TelEduc: A virtual learning environment for teaching and learning at the University of Campinas, Brazil

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Abstract. The present paper aims to describe the learning experiences of some students during their pre-service stage as future teachers between 2015 and 2017. Approximately 80 students have participated in the development of this proposal. These students belong to three different programs: Pedagogy in Early Childhood Education, Bachelor of Mathematics Education, Bachelor in Physics and Chemistry from the State University of Campinas, Brazil. As part of their practice they use the teaching and learning system called Open-Teaching, which is available for undergraduate courses at Unicamp. This system automates the registration of courses in the TelEduc and Moodle environments. Both Virtual Learning Environments offer content and communication tools, allowing activities among the participants. TelEduc supports the teaching learning processes for the three education programs including exact sciences and pedagogy.

1. Introduction

Virtual Learning Environments (VLE) have become an option to support teaching at different levels of Education. This is, new technologies are used with a learning purpose becoming “a relevant input for the transfer of information and training, which allows a personalized process of tutoring, constant access to the program of the course, increased communication between students and tutors through the use of tools” [1]. Particularly, in higher education this type of environment responds to the teaching needs of university centers. In teacher education, in different knowledge areas, the use of these environments invites future teachers to experience other classroom environments. Developed countries have journeyed this road since approximately twenty years ago [2]. However, in countries with less possibilities, the inclusion of this type of environment in teacher training has been but with slow to incorporation. Despite of this, being able to offer this opportunity to future teachers, that of being in unconventional environments of education, allows them to develop technological skills, and possibly, when they are teachers in practice, use other favorable environments for teaching their knowledge areas. In this sense, the integration of VLEs to the teaching and learning of different sciences allows “altering the way educators go about their routines of delivering subject content” [3-4].

Different perspectives highlight the contributions of the inclusion of VLE as a means of interaction and relationship between teaching and learning in virtual education, such as WebCT (Web Course Tools) or Blackboard. However, other research leads to consider it as support to face-to-face education. Specialized companies from different geographical locations offer alternatives to the classic web tool offerings, such as the TelEduc, an e-learning environment for the creation, participation and administration of courses on the Web.
On the other hand, in relation to learning based on the use of these virtual environments, the theories of social learning, such as communities of practice [5], highlight the collaborative learning mediated by participation and reifications tools contained in the virtual environment, for example, by using elements such as asynchronous discussion forums and synchronous chat tools or on-line assessment [2]. In this sense, in this document, we intend to present the characteristics of the VLE (TelEduc), which is currently used to support face-to-face education at Unicamp (Brazil). Subsequently, the description of the three experiences developed with regular courses at the University of Campinas, with groups of prospective teachers of the careers of Pedagogy in Early Childhood Education, Integrated Pedagogy degree in chemistry and physical, and mathematics education degree. From this, some advantages and disadvantages of the use of this VLE in the teaching and learning of prospective teacher as a result of analysis of these three experiences are presented. Finally, the conclusions about the comparison of the results of the three courses are narrated.

2. The VLE in the Unicamp
The State University of Campinas (Unicamp) in Brazil, is a public university in the state of Sao Paulo, which was founded in 1962. It currently offers courses in 70 graduation programs and 157 postgraduate programs, in addition to the coverage offered by the extension programs. The academic programs both face-to-face and extension (some distance). Some courses at Unicamp propose as a tool to support teaching, the TelEduc platform or ensino aberto (in Portuguese means Open teaching or Open university) as it is called in its original language (Portuguese).

The site hosted at https://www.ggte.unicamp.br/ea presents two input options, one for TelEduc, and one for Moodle. The teacher who runs the course decides which one to use, or if he needs the combination of the two. For the particular case of this article, we present the VLE called TelEduc, and its use in courses of the Faculty of Education of Unicamp.

Similarly, the TelEduc offers activities tools, such as agenda, readings, support material, frequently asked questions, groups, which store documents for consultation or work of students. Also, the VLE has as communication tools among the participants (students, teacher and / or invited teacher) the email, chat, forums, wall, portfolio and participant profile, for the participation and reification in Wenger's sense [5]. Other tools are offered by the environment for evaluation (Exercises) and monitoring of student performance (Assessment).

