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The Role of Visual Tools and a Virtual Learning Environment in Student Teachers' Internship

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Abstract

The relevance of this work is conditioned by the important role and aims of a teaching internship within the framework of student teachers' training. The use of a virtual learning environment requires a comprehensive experimental evaluation and may contribute to the resolution of a number of problems which are specific to the teaching internship. The article deals with the evaluation of an educational process implemented outside the university, and this evaluation must be performed with regard to multi-tiered interaction between the participants of educational process.

The main theses of this research may be correlated with the stages of planning and undergoing of teaching internships. The following tools are used during development of the motivational and axiological basis of internships, the stage of its implementation, and subsequent self-assessment: a set of videos (which summarize selected topics) created by senior students when they were undertaking similar internships; simple graphic instructions which allow students to plan and undergo their internship effectively, write an internship report, and create and attach videos to their reports; expert analytical forms necessary to assess the course of internship and its results.

The research included a survey among student teachers who were asked to identify difficult aspects of internship's planning and implementation in a specifically created collective environment for research data with the use of the following means: creation of collective questionnaires, visual representation of the tabulated survey data, and statistical analysis with the use of summarized tables.

Based on the analysis of the work results of student teachers who have already done their internship and acquired the experience of educational process planning, the major issues were identified and described and visual tools for overcoming these issues were tested.

The article describes an approach that helps student teachers overcome the barriers between existing visual educational tools within their training and insufficient orientation of school internships towards these tools' effective application in higher education. The methods of students' motivation for self-education and their implementation during the teaching internship were experimentally assessed in this research.

Keywords: visual tools; virtual learning environment; self-educational competence; teaching internship.

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Introduction

The aim of the article is to describe the development and implementation of effective visual tools for student teachers' internship with the use of a university's virtual learning environment.

One of the key methods of assessing the efficacy of visual tools for teaching internship is statistical analysis of the factual database accumulated in the university's virtual learning environment. This base contains a system of multidimensional matrices with a unified structure containing the data on the educational activity of every student.

The educational process in an open virtual space with the use of the university's virtual learning environment involves the following operations: search, selection and application of methodological literature on the organization of internships; cooperation between students and their supervisors in order to review, edit, and discuss individual documents submitted by students.

The selection and the following evaluation of videos made during the teaching internship are based on their systemic analysis through the use of expert analytical forms. The evaluation includes analysis of the visual tools content and structure. The assessment of students' ability to identify all difficulties related to the teaching internship was chosen as a criterion of the aforesaid analysis.

The data collection was performed in a collective environment specifically organized for the collection of research data with the use of different visual tools, such as those for visual presentation of survey results as well as tools for statistical analysis of summarized tables.

This work revealed the relevance of the suggested visual tools for teaching internship. Created visual tools were aggregated in a virtual learning environment. The analysis of these tools made it possible to characterize the sum of acquired pedagogical techniques for the use of visual tools in teaching internship.

This research emphasizes the demonstration of how planning, completion of internship, and writing of reports are to be done. The main aim was to identify major difficulties which arise during the analysis of students' own work, during the assessment of the work's compliance to its goals, and during the following representation of the achieved results in course and diploma papers.

It was concluded that visual tools for the use in teaching internships satisfy the modern requirements for student teachers' training and allow for optimization of future teachers' work.

Purpose and objectives of the study

The purpose of the study is to develop and implement the effective visual tools for student teachers' internships with the use of a university's virtual learning environment.

While creating and using visual tools in a virtual learning environment in their teaching internship, students face the following questions: "Is the key reason for the use of visual tools described?", "Is the typology of the studied visual tools discussed?", "What do internal and external dynamics of the used tools of a virtual learning environment show?".

Literature review

One of the issues touched upon in this paper is the search for the most effective visual tools and their implementation in teachers' self-education. The demand for such tools is especially high when students undertake internships. This fact is closely related to the following circumstances:

a) teaching internship is executed outside universities;

b) supervisors are not present at the school location and thus cannot provide immediate help for their students (Manuzina, 2012);

c) students are engaged in interaction with pupils, although they do not have significant experience in that;

d) mistakes in interaction with pupils are undesirable and in some cases are impermissible.

Planning and completion of school internships may be based on a modular principle of program creatia.

