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RESUME

Virtual Education was born in 2002 from a joint project between the Center for Improvement, Experimentation and Pedagogical Research CPEIP and the Links Center for Education and Technology.

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Classification: LCC Code: LB1028.38

Language: English



Great Britain
Journals Press

LJP Copyright ID: 573301

Print ISSN: 2515-5784

Online ISSN: 2515-5792

London Journal of Research in Humanities & Social Science

Volume 26 | Issue 1 | Compilation 1.0



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Virtual Education was born in 2002 from a joint project between the Center for Improvement, Experimentation and Pedagogical Research CPEIP and the Links Center for Education and Technology.

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I. INTRODUCTION

Virtual Education, delivered through e-learning and blended learning modalities for teacher development, is an initiative with coverage throughout the Chilean territory and is financed by the Ministry of Education of Chile through the Center for Improvement, Experimentation and Pedagogical Research (CPEIP). It has been developed by the Center for the development of innovations in education. The training is inserted in the framework of the curricular reform, and incorporates ICT resources in the learning and teacher training activities.

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This modality was born in the context of a line of teacher training with the support of a virtual component implemented by the CPEIP. On the other hand, a recent study carried out within the framework of the Links project shows that 92% of establishments have technological infrastructure and 76% of teachers have been trained in the use of ICT, the above as a result of the implementation of the project. Links. On the other hand, the penetration in the use of ICT in teachers is growing: 80% of teachers with computers at home, 51% of them with Internet, 58% of them with broadband (Collect and Links 2004).

The development and implementation of the experience included: a) the selection and training of tutors, b) the pedagogical design of the course, c) the design and implementation of the course on the Moodle platform; d) development of various resources to support the content, e) application of Pre and Post Test and summative and formative evaluations.

The course trained 786 teachers nationwide, divided into 29 courses, with an average of 27 students per course. For tutorial support during the implementation of the course, a community of tutors was created to support them in their tasks of tutoring the course in the areas: administrative, technical, social and pedagogical. The work methodology placed the teacher at the center of learning, as an apprentice who autonomously defines her learning path. In this context, the participant builds knowledge through interaction with: the materials, the tutor and classmates.

II. MATERIALS AND METHODS

The development and implementation of the experience included:

- *The selection and training of tutors*, for which the Salmon e-moderating model was used, creating activities as learning objects. A profile was designed to select the tutors and they were trained through a course in the e-learning modality that concluded with a meeting face-to-face.
- *Pedagogical design of the course*, which has been conceived under an interactive model for the teaching of mathematics whose conception is very close to the expression of the Madison Project, which is synthesized in: "guess - try, put the idea to the test - observe what what happens and... learn as follow";
- *Design and implementation of the course on the Moodle platform*; based on the organization of the contents into units, which have three areas: *Activities and Evaluation*: it is found with the set of activities organized weekly, within the week by day and within the day, the specific activities with a brief description and estimated time of development, consider a weekly formative assessment and a grade per unit; *Interactions*: includes a discussion forum, a space for consultations and a bulletin board; *Library*: groups the different resources such as readings, guides, Applets, training material, reference.
- *Development of various content support resources*: guides, reference material, applets (application component that runs in the context of another program, for example in a web browser), readings, references to sites, among other means.
- *The application of a Pre and Post Test*: A pre-test was applied at the beginning of the course and at the end a post-test.
- *Obtaining and analyzing information such as*: statistical data on face-to-face participation, evaluations with qualifications on the platform and registration of participation in interactive spaces in the platform.

III. RESULTS AND DISCUSSION

In this section the main results of the course are presented, they have been obtained through the

different information registration systems such as: the application of the Pre and Post Test, the attendance at the face-to-face sessions, the results of the summative evaluations on the platform and the data obtained from the platform regarding participation in the interactive spaces.

3.1 Course Participation

During every week, the active students in the course were monitored, issuing a weekly report which accounts for the number of active and inactive students in the week, in addition to counting those without any connection in the course.

In this section the main results of the course are presented, they have been obtained through the different information registration systems such as: the application of the Pre and Post Test, the attendance at the face-to-face sessions, the results of the summative evaluations on the platform and the data obtained from the platform regarding participation in the interactive spaces.

3.2 Course Participation

During every week, the active students in the course were monitored, issuing a weekly report which accounts for the number of active and inactive students in the week, in addition to counting those without any connection in the course. Figure 7 shows the behavior of these parameters during the 14 weeks of the course.

3.3 Participation Face-to-Face Sessions

The course includes three face-to-face sessions, at the beginning, at the end of the course and after the first content unit. For the development of these face-to-face sessions, the tutor was given a plan to follow with the activities to be developed and digital resources as a presentation for their support.

3.4 Participation in Exchange Spaces

This section will analyze the participation of the participants in the various asynchronous spaces contemplated for communication between the tutor and the students and between the participants themselves.

3.5 Participation in Permanent Spaces

The permanent spaces are a set of tools, mainly forums, that are available for use by the participants throughout the course.

165 *technical doubts are presented*, an average of 5.5 per course. These doubts are related to the use of the platform and the configuration of the computers to run certain applications such as Applets.

In the *social forum* there are 765 topics opened by the participants, within them there are various levels of interaction that are difficult to quantify, the average is 26.3 open topics per course, remember that these topics are initiated and encouraged by the participants themselves, with none or little participation of the tutor, except in the welcome forum that the tutor initiates in this space. The social forum becomes a kind of "virtual teachers' room".

