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E-mentoring: The effects on pedagogical training of rural teachers with complex geographical accesses

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ABSTRACT

Considering multi difficulties that determine the labor of rural teachers who perform their teaching practices in semi-isolated contexts, it is necessary to provide them a supportive system which favors their pedagogical performances to benefit rural students' education. The aim of this phenomenological study is to describe and analyze how e-mentoring can strengthen pedagogical performances of primary rural teachers with complex geographical accesses in Chile, exploring the subjective experiences of four couples of teachers and mentors that take place in this process by e-mail relationship. Results show the necessity of considering the accompaniment as a horizontal pedagogical assistance which can be influenced by the technological resources availability, identifying an adequate profile of e-mentor to influence teacher adherence to the process, such as his communicative style, empathy, pedagogical and cognitive skills. Finally, this investigation allows projecting a viable model to be applied as support for rural education with access to Internet resource.

1. Introduction

Numerous studies indicate that Information and Communication Technologies (ICT) contribute to economic and social development of countries, modernization of the state and its institutions and they also contribute to equity in the access to information (Hepp, Hinostroza, Laval & Rehbein, 2004; Hepp, 2011; Lugo, 2010). The majority of South American countries began, more than one decade ago, the incorporation of ICT in their school systems. Some examples are Brasil, which implemented PROINFO in 1997; Mexico, which developed the Red Escolar de Informática Educativa (Red Escolar) in 1996, and Chile, which implemented ENLACES in 1994. Others started more recently, as Paraguay in 2001, which promoted the program *One laptop per child and per teacher*.

Two main objectives were addressed with those initiatives: The first is to achieve greater equity in the access to information, in an effort to narrow the digital gap for vulnerable students and the role of ICT to achieve an inclusive education, addressing issues of gender, disability and ethno-linguistic minorities (CEPAL, 2011). The second is to achieve a higher quality in education systems, through the provision of new resources (digital) for teaching and learning and the access to information networks and people.

Despite the efforts, the evidence indicates that teachers, mostly, do not use ICT intensively as teaching resources in their classrooms. Among the various causes that seek to explain this phenomenon include the teachers' attitudes towards technology, the scarcity of ICT resource or the few opportunities to access to them, the lack of time for familiarization and the few preparation that teachers have in the use of ICT during their instructional period (Brun, 2011; Cuban, 2001; Hinostroza, Labbé, Brun, & Matamala, 2011). This situation includes both developed and developing countries (OECD, 2009). Nevertheless, ICT have become a constituent part of the reality in schools in terms of staffing and infrastructure, as well as the teachers' and students' lives who gradually developed a digital profile that favors the use of technology for school experiences.

In the case of Chile, the Digital Development Index -IDD-2010 (Índice de Desarrollo Digital, 2012) reports that 91.5% of public sector reached the implementation of computers provided by the Ministry of Education through ENLACES network (IDD of Chile, second measurement, 2012). This certainly makes it think about what is the area of the country that still lacks of such implementation? and why? Undoubtedly semi-rural education in isolated areas is one of them due to the difficulty of access.

The rural–urban gap and the imbalanced allocation of educational resources are in large measure responsible for the digital divide (Li & Ranieri, 2013; Li, Zhang, Wu, & Liu, 2009).

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E-mentoring brings important contributions to the difficulty of access that rural education have, on topics such as: access to updated and current information and virtual training opportunities for teachers, access to support networks, among others. Media as Internet offers not only an immediate interconnection and multimedia interfaces, but also the possibility that connected individuals or organizations interact in real time online (UNESCO World Report, 2005).

1.1. Challenges, needs and realities of teacher development in the rural

The reality of rural schools share cross cutting characteristics in different countries of the world such as the lack of relevant programs to their cultural environment, lack of human resources and material for the development of educational activities, system without connectivity and fluency in the processes of communication, among others. This last point takes strength when generating effective alternatives to take contact with systems that help to fulfill and/or resolve some of the requirements listed above; the permeability of rural schools is no different from other schools, at the moment of incorporating new technologies (Moral & Villalustre, 2011).

