From Self-Awareness to Self-Learning: Developing Reflective Competencies of Future Teachers through Simulation Strategies

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ABSTRACT
The paper explores the development of reflective competencies in future teachers by using simulation strategies as a tool to foster self-awareness and self-directed learning among student teachers, which are crucial for their professional and personal growth. The research aimed to assess the impact of microteaching, as a simulation strategy, on the level of reflective competencies in student teachers. Simulation strategies enable students to recognize their own responses and identify areas for improvement in their approach to learning and teaching practice. The study included 142 students from teacher training programs at Pavol Jozef Šafárik University in Košice and 198 mentor teachers. A custom-designed evaluative questionnaire in the form of a scaled survey, based on autonomous evaluation by student teachers and heteronomous evaluation by mentor teachers, was used to monitor the impact of microteaching as a simulation strategy. The questionnaire's reliability (Cronbach's alpha) was α=0.803. In the experimental group, statistically significant differences in reflective competency levels were observed following the implementation of microteaching as a simulation strategy with reflective tools ($p<0.001$). However, in the control group, which engaged in microteaching without reflective tools, no statistically significant difference in reflective competencies was noted. The research findings suggest that simulation strategies not only help future teachers to better understand their strengths and weaknesses but also encourage active personal development, emphasizing the importance of reflective tools. This paper contributes to the discussion on innovative methods in teacher preparation and underscores the need to integrate reflective activities into the educational process.

1. Introduction

The professional preparation of future teachers for the teaching profession is a prerequisite for a high-quality education system. Current trends in teacher training emphasize the development of not only professional but also personal competencies, with reflective competencies playing a crucial role. The ability to analyze and evaluate one's own thoughts, attitudes, and behavior forms the foundation for effective self-awareness and subsequent self-learning. Reflective capacity is central to professional growth while also fostering self-awareness and lifelong learning [1].

Reflection is a broad term that describes the process of wondering about experience and trying to understand it [2]. Reflective practicehas been linked to the development of skilled, self-aware and actively engaged professionals [3]. Developing reflective competencies requires examining problems and its solutions in a process of learning through experience. Reflective learning often includes journal writing, peer reflection, self-reflection or group discussion facilitated by teachers. Implementation of reflective learning can enhance students' critical thinking, insight, empathic concern and other skills [4].

Many solutions to our problems are not to be found externally but within ourselves. A key factor in revealing our inner processes, often accompanied by shifting moods and emotions, is self-awareness – a foundation of emotional intelligence. Self-aware students have an understandingof their strengths and weaknesses, typical responses in various situations, core values, motivations, they have independent attitudes, and are skilled in expressing thoughts, feelings and opinions [5], [6]. Self-awareness positively predicts and identifies one's goals. However pursuing goals is not always straightforward, in fact, it often involves overcoming goal related obstacles. Individuals with higher

levels of self—awareness are more likely to identify mentioned obstacles [7].

Setting goals, planning and monitoring progress is a sign of self-regulated learning, which is characterized by having self- confidence and sense of responsibility, behaving on one´s own initiative, and exercising self-control. If self-regulated learning is high, there is a high predictability that self-awareness is also high [6]. To control the learning and to meet personal or professional goals learners often employ self-directed learning. This type of learning was identified as crucial competence for preparing for adult and professional life. It makes it easier to adapt to various complex social changes [18].One of the features of self-directed learning is that it is highly individual. It offers learners several benefits: it helps prevent the outdatedness of skills and knowledge; allows individuals to adapt and reduce unemployment risks; supports self-actualization; and promotes long-term career success [17].

Self-awareness (understanding of one´s strengths, weaknesses, behavior), self-regulated (planning, monitoring and evaluating strategies and outcomes) and reflective learning (critical thinking, deeper insight) are interconnected processes that enhance personal growthand empower students to take the learning journey into their own hands [4]–[6].

The initial years of teaching are widely considered to be the most challenging, as new teachers have to face unfamiliar situations. One of the approaches to lower the dropout rate among new teachers and to smooth the transition from academic preparation to practical teaching is the use of simulations as a method for gaining practical, relevant and effective knowledge [14]. The concept behind applying simulation in teacher education is to create scenarios that closely replicate the real-life interactions that the teacher students might encounter within school settings, e.g. giving instructions, classroom management, problem-solving, decision making and evaluation. Simulations enable future teachers to practice specific abilities, rehearse classroom scenarios and most importantly analyze and reflect on their performances afterwards. This allows students to identify mistakes, learn from them and minimize or prevent potential future problems [15]. Simulating real-world challenges create safe environment for teachers in training to experience difficult situations without taking the risks or bearing the real-life consequences that could negatively affect students, other educators or teacher students themselves [16].