In *novelties*, a space restricted to publications only by the tutor that cannot be debated by the participants, 624 interventions are registered with an average of 21.5 interventions. These correspond to information and guidelines that the tutors send to their students regarding the development of activities, delivery of evaluations and evaluation criteria, among others.

3.6 Participation in Interactive Spaces

Participation in the interactive spaces, although it is variable in each unit, follows similar trends that are later reflected in the global of the three units, in this sense the discussion forum concentrates most of the interventions, followed by the daily mural forum and queries.

IV. CONCLUSIONS

The course presented an effort to provide teachers in the second cycle of primary education with a process of quality improvement, which allows building the knowledge, both disciplinary and didactic, necessary for the participants to improve their pedagogical practices. The foregoing in a distance mode that favors interaction with peers and the tutor within a learning community. The main conclusions are:

High interest in participating in the course: The interest shown by teachers to perfect themselves in Geometry has been reflected in the high numbers of enrollments and enrollments, which confirms the perceived need to train in this area. A total of 1,004 registered participants are registered.

Active students: The number of students who remained active in the course is highly positive. Of the 1,004 original enrollees, 786 completed the summative evaluation, representing 78% effective participation, and between these and those who take the final evaluation there is a retention level of 83% of the participants. Additionally, an average of 670 participants connect weekly to the course, 85% of active participants.

Evaluation of the contents and resources: The contents of the course and the various resources it provides have been valued by the participants, due to their quality, contextualization and the feasibility that they can use them and transfer them to work in the classroom. The Applets applications have been within this set the most innovative, since they simulate geometric constructions.

The positive aspects of the face-to-face meetings focused mainly on the possibility of carrying out collaborative work, sharing experiences, increasing the feeling of belonging and resolving doubts associated with the methodology and the use of technology. The first face-to-face presented problems in its development due to the call and problems with the platform, the second developed normally. The participants have suggested for future versions to incorporate work directly related to the contents and some, despite being a distance course, suggest more face-to-face courses.

The platform: The platform has shown great stability, it was only seen with problems at certain specific moments in the development of the course, mainly related to the online questionnaires, in general terms it has been in a high percentage operational and accessible. The way in which the interactive spaces have been arranged is positively evaluated by the

participants. They highlight its ease of use, they find it “friendly, and they frequently use the spaces and find them useful. In this sense, providing differentiated spaces for discussion, sharing resources, clarifying doubts and interacting on free topics such as the "social forum" we believe is an element that contributes to increasing the interaction and organization. When participants are asked about the platform, they usually end up talking about the course and that is a sign that it has become “invisible” to them, it has merged into a single great element: the course.

The Interactions: An interesting use was made by the participants of the interactive spaces. Interventions were concentrated in the discussion forums (66%), while the "Mural diary" and "Consultations" registered 28% and 6% respectively. There was also a permanent space in which the social forum that captured the greatest participation based on issues raised by the participants, transforming itself into a kind of "virtual teachers' room". In this sense, we believe that the key to participation was having established differentiated spaces for the types of interventions, which were able to channel the type of interventions that the participants normally carry out in these courses, in addition to the animation of the tutor, especially in the forum of discussion.

Community of tutors: The community of tutors has been a space that has allowed the coordination of the pedagogical and tutorial team that coordinates the project with the tutors, through it has been possible to guide and support the tutors in the development of their work, the main spaces used have been: orientations, consultations, requests for information and reports, as can be seen, the first two are dedicated to pedagogy and the other two to administration. An active role of tutors is observed in this community, especially those who achieve better results in their courses.

The tutors: The tutors are relevant agents in the development of the course, they have developed various tasks in the areas: pedagogical, social, technical and administrative. The role played by

them especially at the beginning of the course to motivate those who did not attend the face-to-face and in the times of assessments so that students take them within the established deadlines has been vital to keep students active. The work of these professionals has been highly valued by the participants, they perceive constant support in the development of the course and its activities as well as the clarification of doubts of a pedagogical and administrative nature, they perceive them as supportive and consistently attentive to answering their questions. A factor that has probably contributed is the weekly reports that were sent to them regarding the active and inactive participants of their course, this allows them to determine how their course is going in relation to their peers at the national level, several of them have received congratulations and recognition of the pedagogical team and their peers for the achievements achieved.

Formation of groups: In large regions such as the Metropolitan Region where the country's capital is located, forming groups according to the teacher's address, we believe that it is not the most optimal, since it transfers existing social divisions into the virtual environment. Teachers from schools in poor districts with their peers and those from more affluent schools with theirs. This from the perspective of the social construction of knowledge and the concept of Vygotsky's Zone of Proximal Development is not very adequate. In this sense, we believe that the participation of teachers of Private establishments can become a contribution to the rest of the learning community, especially when they are integrated into groups from more popular sectors.

Evaluations: At a general and unit level, important advances in learning are observed, reflected in the differences between the pre and post tests. Additionally, the summative online assessments also reflect these advances. A relevant element in our opinion is that the difference obtained in relation to the online summative tests and the pre and post tests reflect that these are significantly closer to the post test, for which they account for the learning acquired, overcoming initial mistrust that these do not

reflect individual learning since the teacher is presumed to have completed it with external assistance

The process followed by the participating teachers has been largely successful, without a doubt, it can be improved in various aspects. It has meant the development of a virtual experience of teacher training that has provided the participants with a new way of accessing content, quality materials and interaction with peers, tutors and specialists, in a theme that is a priority in the mathematical training of students. Chilean children such as geometry. The experience of this course shows a way forward in these new ways of updating teachers that integrate the use of ICT as a channel of communication and training during professional life, giving access to a training experience that many of the participating teachers do not they would have had access in the traditional face-to-face training formats.

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