43.8	7.3	10.4	100
Rural	32.9	1.3	16.3	2.6	22.5	38.1	10.7	8.6	100
Nepal	30.1	1.2	16.5	2.4	22.2	38.4	10.5	8.7	100

Source: NLSS 2003/2004

Table A.4: Reason for dropouts.

	Help at home	Too expensive	Poor academic progress	Parents did not want	Completed desired level	Moved away	Other reason	Total
Urban	23.1	15.7	33.4	6.1	4.6	3.2	13.9	100
Rural	27.5	10.7	31.3	8.9	3.7	4.7	13.3	100
Nepal	26.8	11.5	31.6	8.5	3.8	4.5	13.4	100

Source: NLSS 2003/2004

Table A.5:Statistics of variables used in the analysis.

Statistics	Education Level	Age	Household Size	Distance to Primary School (min)	Dry Land (in acres)	We Land (in acres)
Mean	5.82	44.48	6.65	17.47	0.27	0.40
median	9.90	42.00	6.00	10.00	0.03	0.10
Standard Deviation	4.58	11.54	2.97	26.67	0.53	0.82
Standard Error (mean)	0.68	0.17	0.04	0.39	0.01	0.01
Coefficient of Variation (cv)	0.79	0.26	0.45	1.53	1.98	2.05

Table A.6:Probit regression: determination of no schooling for children aged 7 to 15 years

Variables	Coefficients
Education Level	0.002
	(0.001)
If the head is literate [ab]	-0.530***
	(0.137)
Age	-0.005
	(0.003)
Rural [ac]	0.340***
	(0.130)
Male Headed [ad]	0.442***
	(0.081)
Male Child [ae]	-0.656***
	(0.071)
Household Size	0.019
	(0.013)
Distance to Primary School	0.002
	(0.002)
Eastern Developmental Region [af]	0.009
	(0.152)
Central Developmental Region [af]	0.213
	(0.149)
Western Developmental Region [af]	-0.458**
	(0.196)
Mid-West Developmental Region [af]	-0.038
	(0.159)
Mountain Ecological Belt [ag]	-0.333***
	(0.121)
Hill Ecological Belt [ag]	-0.125
	(0.155)
Mud Roof House [ah]	-0.059
	(0.265)
Wooden Roof House [ah]	0.509
	(0.355)
Zinc Sheet Roof House [ah]	-0.907***
	(0.121)
Tile Roof House [ah]	-0.487***
	(0.105)
Cement Roof House [ah]	-0.459***
	(0.154)
Other Roof House [ah]	-0.710*
	(0.439)
House with Flush Toilet [ai]	-0.385*
	(0.210)
House with Community Toilet [ai]	-0.024
	(0.432)
House without toilet [ai]	0.402**
	(0.160)

Dry Land (Acres)	-0.183**
	(0.094)
Wet Land (In Acres)	-0.147**
	(0.067)
If head is wage employed in non-farm [aj]	-0.047
	(0.065)
If head is self employed in farm [aj]	-0.138
	(0.160)
If head is self employed in non-farm [aj]	0.178**
	(0.077)
Constant	-0.914***
	(0.332)
Number of observation	4568
Wald chi2(28)	472.75
Prob > chi2	0.000
Log pseudo-likelihood	-1437.07
Pseudo R2	0.2576

Robust standard errors in parentheses. Standard Err. Adjusted for 72 clusters in district code [a] dummy variables; [b] excluded category: literate; [c] excluded category: urban; [d] excluded category: female headed; [e] excluded category: female child; [f] excluded category: far-west developmental zone; [g] excluded category: terai (plain) ecological belt; [h] excluded category: thatch roof house; [i] excluded category: house with pit toilet; [j] excluded category: household head with wage employment in farm; [***], [**], and [*] indicate significance at the 1%, 5%, and 10% level.

APPLIED COOPERATIVE LEARNING IN TEACHING DEVELOPMENTAL MATHEMATICS COURSES

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Abstract

This project integrates cooperative learning strategy in teaching developmental mathematics courses. This study uses a quasi-experimental non-equivalent control design comparing student's outcomes with and without implementing cooperative learning in these courses. The results of the data analysis shows that there is an increase in student's critical thinking ability, retention rate and the percentage of students obtaining A's and C's. This project is supported by Elizabeth City State University Minority Science and Engineering Improvement Program (Award Number: P120A110105).