The VLE has evolved, to the point of adding to or System tools since version 3.8, as assessment and Exercises. The first one, allows the teacher to accompany the performance of the students. The second one, allows only to offer students questions and questionnaires. Currently version 4.4.0 of this VLE works, which allows to consolidate in a single user all the courses registered by the student, and online access. This is a light, free and open e-learning system, created in Brazil in 1997 as a result of a master's thesis of a Brazilian student, for classroom and distance education at a national and international level.

The contents stored in a course registered by the student remain in time, which can be accessed by both the teacher, teachers and guests. Its access and navigation is intuitive, and easy to access online. The TelEduc site, properly from its beginning, is in the web address as http://www.teleduc.org.br/. However, each university houses this site within the institutional, as in the case of Unicamp, which is today http://webensino.unicamp.br/pagina_inicial/index.php. On the other hand, we can demonstrate multiple teaching and learning experiences based on the use of the TelEduc VLE. In this particular, the faculties and institutes adopt their own methodologies that involve the use of technological tools that facilitate both teaching support, as well as access to materials, proposals, exercises, and to communication tools such as forums and mail. The Faculty of Education promotes the use of TelEduc, since its inception, this product being a graduate of the master's program in education this faculty since 1997. Within the courses offered by the faculty and accompanied by the first author- The researcher of this article, as invited teacher, are Pedagogy in Early Childhood Education Course, Pedagogical Practices in Mathematics course and Physics and Chemistry Seminar. That is to say, three experiences lived with these regular courses at the University of Campinas will be narrated, in three different semesters, from the description of the contexts in which these courses were developed,
their participants and the learning of the participants, in terms of using tools to analyze their practices as future teachers.

2.1. Pedagogy in early childhood education course

Within the education of prospective teachers of pedagogy, they have Pedagogy in Early Childhood Education, and internship stage in Early Childhood Education course. In the first semester of 2015, the first author was invited to participate in the both courses. With forty eight participating students, one main teacher and one visiting professor, the Pedagogy in Early Childhood Education course was developed during four hours per week, focusing on the use of communication tools, through forums, email and the use of individual student portfolios, in which, they stored each one of the artistic registers proposed by them as evidence of learning and exploration of multiple languages in early childhood education [6], but under the exploration of the multiple languages of the prospective teacher of Early Childhood Education. With a total of eleven registered activities, in the individual portfolios, the face-to-face classes were developed under the perspective of debate with the readings of the support material, and at other times under the focus of case studies from the practices of education childish.

On the other hand, during the same semester, the internship stage in Early Childhood Education was the place where the students made their observations and accompaniment to the kindergarten of the region, in four hours at the week, as the beginning of their practices as a prospective teacher of Early Childhood Education. Therefore, it was broadly related to the first course offered, already mentioned in the previous paragraph, so, in the VLE of this course, it was only focused on the narrative record of its accompaniments, through the use of individual portfolios of the twenty-seven prospective teacher participants. From the use of these narrative records the prospective teachers managed to create an effective communication channel between them and the professors (holder and guest), since, for each portfolio uploaded by the student, a feedback of what was written was recorded by their teachers. In addition to this, some of the cases narrated in the portfolios were selected as case studies in the pedagogy course of Early Childhood Education. At the end, both the first and the second course of prospective teachers of pedagogy, the participants prepared a final report, in which elements were exposed in their respective portfolios, during the semester, which served to bring the evidences of learning from them.

2.2. The pedagogical practices in mathematics course

One year after the first the accompaniment of the first group, was developed the second experience. This is, in the second semester of 2016, twenty-seven students from Bachelor of Mathematics education, comes to the Education institute to participate in the Pedagogical Practices in Mathematics course. The course was developed with an hourly intensity of two hours per week, for sixteen weeks. The course teaches under the formative process, the learning and the argue about the mathematics teaching and learning practice in the initial formation for prospective teachers in the Pedagogical Practices in Mathematics Course. The course aim was to know and problematize the teaching and learning practices in the school. The activities of the prospective teachers were developed under the methodology Lesson Study (LS). Also, within the Figure 1 and in pink, there are the moments attended by each of the six groups, which correspond to the specific steps of the original Japanese LS: Goal Setting, Lesson Planning, Research Lesson, and Reflection and Systematization.

