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**DEVELOPING CREATIVITY IN ITE THROUGH MODELS OF
SYSTEMATIC ENQUIRY**

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Abstract

ITE programmes around the world attempt to prepare students to cope with a variety of teaching situations. In rapidly evolving information technology classes, with very different needs and abilities, creative problem solving skills are increasingly valued. In this study, we explored the concept of creativity in ITE and we presented a model of systematic enquiry that could enhance student teachers' understanding of professional issues and learning. By means of specific questions asked in a specific order, each topic approached was rendered problematic, creating a pattern for finding solutions. Creativity was defined here as the capacity to adjust to novel circumstances and to find solutions to problems that unexpectedly arise. This enquiry model was applied systematically with 50 student teachers in their first year of study during three of their courses. They were asked to complete tasks on professional issues under the form of reflective essays which were analysed in terms of features of the creative process or personality. A software for qualitative data analysis was employed. We concluded that we can enhance creativity in our students' learning by leading their approach of any professional issue, by determining them not to adopt any pedagogical stance without prior questioning and close analysis. This specific model adapted and tested in the context of ITE is open to other fields of study, due to its focus on generating solution answers.

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Keywords: Creativity, systematic enquiry model, ITE, LLL



1. Introduction

The research presented in this article is part of a larger study concerned with the quality of ITE in Romania and the means of enhancing learning for continuous education, as a necessity to cope with the ongoing changes in the nowadays schools. Our current educational system better prepares pupils to answer questions to readymade problems rather than teaches them to formulate the nature of problems in the first place. Often the skills involved in solving well defined problems are not the same as those involved in recognizing a non-obvious problem or creating a problem. The skills needed clearly to state a problem and to represent information about it in a way that permits solution are also often not emphasized in current classrooms. It is well known the gap between theory and practice that we continue facing, due to this lack of skills that we cannot develop since trainers offer only canned solutions. The reality of the classrooms changes even before student teachers finish their education. Therefore, we approached teacher preparation differently, presenting student teachers with ill-defined problems that need a solution since this is the reality of the classrooms that they are going to teach after their initial education and they need to be ready to cope with any unexpected situations. Literature supports the argument that the best learning context is the one that reflects the real working conditions (Day et al. 2007).

The ability to create problems and solve them in a way that is considered useful and original in the field of teaching would relate to finding customised solutions for every class, pupil or teaching situation encountered, to being extremely resourceful in terms of ideas, playfulness, open-mindedness, flexibility, patience, as there would not be two situations alike, even if general conditions were similar. Jay (1996) found that problem-finding behaviour was enhanced when it was encouraged and guided. We wanted to encourage this attitude of ongoing exploration and investigation, to assist the analysis of problematic issues by guiding it through a model of systematic enquiry, and create a habit of approaching any problem encountered with questions, in order to find a solution. In our attempt, we considered various factors that have been identified as influential for this creative problem solving process (Davison and Sternberg, 2003): reflexivity, personal beliefs and attitudes, prior knowledge, expectations, motivation, tolerance to ambiguity or divergent thinking. We are going to refer to these further. |

2. Problem Statement

Creativity, defined here as the ability to find solutions to any problem (Simonton, 2001), is compulsory in the context of ITE when speaking about preparing best the trainees for the teaching profession. Teaching is challenging in any conditions, and teachers in Romania, like all teachers around the world, need to be prepared to work in various contexts where they need to find the appropriate solutions for highly competitive or, on the contrary, very demotivated pupils risking school drop, pupils belonging to poor communities that do not support their education, compensate for lack of textbooks or other resources or learning how to use technology in the classroom and keep up with their pupils' needs and interests, face a hostile environment resistant to any kind of change or innovation or struggle with bureaucracy and paper load, just to name a few. In either case, teachers need to adapt constantly to ongoing changes and solve a diverse range of problems that arise unexpectedly, for which they have not been prepared during ITE.

We agree that reflexivity, understood as an analytical process for study, comprehension, integration and identification of solutions for learning, can become a powerful instrument in any educational environment. Previous research (Tugui, 2011) showed that reflexivity could have positive effects when approaching changes in teacher education. Still, in ITE it is used superficially due to lack of teaching experience and of analytical thinking (Korthagen & Vasalos, 2005). There are approaches based on the idea that guidance by means of different instruments can lead to the development of reflective abilities for an individual independent progress in learning (Christie & Kirkwood, 2006).