Keywords: Cooperative Learning, Critical Thinking, Retention and Success Rate

Introduction

Cooperative learning techniques (Stenley and Siemund, 2011) are aimed at achieving the essential objectives in teaching college classes that may not be attained under the traditional teacher-directed classroom setting. However, collaborative learning techniques do not abandon the lecture, but rather use a combination of teacher-directed lectures and student-centered active learning techniques to supplement lectures.

This design requires much more active participation from students than passive lecture-only formats of the past required. This includes complex group exercises in which students apply course material to "real life"

situations and/or to new problems. The term "collaborative learning" covers active learning experience which students solve the questions as groups rather than alone. In cooperative learning techniques, students work in groups and are assigned common quizzes as a group.

Salvin did a research review (Salvin, 1980) on classroom cooperative learning techniques in which students worked in small groups and received rewards or recognition based on their group performance. The review summarized the results of 28 primary field projects lasting at least 2 weeks, in which cooperative learning methods were used in elementary or secondary classrooms. The pattern of research findings supported the utility of cooperative learning methods in general for increasing student achievement, positive race relations in desegregated schools, mutual concern among students, student self-esteem, and other positive outcomes. The various cooperative learning methods were contrasted in terms of characteristics and outcomes.

The main of goal of this project is to get students to become interested in the world of mathematics and other related STEM courses. The activities designed for the program will provide students an opportunity to think logically and creatively on solving mathematics problems. The objectives of this proposal are: (1) to increase student's critical thinking ability through cooperative learning, (2) to encourage students to teach each other, (3) to get students to be prepared for upper level mathematics courses in their disciplines.

Methodology

Intermediate Algebra Course. Intermediate Algebra is designed to prepare students for Pre-calculus, Elementary Statistics, and other general education Mathematics courses. Intermediate Algebra is one of the fundamental and elementary courses for STEM majors. A student's score on the Mathematics Placement Exam will determine his or her placement in a mathematics course. Those students who score high enough to enroll in Calculus I are exempt from this three-hour math requirement. Otherwise, students cannot take advanced mathematics courses toward their degree without successfully completing this course. The course topics include: Linear equations and inequalities, graphing, linear systems, polynomials, factoring, and rational expressions, radicals, and quadratic equations.

Rationale. It is recognized that intermediate Algebra is ideally a level of mathematics maturity that can be achieved through a variety of topics and skills. It is not static, and it is changing and evolving along with the technology available to teach mathematics. It is a combination of computational skills, manipulative skills and critically thinking skills. Conceptual understandings and technical skill go hand in hand, each

reinforcing the other. The teaching experience of the instructor showed that students from Intermediate Algebra courses don't understand the basic definitions of functions and algebraic expressions of fractions. Thus, students have difficulties when solving linear equations and inequalities. Furthermore, it causes more confusion in learning how to solve quadratic equations and inequalities, which are the main topics in this course. I used in-class quizzes, which focuses on the key topics that are necessary for this course, to identify the key information gaps. To promote conceptual reasoning, the instructor often uses an expanded emphasis on applications to promote an appreciation for mathematics in everyday life. However, the instructor cannot cover its applications in each discipline, so some students still look at mathematics simply as a group of formulas and numbers.

Design. This project uses a quasi-experimental non-equivalent control design comparing student outcomes in Intermediate Algebra courses before and after implementing the cooperative learning strategy. The independent variable will be Course Type (traditional baseline or experimental). Baseline measurement (before cooperative learning) took place in Fall 2011 and the Experimental measurement (after cooperative learning) was given during Fall 2012. A pretest and posttest on critical thinking was given at the beginning and the end of each semester.