Prospective teacher developed a ‘Glocal’ Lesson Study from the choice of topic - relevant to the school curriculum - along with lesson planning, sharing and discussion of lesson proposals, lesson implementation, lesson analysis, and presentation/discussion of results, culminating in the writing of articles. To this study was very important the Teleduc VLE, because, each advance within the stages of the Lesson Study, was stored in the VLE, and by this means a first feedback filter of the class proposals was made. Also, the Teleduc portfolio, was a virtual space to store articles, textbooks and theses, with which the students could sustain their proposals for planning, application and reflection over the application. Below, we describe briefly some reactions and reflections from the students over each part of the LS cycle in the PPM Course as appear in Table 1, and the relationship with the actions in the Teleduc.
Figure 1. The process of lesson study in the pedagogical practices in mathematics course [7].

Table 1. Reactions and/or reflections from the students in the processes and sub-processes of Lesson Study Cycle.

| Process in LS            | Some reactions and/or reflections from the students                                                                 | TelEduc Actions                                                                 |
|--------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Lesson Planning          | The preparation of the lesson (Planning) is of great importance. Time and research should be devoted to thinking about a task/activity that fits the proposal being taught and thinking about the possible reaction of the students. | • Learning memorials (individual Portfolios).                                      |
|                          |                                                                                                                     | • Bibliographical references in Material of support in the TelEduc.               |
|                          |                                                                                                                     | • Proposal records of the lesson planning and feedback on each proposal on the group portfolios. |
| Research Lesson &       | Discussing among us the information obtained in the discussions, execution and final result of the activity carried out, we conclude that exploratory-investigative classes contribute richly to the formation of the students. | • Observation and analyze records before the research lesson planning to record in the group portfolio. |
| In-Lesson Discussion     |                                                                                                                     |                                                                                  |
| Pos-Lesson Discussion    | The activity objective was reached in the school since the students got involved in the search of the relations that we were proposing. The activities and approaches about the practices used are very efficient means to enrich professional development of graduate students. | • Discussing and record on the actions on the reflexive diary on group portfolios. |
| Reflections (systematization) | The activity proved to be a strong base for the students, because when we present the results we obtained for the Pedagogical Practices in Mathematics, and discuss these with the class, we concluded that we should go back to class and present other experiments to students. | • Reflections record in the portfolios.                                           |
|                          |                                                                                                                     | • In some cases, the students made a new proposal for the class, to start the LS cycle and saved in the group portfolio. |
| Final Discussion         | The Lesson Study also gives us contribution when proposes a bigger planning and analysis of activities, an investigatory posture of your own practices and the collaborative construction of activities. | • Record of the experience in article format, in order to share with other groups from the record and storage in group portfolio |

We will highlight the process and some results of the implementation of the Lesson Study in a pedagogical discipline of the degree course in mathematics. The mail, the forums, and the portfolios were other tools of the VLE, which helped the communication and the debate about the proposals registered in the TelEduc.
2.3. The physics and chemistry seminar

One group from the Integrated Pedagogy degree in chemistry and physical participated in the chemical and physical Seminar in the first semester of the 2017. In this seminar participated thirty-three students, one teacher and one invited teacher. The course structure was based on: (i) Exhibition classes, based on selected bibliography, according to the content. (ii) Seminaries with invited professionals; and, (iii) Two assessments (Exam one and Exam two) plus participation/frequency score. In this course, the use of TelEduc tools was limited to the communication (mail), the course dynamics, and Material of support. The students participated in all the seminar sessions, and the students participated in all the seminar sessions, and for each last class, they had to review the texts kept by the teachers in the Teleeduc support material space. After consulting the material, the students participated in classes, along with the teachers. Doubts and requests about the passing of the subject, the students communicated through the VLE mail, where the teachers followed up. The course was very productive, so the students identified other forms of interaction in class and outside it, by bringing elements of the VLE, such as bibliographical references, and sharing them in the reflections raised by the teachers.