Let us examine visual tools designed to help students undertake internships. Visual tools (Chuchalina & Lyakhova, 2014) for the stimulation of the motivational and axiological aspect of self-educational competence are developed to help students set personal priorities, compare their own priorities with those of other students, and identify discipline-oriented tasks for their future pupils. This requires the use of visual tools in the outer and inner spheres of one's perception, in other words, for the analysis of personal and conventional preferences. The key role of visual tools, which are used for the analysis of personal preferences, is that they facilitate the processing of previous experience, its evaluation, understanding, and interpretation. In this case, the achieved result is the understanding why some methods are effective and comfortable, while others are ineffective and uncomfortable (Margolis, 2014).

Some interesting data on how students are taught the methods of acquisition of self-educational competence through the use of visual educational environment is already available (Galimova & Kirilova, 2018). At the same time the work of future teachers is organized with respect to a complex of profession-oriented role functions; they independently study and evaluate the literature on principles of visualization, describe their own and other students' experience, present their own findings on the effective use of visual tools and review the works of their peers.

The most important components of the research are as follows:

– simple presentation of the work process and results that all students in a group have done to identify the most effective methods of visualization while planning and undertaking their internship;

– independent assessment of the use of visual tools is seen as the development of inner understanding of their efficacy from the point of view of the dynamics of one's own education and the dynamics of the process of a target-driven choice.

In fact, being able to process data in a collective environment, students can see and analyze not only their progress, but also the success and difficulties of their groupmates.

Methodology

It must be noted that planning and undertaking of internships play a particular role in student teachers' training (Baiborodova, Artemieva, & Shchelkunova, 2015). The use of a virtual learning environment requires a comprehensive experimental evaluation and may contribute to the resolution of a number of problems which are specific to teaching internships. The evaluation of an educational process implemented outside the university must be performed with regard to multi-tiered interaction (Sergeyeva & Voskrekasenkob, 2014) between the participants of educational process (Krutykh, 2010). Therefore, it is exactly a teaching internship that strongly emphasizes the development of self-educational competence. The main theses of the research may be correlated with the stages of planning and implementing of a school internship, for which relevant and effective visual tools of a virtual learning environment must be proposed and tested.

This research focuses on motivational and axiological, cognitive, and reflective components of the

development of self-educational competence through the use of visual tools of a virtual learning environment.

The following visual tools may be recommended for teaching internships:

a) a set of videos which summarizes specifically selected topics and was created by senior students when they were undertaking similar internship;

b) simple graphic instructions which allow students to plan and complete their internship effectively, write an internship report, and create and attach videos to their reports;

c) expert analytical forms necessary to assess the internship progress and its results.

In this research, it was decided to use visual tools of a virtual learning environment which will help future teachers acquire positive experience of overcoming difficulties, as well as experience of positive planning, completion, and analysis of the results of their work with pupils. At the same time, students will gain access to a specifically designed collective learning environment where they will be able to use the aforementioned visual tools.

Basing on the analysis of the internship course and results, a new methodological approach was tested.

The educational process in an open virtual environment requires that conditions should be created for an effective search for methodological literature on the organization of internships and its subsequent use, for cooperation between students and their supervisors, for cooperative editing and discussion of an educational toolkit created by students, and for the collection of research data on pupils' activity with the use of visual presentation of the summarized data and its statistical analysis.

As a result, it became possible to assess the relevance of every visual tool and determine the complex of mastered techniques that involve these tools. A special emphasis was put to the assistance students were provided with in order to make plans and write reports on the tasks specified in the internship program.

The efficacy of visual tools was assessed by designing multidimensional matrices with a unified structure which contained data on the educational work of each student.

Let us examine the self-educational competence of future teachers who have already undertaken the school internship and acquired the experience of independent planning, identified major difficulties, and tested visual tools necessary to overcome the difficulties (as well as difficulties in establishing the interrelation between teaching and research work and the problems of data collection and its comprehensive analysis).

This article is aimed at establishing an approach that would alleviate a barrier between the potential of virtual learning environment's tools for student teachers and insufficient orientation of internships towards the tools' effective use in higher education.

The techniques which were used in this research are given below. These techniques were realized through the virtual learning environment's tools. These tools consisted of a number of visualization instruments and means which facilitated different aspects of teaching and classroom management.

The techniques used in the research may be divided into a number of groups. The first group consists of techniques aimed at the stimulation of a motivational and axiological component of future teachers through the use of visual tools. At this point, we should also identify the conditions under which a key role would be given to the personality of a teacher who is able to share his or her experience of self-development (Day, 2012).