In the Baseline condition (Fall 2011), the instructor lectured for three 50-minute periods per week in a traditional classroom setting. In Fall 2012, the Experimental condition contained a cooperative and student-centered active learning course design. This cooperative learning session involved reducing lecture time from 50 minutes to 20 minutes per class, adding cooperative learning workshops, adding group quizzes, adding technology-based independent learning materials to give students more practice time and feedback, and shifting instructional roles from information presentation to learning facilitation. The combination of teacher-led lectures and student-centered problem solving workshops will enable faculty to have more one-to-one contact with students. During these periods, students will be assigned applied problems from Agriculture, Psychology, Biology, and other scientific disciplines. On the first day of class, students were divided into five groups according to the class roster and their majors. Each group had five or six students. At the end of each class, each group was assigned problems from core and challenging concepts. The group members helped each other to figure out the solutions to these questions. At the end of cooperative learning session, a quiz was given to the class and the average of the whole group was counted as extra credit.

Participants. The participants of this project are students from Intermediate Algebra courses in Fall 2011 and Fall 2012 (*N=110)* The class

in Fall 2011 serves as the control group under baseline condition and the class in Fall 2012 serves as the experimental group with treatment condition.

Data Analysis of Fall 2011 and Fall 2012

In the fall semester of 2011, 54 students were enrolled in my Intermediate Algebra class and 9 of them dropped the class during the semester. 42 completed the course with a letter grade and three of them received a passing grade for auditing the course. Their final grade are distributed as followings: A-5 students, B-12 students, C-14 students, D-1 student and 10 students failed the class. The retention rate is 42/54=77.8% and the passing rate of the class is 32/42=76.2%.

In the fall semester of 2012, 51 students were enrolled in my Intermediate Algebra class and 9 of them dropped the class during the semester. 45 completed the course with a letter grade. Their final grade are distributed as followings: A-8 students, B-5 students, C-20 students, D-1 student and 11 students failed the class. The retention rate is 45/51=88.23% and the passing rate is 34/45=75.6%.

FIGURE 1: Retention Rate and Pass Rate of Fall 2011 and Fall 2012.

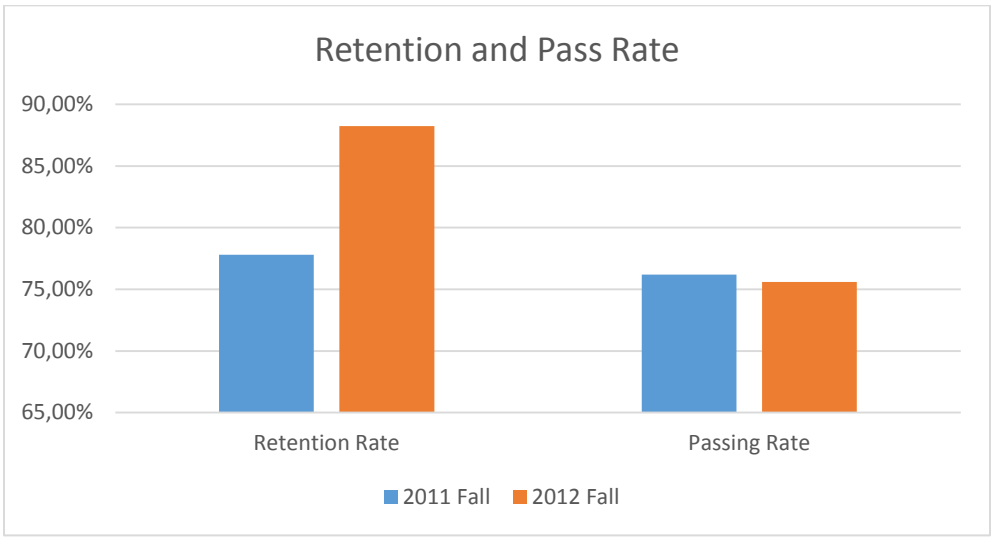


Figure 2: Grade distribution of Fall 2011 and Fall 2012.