Up to now, three different experiences have been narrated as invited professor, with regular courses of undergraduate students at the University of Campinas, in three different time spaces. From the description of the contexts in which these courses were developed, their participants and the learning of the participants, in terms of using tools to analyze their practices as future teachers. In the three courses accompanied the professors tended for the effective use of the VLE called TelEduc, in which they made use of their tools, and the registration of student learning was strengthened, in the form of a narrative diary, a partial report, a final report or as a learning memorial.

3. The VLEs for the prospective teacher learning

As trainers of future teachers, we must be aware of the generational gap we have with those born in the era where technological advances are evolving by leaps and bounds. The majority of the students we educate have greater access to technological tools, while their trainers are older than the time of the transition in which the experiences with which we pretend to enrich the learning contexts were alien. Mathematics as other sciences, in any form action or any form of use “are the need to be carefully critiqued. This applies to any form of mathematics: mathematics, engineering, math every day, academic mathematics and Ethno mathematics, among many other varieties” [8]. This is, Mathematics, as another science, needs to be adapted to different scenarios, from any of its interpretations, and from its different uses, such is the case of the training of mathematics teachers. The inclusion of this type of environment, involves a greater effort for those who belong to the time, because it implies the recognition of the tool and the identification of possible help by involving them in the educational format that aims to promote. This is, “e-learning has rapidly become a ‘must-do’ across Higher Education (HE) (…) e-learning is now characterized by virtual learning environments (VLE), usually operating within a managed” [9]. In any case, to talk about involvement with the courses and virtual environment, it is necessary to talk about the motivation to participate in this. In this sense, motivation is something that "should be strengthened in virtual courses, where teachers should strive to maintain it at a high level and develop collaborative activities in an appropriate manner, in addition a relationship between motivation and satisfaction of the course was found" [10]. In particular, the courses with prospective teacher of child pedagogy and mathematics, the participation was greater due to the proportion of use of the virtual tool TelEduc. That is, the courses were programmed so that they made constant deliveries of reports, planning, learning memorials, and prototypes through the virtual platform, which allowed the students to be more motivated to participate. The opposite occurred in the training course of prospective teacher of Physics and Chemistry, where the tool was underutilized when consulting bibliographic material and short reports of the consultations. The more future teachers are involved in the use of these tools, the more products delivered by students that show progress in their learning processes.

The other hand, “the design of several current educational environments increasingly reflects the constructivist pedagogy, by which learners actively construct and interrelate knowledge and ideas” [11]. This is, providing students with rich environments of different elements, such as VLE, allows contact
with them to become familiar, and possibly be contemplated by them in future experiences with their own students. On the other hand, it could be demonstrated that the VLE TelEduc was shown as a support to the teaching, in the sense that besides the storage of information of two courses at the same time, the tools could be alternated together with debates and socializations of works, in a way face-to-face with all group participants. Finally, the e-learning model is based on collaborative learning, increase “recognition of the need for education to be closely aligned with team playing, project-based learning and problem-solving approaches has increased the interest in collaborative learning among university and college instructors” [12].

4. Conclusions
Subjecting prospective teachers to different learning environments, allows them to experience other paths in teaching, when they become teachers in exercise. In other words, the lack of access to experiences in VLE, Communities of practice, other physical spaces, possibly perpetuates the teaching model lived by the future teacher. For the trainer of future teachers, it implies the recognition of a need for change in the educational paradigm, as well as an insertion in it, thinking in Accessibility, usability and navigation become essential elements to take into account when carrying out a review of the measurement of e-learning in educational environments. As an aim conclusion, we can highlight the prospective teacher had an investigative stance on their own practice providing a broader understanding of aspects before and during the participation that contributed to their professional perception as prospective teachers. Performing exploratory activities requires a greater effort from the trainers and a different posture than one is accustomed to in the classroom. As was worked out the activities allows context of reflective and investigative participation for the prospective teacher in mathematics, physics, chemical and Early Childhood practices of teaching and learning in the School. Finally, the virtual learning environment can be a pretext for constituting learning communities for teachers and future teachers, who participate to consolidate professional teacher learning.

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