This pedagogical condition is met if a university teacher possesses necessary knowledge and

skills, social and psychological preparedness and flexibility to use techniques aimed at the stimulation of students' self-educational competence, and can use visual tools of a virtual learning environment. The criteria for the assessment of teachers' ability to use modern information technologies and visualization means are as follows:

- ability and readiness to use electronic tools to acquire subject-specific knowledge and skills;

- a system of pedagogical techniques aimed at the stimulation of the development of self-educational competence in future teachers through the use of visual tools;

- subject-specific and methodological skills necessary for indirect control of the development of self-educational competence in future teachers.

The aim of visual tools is to stimulate the motivational component and to help students choose instruments of self-education within which visualization means are actively employed in order to study relevant literature (Kirilova, Galimova, & Grunis, 2018). In contrast to conventional graphical instruments, visualization tools demand the use of dynamic visual objects, notions, and systems (Galimova, Sibgatullina, & Telegina, 2017). In order to pursue this line of research, a standard interface was used. Within such an interface, an electronic log was kept where activities done at home and in class were recorded.

In order to stimulate the motivational and axiological component of self-educational competence, the following visual tools were introduced into the educational process:

- visual representation of case-based and heuristic tasks which aim was to promote interest in their completion;

- visualization of algorithmic methods which aim was to promote interest in creative work and primary skills of creative thinking.

A second group is comprised of techniques which aim is to stimulate the reflective component (deliberate self-development) in future teachers through the use of a virtual learning environment.

The virtual learning environment's tools are aimed at the stimulation of the reflective component and the development of self-assessment and self-control. It must be noted that different participants of educational process have different experience in the field of self-education and reflection. At this important stage, not only discipline-related, but also qualitative monitoring is carried out. The use of qualitative monitoring is regulated by the instrument "Priorities", which makes it possible to highlight and select threshold-knowledge tasks for future assessment and self-assessment. During the evaluation of these tasks, the following questions related to qualitative analysis must be answered: "Is the key aim identified?", "Is the typology of the studied means of visualization determined?", "Are their internal and external dynamics shown?".

Specific properties of the complex of professional (pedagogical) role functions at the stage of qualitative evaluation require from future teachers to be engaged in monitoring activities. The evaluation may be based on summarized characteristics of one student or a number of groupmates. These characteristics are derived from the students' answers to the questions of qualitative analysis. Diagrams and charts are used to illustrate the qualitative analysis, and they can become the basis for the determination of a necessary and sufficient degree of students' understanding of the studied material and become the basis for the projection of students' future involvement in the development of visual learning resources.

The aim of visual tools is to determine the ratio between studying in class under a teacher's

supervision, studying outside the class in accordance with a given template, and independent extracurricular studying when students work with new materials and do creative tasks. The following instruments of visual monitoring were used at this stage: "Traffic light" – to illustrate whether or not the tasks were done correctly and completely, "Color grading" – to illustrate whether or not the tasks were submitted in time. The study regularity and efficacy were reflected by these two parameters. These instruments present data in a simple, visual manner and have a strong motivational component. For example, green color indicates that a task is done completely and a student fully understands the studied material; yellow color indicates that some important parts of the task may not be done properly; red color indicates that the task is understood incorrectly. Additionally, the intensity of the aforementioned colors indicates whether the task was submitted in time or after a deadline.

Other important factors are as follows:

-        the use of interactive instruments (network services) as a means of reflection;

-        working on pedagogical tasks in an open environment, self-assessment and mutual assessment;

-        existence of subject-to-subject interaction, which creates conditions for reflection, cooperation, dialog, and creative work in educational process;

-        invariant expert analytical forms for reflection and evaluation of the course of teaching internship and its results;

-        presentation of projects in the form of a video conference with following discussions.

A third group of techniques is comprised of those which aim is to stimulate the cognitive component of future teachers through the use of visual tools.

The aim of visual tools in a virtual learning environment is to stimulate the cognitive component and self-comprehension. They are used to give a clear explanation to the reason why students choose certain visual tools; that is, the reason why a student sees certain tools as the most convenient and useful for herself or himself, for their groupmates, for certain discipline-oriented tasks, and for their pupils. This group of techniques requires the visualization of internal and external views of a person who analyzes his or her personal and conventional preferences. The key aim of the visualization techniques used for internal analysis is to consider previous visual experience, its evaluation, comprehension and interpretation. The use of these techniques reveals the reason why some tools are effective and convenient while others are not.