When we approach a new situation, our knowledge based on prior experiences will influence our ability to define and represent a problem correctly. In fact, we may fail to notice the existence of a problem if it runs counter to our strongly held expectations (Davison and Sternberg, 2003). Teachers can filter out training interventions, or interpret input so that it fits in with their existing personal theories about teaching and their prior experience (Fosnot, 2005). This tendency to assimilate inputs indicates the need to uncover teacher's implicit theories and beliefs in order to make them available for conscious review (Schulman, 1997). A person's set of beliefs, values, understandings, assumptions – the ways of thinking about the teaching profession, comprise a 'personal theory' (Freeman & Richards, 1996). In this sense, teacher education needs to recognize that each student teacher has a different way of seeing, and thus feedback in the initial education setting should focus on the thinking and the perceptions of individual students as well as on their actions (Steffe & Gale, 1995).

Another important factor that has been identified as critical to the creative process (Amabile, 1996), in some of the early stages of problem solving, is motivation. Motivation can be referred to in terms of motivation for the career and motivation for learning. One implies the other, namely motivation for the career would imply motivation for learning. Once student teachers enter an ITE programme they start realizing that the boundaries of knowledge are inexistent and that the general guiding principles regarding the pedagogy, the child psychology or they didactics are changing continuously, according to the class context, the age of the children, the individual characteristics of the pupils or the social context or the school culture. They will engage on a continuous learning process that will persist throughout their career. Therefore, readiness to learn, the ability to embrace change and find novelty challenging and not threatening, keeping the curiosity alive would be very important for a teacher who wants to keep the pace with his/her pupils (Tugui, 2011).

The ability to think divergently and flexibly is valuable in the process of problem formulation, as is an open and intrinsically motivated disposition. Individuals with this disposition are always thinking of different ways to regard the information in their environment and the information they possess in long-term memory. When they are working on a problem, they naturally attempt to redefine and re-represent the problem, thus increasing their chances of finding a definition and representation that will yield a creative solution (Davison and Sternberg, 2003). Intrinsically motivated student teachers will always seek for a multitude of perspectives, in order to select the most suitable for the context in which they practice their teaching.

3. Research Questions

In the context of LLL and everchanging classroom conditions, we considered different means to develop adaptive and creative skills to reach a solution that would be effective during their initial education and would continue to work surpassing the boundaries of any ITE programme. Therefore, we tackled creativity in the field of ITE (How can creativity in ITE be defined?) and wondered about a model of systematic enquiry and its effects on our student creative abilities (Can a model of systematic enquiry enhance creativity in ITE?)

4. Purpose of the Study

The study aimed at exploring the applicability of a systematic enquiry model to enhance student teachers' understanding of professional issues and learning. By means of specific questions asked in a specific order, each topic approached was rendered problematic, creating a pattern for finding solutions.

5. Research Methods

The model employed is the SPIN model, an instrument that can assist problem identification and adaptation to change by means of individual questions asked in a particular order. It has been used successfully in business for identifying customer needs (Rackham, 1996), and it was adapted to ITE as a result of an extensive research study which concluded that change can be approached efficiently through understanding all aspects related to an issue (Tugui, 2011). Any change situation involves awareness of past and current experiences, their critical analyses which leads to acceptance and facilitates implementation of new ideas in practice. The model approaches any problematic issue in four steps: **Situation** (*How much time do you spend preparing for classes?*), **Problem** (*Do you encounter problems because you lack hardcopy textbooks?*), **Implication** (*Have pupils ever performed badly in the exams because of lack of textbooks?*), **Need-Payoff** (*So a digital textbook, would that solve the problem for you?*). Because most of the time needs are implicit, the questions of the model are aiming at making them explicit at different levels before being able to find solutions to respond to these needs. In a similar way, the literature on creativity describes the creative process as a the sequence of thoughts and actions that leads to a novel and adaptive production (Lubart, 2000–2001), and based on introspective accounts, identifies the following stages: preparation, incubation, illumination, and verification. These can be compared to the SPIN model approach with the four stages.

This enquiry model was applied systematically with 50 student teachers in their first year of study during three of their courses, for one term, each teaching issue being analysed by asking questions in 4 steps. Before they started attending the courses student teachers were asked to write a reflective essay on their choice of career, their motivation for study, and their expectations of the programme. Another similar task was given after they have completed the first term of pedagogical practice.