Based on the findings of the mentioned studies, the development of reflective competencies in future teachers through the use of simulation strategies as a tool for fostering self-awareness and self-learning appears to be a highly suitable approach for supporting their professional and personal growth. Consequently, our primary objective, aimed at monitoring the impact of microteaching, was to create a custom-designed evaluation questionnaire. This scale-based questionnaire was grounded in both autonomous self-evaluation by teacher education students and heteronomous evaluation by mentor teachers. It was structured into three domains: the student, the educational process, and self-development.

2. Methodology

The research was focused on comparing autonomous and heteronomous evaluation of the professional competencies of future teachers. Students used autonomous evaluation, which included self-assessment. Mentor teachers used heteronomous evaluation, which included evaluation of students by their mentor teacher. The aim of research was to determine the impact of simulation strategies (microteaching) on the development of reflective competencies of future teachers. Simulation strategies (microteaching with reflective tools and microteaching without them) were used during an interactive experimental intervention.

The research design consisted of pretest (evaluation of the level of students' professional competences) – experimental intervention (video-reflection, reflective discussion, self-reflection),

and post-test (evaluation of the level of students' professional competences). Experimental intervention was aimed at microteaching with tools of reflection (video reflection, reflective discussion, self-reflection), which students worked with after the microteaching and after observing their own microteaching performance within the course "Pedagogy and Didactics for teachers".

A descriptive research was used for describing and analyzing the evaluation of the level of future teachers' and mentor teachers' professional competences. The aim was to collect research data, which describe a central variable in detail – the evaluation by mentor teachers from elementary and secondary schools of student teachers' professional competencies in three areas – the learner, educational process and teacher's (student teacher's) self-development. Each area contained items related to specific competencies, assessing the level at which student performs particular tasks.

Mentor teachers and student teachers were provided with structured reflective observation sheet, in which they evaluated specific items using five-point Likert scale. The evaluation sheet was created according to professional standards for elementary and secondary school teachers. The evaluation sheet for mentor teachers was focused on heteronomous evaluation of student teachers' professional competencies and the evaluation sheet for student teachers was focused on autonomous evaluation of student teachers' professional competencies (self-evaluation).

A. Characteristics of the Research Sample

The research sample was collected using convenience sampling method. It consisted of 142 students of teacher education programs at UPJŠ in Košice and 198 mentor teachers from elementary and secondary schools. Each student was evaluated twice (for each teaching specialization). The control group consisted of 74 students and the experimental group of 68 students from education programs at UPJŠ.

B. Data Analysis

Non-parametric tests were used for statistical processing and data comparison, because the collected data, which were subjected to the Kolmogorov-Smirnov test for normality of data distribution, indicated$p<0,5$.

The Mann-Whitney U test was used to identify statistically significant differences. The chosen significance level was 0.05. From descriptive statistics was chosen arithmetic mean (x), and median (MD), and standard deviation (SD). Statistical analysis of the data was performed using SPSS version 27.1.0.1.

3. Research Results

Teacher students in both the control and experimental group evaluated their competences, knowledge and skills significantly higher than their mentor teachers did before intervention. This was evident in all areas of their competency profile (pretest). The experimental intervention (video reflection, reflective discussion, self-reflection) contributed to an improvement in reflective competencies of teacher students in experimental group. After intervention, the self-evaluation of students in experimental group aligned more closely with the evaluation of their mentor teachers (posttest). A statistically significant difference in evaluation was observed in the pretest, however no significant differences were observed in the experimental group (Table 1).

Table I. Reflective competencies of future teachers

Area	Test	Group	Teacher/ Student	Mean (x)	Median (MD)	Standard Deviation (SD)	P-value	Significant (p<0.05)
L	Pretest	CG	T	2.98	3.00	0.36	0.080	No
			S	1.75	2.00	0.49		
		EG	T	2.99	3.00	0.28	0.073	No
			S	2.55	2.00	0.47		
	Posttest	CG	T	2.58	3.00	0.59	0.054	No
			S	2.44	2.00	0.79		
		EG	T	2.55	3.00	0.88	0.023	Yes
			S	2.48	2.00	0.60		
EP	Pretest	CG	T	3.03	3.00	0.44	0.068	No
			S	1.95	2.00	0.27		
		EG	T	3.00	3.00	0.17	0.066	No
			S	2.54	3.00	0.44		
	Posttest	CG	T	2.51	3.00	0.77	0.073	No
			S	2.02	2.00	0.32		
		EG	T	2.54	3.00	0.55	0.015	Yes
			S	2.48	2.00	0.40		
PD	Pretest	CG	T	3.03	3.00	0.35	0.064	No
			S	1.87	2.00	0.44		
		EG	T	3.00	3.00	0.42	0.059	No
			S	1.87	2.00	0.22		
	Posttest	CG	T	2.51	3.00	0.65	0.068	No
			S	1.68	2.00	0.81		
		EG	T	2.53	3.00	0.70	0.026	Yes
			S	2.45	2.00	0.15		