It is our understanding that the main criterion upon which the cognitive component should be assessed is students' creative work. It can be evaluated by the analysis of how students apply their competencies, by the analysis of students' creativity and their research skills. The research skills, in turn, can be rated through the evaluation of students' work, self-evaluation, and evaluation of general efficacy of independent work. These skills will also play a role in students' capacity for professional growth when they graduate and become teachers.

In order to stimulate the cognitive component, the following visual tools were used:

-        a set of videos which summarized the materials collected by senior students who had already undertaken similar internship;

-        graphic instructions which allowed the students to plan, complete their internship, write reports, and create and attach videos to the reports;

-        schematic representation of a lesson's plan through the use of an electronic constructor.

In order to evaluate the development of the cognitive component of self-educational competence

under the influence of visual tools, instruments of the Google platform were used. These instruments provided an opportunity to perform a number of procedures. Namely, it became possible to search, select and use relevant methodological materials and work with summarized electronic logs; students could design, view, and edit individual documents and receive feedback. At this stage, it was decided to prioritize the organization of future teachers' research activity in a collective environment where research data was collected. That environment was used to create collective questionnaires, give visual presentation of the summarized findings from the questionnaires, and perform statistical analysis of summary tables.

Table 1.

Aggregated data on the development of self-educational competence components

Components	Distribution of respondents by the levels of self-educational competence, %			
	First level	Second level	Thir d level	Fourth level
Motivational and axiological	2.9	2.8	33.0	61.3
Reflective	4.5	5.1	37.6	52.7
Cognitive	3.5	2.7	40.1	53.7

The data on components and parameters of self-educational competence (given in Tables 1-2) was used for experimental substantiation of pedagogical requirements that would ensure a sequential development of self-educational competence through the use of visual tools.

Table 2.

Collective parameters of the development of self-educational competence

Collective parameters of the development of self-educational competence	Posi tive	Undecided	Neg ative
Parameters of personal self-education	72.6	14.7	12.8
Parameters of professional (pedagogical) self-education	79.7	9.3	11.1
Degree to which visual tools of a virtual learning environment were used	67.1	20.3	12.6

The obtained data allowed us to propose necessary requirements for gradual development of self-educational competence in student teachers with the use of visual tools of a virtual learning environment.

Requirement 1. Gradual development of the parameters of self-educational competence by means of reinforcement of the key parameter on every stage from the lowest to the highest level of the competence development.

This requirement is substantiated by the obtained experimental data which indicates that 73% of the respondents acknowledged the motivational component, and 74% of the respondents acknowledged the cognitive and reflective components. This finding indicates that students had a clear motivation to develop all components.

Requirement 2. Moving from a lower level to a higher one, students must rely on strong aspects with the most positive figures.

Such figures were shown for the parameters of professional (pedagogical) self-education (79.7%), and they had the highest positive value. The parameters of personal self-education and the use of visual tools of a virtual learning environment were reported to be positive by 72.6 and 67% of the participants, respectively. This stage is realized on the basis of the cognitive component.

Requirement 3. When moving from a minimally permissible level to a medium one, it is necessary to improve parameters that have low values. Namely, students should improve their proficiency in the use of visual tools, because 20.3% of the respondents did not have a good understanding of this instrument. This value is reasonably higher than the values corresponding to personal self-education (14.7%) and professional (pedagogical) self-education (9.3%).

Requirement 4. This requirement is related to the development of self-educational competence at an expert level. As can be seen from the obtained data, an emphasis should be placed to parameters with the lowest values and high differentiation. Due to the fact that a significant amount of data has already been gathered and processed, teachers should target parameters with low positive or even negative values, which were shown for several parameters. Namely, in the given example, a value of 17% was shown for the cognitive and reflective components.

Results

While conducting experimental classes with their students, the authors of this paper set an additional task. It was decided to give students a comprehensive and visual review of positive means of overcoming problems and difficulties associated with pedagogical and research work. This idea was initially proposed by the supervising teacher, who did not offer a clear solution, but only suggested feasible approaches. The next stage of the research is to visualize occurring problems and approaches to their solution in order to impart this practical knowledge of self-education to students. It is expected that current students will share the knowledge with their future students too.

Conclusion

This paper offers a review of various visual tools that can be used as a guideline for interaction between a teacher and student and offers a procedure for data collection and processing. It also proposes a promising application of tools for self-assessment that allows teachers to adjust their work with students and, most importantly, ensures positive reflection. All these results will become an inherent part of an experience that will contribute to the proper development of self-educational competence.

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