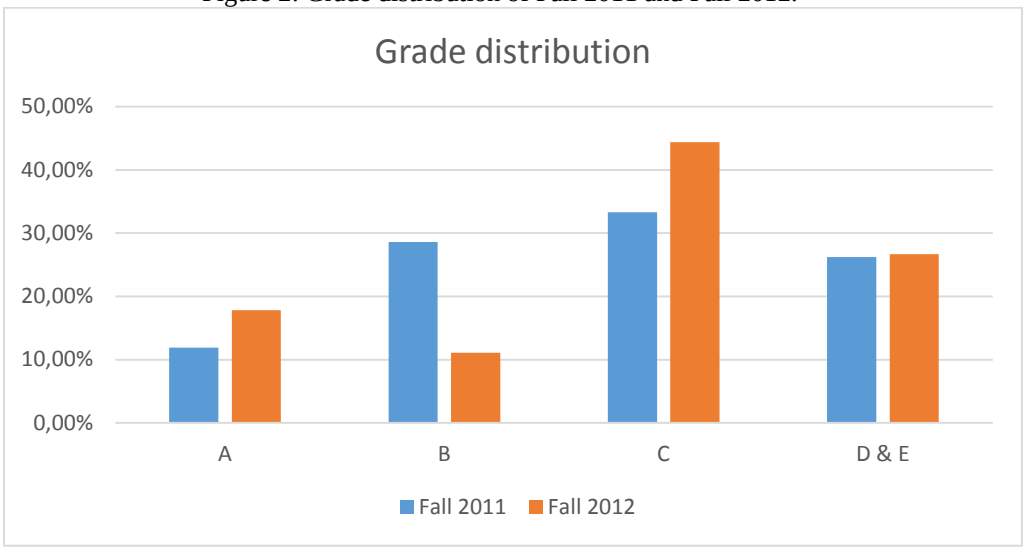
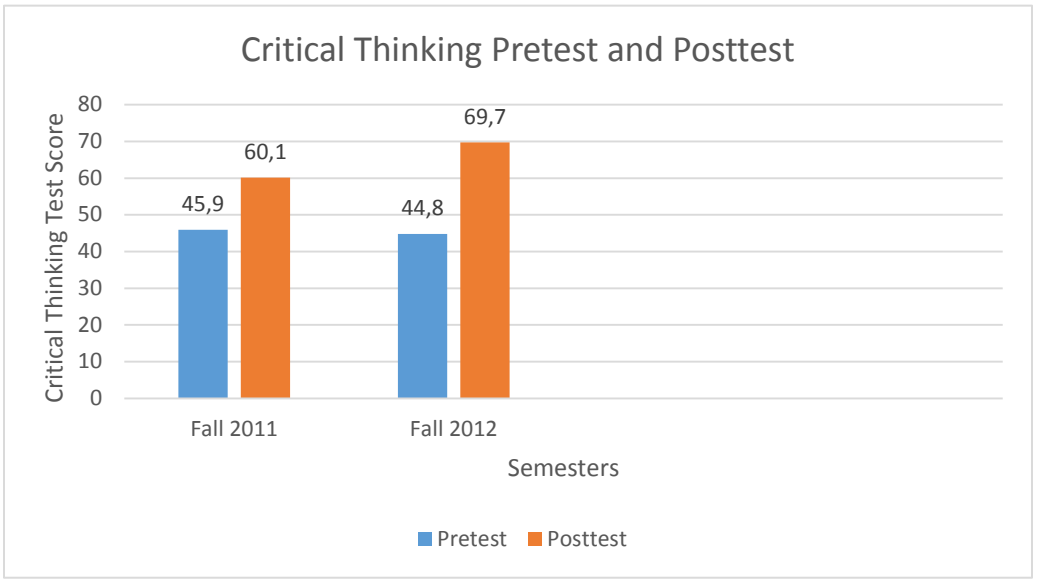


Figure 3: Descriptive statistics of Critical Thinking Pretest and Posttest in Fall 2011 and 2012.



Data Assessment. Comparing the results from Figure 1 and Figure 2, the retention rate had a 10% increase and the passing rate remained relatively stable under the new teaching technique. The newly developed teaching technique did show great improvement in retaining the students, but it did not show great improvement in passing. The students who obtained A's and C's had a great increase, but it has a decrease in B's. In figure 3, students had an average of 31% increase in critical thinking posttest compared with pretest in Fall 2011, while students had an 55% increase in Fall 2012.

Conclusion

The positive outcome of this project was the great increase in student's critical thinking ability, retention rate and the great increase of students obtaining A's and C's in this course. It showed that cooperative learning did promote students to think critically and stay in the class until the end of this course. Students, especially high achieving students (students who obtained A's) and relatively low achieving students (students who struggled to pass the course), obtained the most benefits from helping other students and learning from their classmates. However, the pass rate of the course did not show an increase and there was a decrease of students obtaining B's in the course.

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