A software for qualitative data analysis was employed to manage the data resulting from the reflective writings. At the moment of this article, data analysis is not completed and the results presented here are referring to a part of the research outcomes. We are going to refer in general terms to what the creativity literature has identified as individual-difference variables that appear to influence problem

solving, namely divergent thinking, openness, tolerance of ambiguity and intrinsic motivation. We have tried to identify these elements in the reflective writings of the students before and after attending their first term courses and pedagogical practice. |

6. Findings

|Data revealed that the pattern of approach imposed by the model used during the three courses was also found in the essays analysed. If at the beginning the essays were merely descriptive and unstructured, the writings collected after attending the courses in the first term became more focused on the tasks and followed the approach in four stages, describing the state, identifying the problem and its implications as well as the solution to it. It generated at least one solution to the issue discussed and much more opportunities for arguments for different perspectives or cause-effect connections, leading to student teachers' better understanding of the problematic at hand.

In terms of factors affective creative problem solving, data revealed high levels of intrinsic motivation both at the beginning and at the end of the term, but this was not surprising since the participants were very motivated for the career according to their first essays and they considered that the courses in the first term met their expectations, according to the final essays. According to literature, this was important for sustaining learning and seeking for solutions to different problems posed during training (Tugui, 2011). These were accompanied by openness to learn, to find out more, to discover what is involved in teaching in both types of essays. It was striking to discover that all student teachers had zero tolerance to ambiguity, since all of them expected recipes for any teaching situation possible- this made them feel safer when mastering teaching in class, having all answers – although at some level they were aware of the fact it was an utopic attitude. It would be interesting to follow this attitude in later stages of their education, when they would acquire more knowledge and feel more comfortable within the profession. Divergent thinking signs appeared in the reflective essays written only at the end of the term, after they attended the courses and they had their pedagogical practice, which brought more information about the field and put things into a more practical perspective, under the form of suggestions, solutions and arguments, that were sometimes complementary and sometimes contrasting.

We are aware of the fact that, concerning the combination of these components, the level of creativity of a given subject does not result from the simple additive combination of the various components (Davison and Sternberg, 2003). If somebody has a level close to zero for a given component, the probability is very low that creative work will emerge, but we believe that in some cases a high degree of perseverance may partly compensate for relatively low levels on certain cognitive abilities. Although some of participants had few or no practical knowledge, their motivation and perseverance to learn about the field could compensate for it and still be considered premise for creative problem solving.

It was interesting to notice that student teachers after being exposed to the SPIN model started spending more time planning future actions and analysing problems, rather than plunging into an impulsive solution, they developed a plan reflectively to address the problem, actions that would be characteristic to more experienced teachers (Moore, 1990). Moreover, despite the fact that student teachers did not have much knowledge in the field, there was a tendency to render problematic their own

existing knowledge on every opportunity they had. We believe that the approach imposed by the model influenced the way they dealt with all tasks received. |

7. Conclusion

|For student teachers, most cases presented to them theoretically during courses fell into the category of routine problem solving that require ready-made solutions. Though, they soon discovered during pedagogical practice that these ready-made solutions did not always work in the classroom, that they needed to be adapted, customised, and this was the moment when the creative process of finding solutions for the specific situations encountered started. When they were working on a problem, they naturally attempted to redefine and re-represent the problem, thus increasing their chances of finding a definition and representation that will yield a creative solution. This is the reason why the spiral process that the SPIN model proposes to approaching teaching issues falls in place here, as every problem analysed generates a new situation to be considered further. We were encouraged by the high levels of intrinsic motivation declared by the student teachers to sustain creative performance through ITE. Though, we hope that we can ensure continuity by providing the appropriate environment and the inquisitive attitude that could promote learning beyond the programme. Studies show, for example, that a stimulating physical environment or contact with diverse creative people promotes creative attitudes during problem solving (Amabile, 1996; Shalley & Oldham, 1997). In their writings, student teachers mentioned the opportunities to learn, to be creative, to debate, to discuss they had during seminars.

We concluded that we can enhance creativity in our students' learning by leading their approach of any professional issue, by determining them not to adopt any pedagogical stance without prior questioning and close analysis. This specific model adapted and tested in the context of ITE is open to other fields of study, due to its focus on generating solution answers. |

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