

DEVELOPING PROSPECTIVE PRIMARY TEACHERS LEARNING TO- LEARN COMPETENCE THROUGH EXPERIMENTAL ACTIVITIES

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Abstract

The aim of this study was to determine if there is a connection between the inquiry-based teaching of science in primary school and the development of the students' learning to learn competence. The research shows that through inquiry-based teaching students developed a higher level of the learning to learn competence than by using traditional teaching methods. Therefore, it is recommended to use inquiry-based learning as often as possible, because by developing the students' learning to learn competence, students will be empowered for the process of lifelong learning.

Keywords: inquiry-based teaching; learning to learn competence; self-regulated learning; students' perception of learning, framework, methods, knowledge transformation.

Introduction

The nowadays society is in a continuous change with major impact on education, and in the overall development of an individual. In fact, the school cannot provide all the information and related knowledge for the whole life, and, in the context of the actual lifelong learning, an individual has to be trained with those competences and capacities that allow to continue the learning process also after the ending of the studies. As defined at the European level, the key competences for lifelong learning represent those which all individuals need for personal fulfillment and development, active citizenship, social inclusion and employment. One of those competences is "learning to learn", defined as the ability to pursue and persist in learning, to organize one's own learning, including through effective management of time and information, both individually and in groups (The Key Competences for Lifelong Learning - A European Framework, 2006).

Learning to learn is neither a set of skills nor a recipe that will enable the improvement of learning. It is a kind of philosophy that puts the student in the center



of attention through several key factors:(a) the school, which provides the student with the opportunity to learn; (b) parents, who participate in the shaping of the learning process by encouraging children to find their own methods and strategies of learning; and (c) students themselves, who seek to develop into individuals who will practice lifelong learning throughout their lives learning can be divided into two broad categories: learning as the reproduction of knowledge and learning as the transformation of knowledge. The first category includes the understanding of learning as an accumulation of knowledge (increasing the amount of information), or as a process of memorizing knowledge and skills with the aim of using them later. The second category refers to the notion of learning as a process of discovery that enables understanding of the phenomena in nature and an activity that leads to conceptual (and personal) change. According to the above, in order to develop the learning to learn competence within a lifelong perspective, it is necessary to consider learning as a process which does not involve mere memorization and reproduction, but knowledge transformation. Research on the learning to learn competence, its basic characteristics and key elements, and its development among students has become more frequent in the last decade. Thus, within the Finnish project “Life as Learning”, the University of Helsinki organized a series of studies dealing with the study of this competence. Thanks to the British project “Teaching and Learning Research Program”, a number of questions related to this competence were also opened. The University of Bristol launched a project known as the “Effective Lifelong Learning Inventory” (ELLI) which aimed to define and examine the personal orientation of respondents towards lifelong learning. They used “learning power” as a new term that implies a complex mix of disposition, experience, social relationships, values, attitudes, and beliefs that influence a person’s individual engagement in different learning opportunities

When it comes to this **competence**, the term self-regulated learning is often mentioned. Self-regulated learning, as a type of competence, implies a multi-component, cyclical, self-initiated process that involves cognitive, metacognitive, and motivational systems; behavior; and adaptation of learning situations in order to achieve student goals. Bakračević emphasizes that self-regulation, along with metacognition, is an important part of the learning to learn competence, and Moreno talks about certain elements of metalearning, such as planning and monitoring the learning process, that can be described as self-regulation. Self-regulation is considered to exceed metacognition because



it includes affective, motivational, and behavioral monitoring and self-control processes.

Learning to learn competence

It includes the availability and ability of a student to organize and regulate his/her own learning, either in individual or group contexts, and the ability to effectively manage learning time, solve problems, and assimilate, apply, and evaluate new knowledge, as well as the application of the acquired knowledge and skills in different contextual frameworks.

Whereas many studies investigate the effects of inquiry-based versus traditional lecture-based teaching on the students' academic achievements in primary science classes, few studies have considered its effect on the development of the students' learning to learn competence. Such research is especially rare in the first educational stages. In addition, previous researches into the learning to learn competence have shown the possibility of its development during the educational process through the implementation of specific teaching strategies and active learning methods. Thus, this work focuses on how inquiry-based teaching, as opposed to traditional teaching affects students' perception of learning, their motivation to learn, their process of learning in different circumstances, and the impact it has on the application of different learning strategies. This research shows that inquiry-based teaching produced a better development of the students' learning to learn competence and that its effect on that development was significantly higher than that of traditional lecture-based teaching. Based on that finding, the hypothesis that inquiry-based teaching of primary science will result in an increased development of students' learning to learn competence (with regard to traditional teaching) has been proven. Better development of the students' learning to learn competence in the experimental group can be interpreted as a result of the students' active inclusion in planning the inquiry process and in thinking and reasoning about the learning objectives which they needed to achieve. It is important to emphasize that inquiry-based learning is a student-centered approach, focusing on questioning, critical thinking, and problem solving. Learners are actively involved in formulating the question and posing a problem and make their own connections about what they are learning. This allows them to gain a deeper understanding than they would get by just memorizing and recalling facts and they are able to develop a passion for exploration and learning. Besides, the learning to learn competence implies that students in the process of



learning begin from previous knowledge and life experience, which is the main postulate of constructivist learning incorporated in the basis of inquiry-based teaching. The positive impact of inquiry-based learning has mainly been determined in their perception of learning and their use of different learning strategies. These findings could provide valuable information for successful shaping of initial STEM (Science, technology, engineering, and mathematics) education, which often depends on the students' interest and motivation to learn. The positive shift in the development of the learning to learn competence with the inquiry-base teaching shows its significant role in preparing students for lifelong learning. It can be assumed that a longer exposure of students to inquiry-based teaching would have an even more positive effect on the development of their learning to learn competence in primary science, because a short period of three months was enough to achieve a statistically significant positive shift in the development of this competence.

KNOWLEDGE

Knowledge and understanding of different learning methods, strengths, and weaknesses of their own learning skills. Knowledge of educational opportunities and understanding how decisions during education lead to different professional careers.

SKILLS

Ability to self-regulate learning, effective management of learning time, autonomy, discipline, perseverance, and information in the learning process.

Ability to concentrate in longer and shorter periods of learning. Ability to think critically about the goal and purpose of learning

ATTITUDES

Positive attitude towards learning and readiness for further development of learning to learn competence, motivation, and confidence in one's own success during learning. Positive attitude towards learning as an activity that is important for the life of every person and the development of initiative for learning. Flexibility in the learning process



This research shows that inquiry-based teaching can contribute to the development of lifelong learning skills in 10-year-olds, which is extremely important in today's fast-changing world. That is why it is necessary to offer numerous opportunities for students to participate in research activities in their regular primary science classes, because the processes of independent or guided experimentation allow students to develop relevant learning skills and acquire new information. Participation in research activities offers a unique opportunity to simultaneously strengthen conceptual understanding of the area/topic of research, acquire research skills, learn new skills, and understand the process of learning; as such, it should be the essential activity in natural science education. In this research, inquiry-based learning led to an increased motivation to learn science, improved perception of the learning process, and more efficient use of learning strategies and handling of different learning conditions among students in the fourth grade of primary school. When assessing the effects of inquiry-based teaching on the development of students' learning to learn competence, it is necessary to take into account that the development of the learning competence has been analyzed by means of a survey in which students expressed their observations regarding the changes in their learning process in the science class. Subsequent research aimed at examining the development of this competence might further explore students' use of the learning to learn competence in specifically designed situations, and testing a larger sample. A longitudinal study would also provide an insight into the possibilities of developing this competence in science classes at the secondary stage of education.



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