L - Learner, EP – Educational Process, PR - Professional Development, CG – Control Group, EG – Experimental Group, S – Student, T- teacher

Students in the experimental group evaluated their level of competencies, knowledge and skills much more critically after the intervention. Their evaluations aligned with those of their mentor teachers. Based on research results, we assume that simulation strategies positively influenced the reflective competencies of future teachers, leading them to more critically reflect their performance during microteaching. The significance of the difference in the level of student teachers' reflective competencies was confirmed by verifying the hypothesis: H_1: *Simulation strategies utilizing reflective tools have positive effect on the level of reflective competencies of student teachers.* The paired Wilcoxon Signed-Rank Test was used to verify this hypothesis

Table 2. Wilcoxon Test

Test	N	Mean Rank	Sum of Ranks	Z	P-value
Pretest - Posttest	25	0.5868	14.67	-3.26128	0.000

The hypothesis verification confirmed, that it is possible to strengthen the level of reflective competencies by intervention of simulation strategies in professional preparation of student teachers (Table 2).

4. Conclusion and Discussion

Self-awareness and self-learning among teacher students through microteaching are essential components of their professional development [8]. This paper focuses on the development of their reflective competencies as future teachers through simulation strategies. The research methodology compares autonomous and heteronomous evaluation of professional competencies among teacher students in the Pedagogy and Didactics for Teachers course at Pavol Jozef Šafárik University in Košice, evaluated by both the students themselves and their mentor teachers.

The research findings highlight significant differences in the self-evaluation of teacher students and the evaluation of their competencies by mentor teachers prior to the intervention. Students in both the control and experimental groups rated their competencies significantly more optimistically, which may reflect overconfidence, insufficient reflective ability, or limited understanding of the demands of the teaching profession. This phenomenon aligns with the Dunning-Kruger theory, suggesting that less experienced individuals tend to overestimate their abilities.

The intervention, which included video reflection, reflective discussions, and self-reflection, contributed to the enhancement of reflective competencies, consistent with the premises of reflective learning theory. These methods enabled students to analyze their microteaching performances, identify strengths and weaknesses, and receive constructive feedback. This process fostered critical thinking, as evidenced in the post-test results, where evaluations by students in the experimental group showed statistically insignificant differences compared to evaluations by mentor teachers. This finding aligns with a study [13] demonstrating higher levels of critical thinking in post-tests among teacher education students before entering the profession. Conversely, another study [10] revealed that mentor teachers rated students more positively than the students' self-evaluation, potentially due to intentional leniency from the teachers. This observation is supported by a study [11] which found that better evaluations by mentor teachers were often motivated by the desire to encourage students, help them overcome initial failures, and foster their personal growth.

The statistically insignificant difference between self-evaluation and mentor evaluations after the intervention indicates that the reflective approach in the experimental group improved students' ability to objectively perceive and evaluate their own competencies. This shift can be interpreted as a positive effect of the intervention, contributing to the development of critical thinking and enhanced professional self-reflection. Hypothesis H_1, which posited a positive impact of simulation strategies on reflective competencies, was statistically confirmed using the Wilcoxon test, which revealed significant differences in students' self-assessments before and after the intervention.

In contrast, the control group, which was not exposed to the intervention, likely retained a distorted perception of their abilities, possibly due to the absence of adequate reflective tools. This result underscores the necessity of integrating reflective strategies into teacher preparation programs.

The research results confirm that simulation strategies represent an effective tool for developing reflective competencies in future teachers. These methods support not only professional growth but also critical self-evaluation, which is crucial for addressing the challenges of teaching practice.

Incorporating such strategies into educational programs can significantly contribute to preparing skilled and reflective educators, emphasizing the need to continuously improve the quality of teacher preparation [12].

5. Limitations

Despite significant findings, the research has certain limitations. One major limitation is the generalization of the results, as the study involved a convenience sample of teacher education students at Pavol Jozef Šafárik University, specifically within the Pedagogy and Didactics for Teachers course. This constraint also affects the validity of our findings. While the results of the experimental group indicate the effectiveness of the intervention methods, the research did not account for factors such as students' individual motivation, prior experiences, or the influence of specific mentor teachers on the evaluations.

Based on the findings, we recommend a more systematic integration of reflective methods into teacher training, the provision of regular feedback from mentor teachers to offer students a more realistic perspective on their abilities, and the long-term monitoring of the effects of simulation strategies to ensure their sustainability and impact on teachers' actual performance in practice.

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