The situation of rurality in education has been a current topic, especially in underdeveloped territories. As Brumat (2011) indicates, school should be recognized as an everyday construction and not only determined by the school regulations. For example, Argentina has implemented specific policies for rural education in the last 8 years creating the Rural Education Department, as part of the established programs of its Ministry of Education. On the other hand, Chile has the ENLACES Rural program, created in 2000 with a similar purpose; and Colombia has state plans designed to meet the needs of this sector.

The Food and Agriculture Organization of the United Nations (FAO), The United Nations Educational, Scientific and Cultural Organization (UNESCO) among others, agree that education in rural areas is affected by the low quality of the education provided, being notoriously deficient, both by the lack of resources and infrastructure and the inadequate training and little incentives that teachers receive (FAO-UNESCO, 2002).

To the geographical problems, there should be added the cultural and social issues, and also recognize that initial training of all teachers of the country does not integrate an instructional curriculum that considers teaching in rural context. That is, it is assumed that the methodological and curricular teaching is the same for an urban school and one located in the rural mountains.

The e-mentoring responds to the need previously mentioned, as it has been valued as a significant alternative when it comes to face time and space limitations which have been the greatest challenge of traditional programs (Noe, 1998; cited in Rísquez, 2006).

1.2. The e-mentoring as a support for the process of pedagogical accompaniment

In the last 20 years, mentoring has become more popular in education. The increased interest in mentoring has resulted in part from the development and increased popularity of e-mail and other forms of electronic communication (Penny & Bolton, 2011).

Mentoring according to Monereo and Pozo (2005) is the continuous teacher training under the concept of strategic teacher. O'Neill, Wagner and Gomez characterize it "by a richness of interdependence between two people" (1996, p. 42), for example between teachers more and minus experts from primary and/or secondary school. Smith and Israel, defined e-mentoring as the use of computer-mediated communications such as e-mail, discussion boards, chat rooms, blogs, Web conferencing, and growing Internet-based solutions that are changing the way mentors and mentees interact (2010).

It considers the teacher as an apprentice, which, on one hand, is strategic and on the other, a strategic teacher. Mentoring aims, in any of its model on site or virtual, that whoever participates receiving the accompaniment of an expert, succeed in identifying what he/she needs. It is in the process of reflection that the mentoring group accomplishes the achievement of consciousness, which allows identifying educational needs (Cortez & Soto, 2012).

From the above, it is necessary to recognize that not everyone can take the role of companion, mentor or counselor, who serves as a link, mediation and support for teachers and not necessarily has to have an extensive academic background and a great career (Rodríguez, 1996).

According to Zeeb (2000) there are four types of mentoring modalities: traditional mentoring: regarding the relationship between two people in which one is older or more expert and it is given in a face to face context, peer mentoring: seen as support between equals whose benefit is mutual development, the roles are exchanged and lasts less than traditional mentoring; the group or team mentoring: it is similar to peer mentoring but with more participants, and the online or telementoring, which is a variation of the above but using a technological medium for communication, considering email and chat among others, as a mean of communication.

The mentoring and e-mentoring come together in the purpose of being social processes and, therefore, a communication process; in bothtypes of mentoring the accompaniment involves identifying problems and needs of the school, the community and accompanied individuals and thereby recognize models or approaches of counseling or mentoring (Rhodes & Spencer, 2010). The e-mentoring in particular, is distinguished by the use of computers as a mediator for the mentoring relationship (Rísquez & Sánchez-García, 2012) pursuing the objective of supporting as the face to face process also does.

Rísquez (2006) presents the e-mentoring as the process that found the opportunity since the apparition of the Information Technology and Communication (ICT) as massive media that enable physical and psychological approach between people. Kopcha argue that the mentor also played a role in promoting positive beliefs about technology (2012). In addition, each e-mentoring program responds to approaches, contexts and different populations, under the same concept of providing support from someone who manage an expertise towards someone who needs it to achieve the improvements in their practices.

Authors as Shpigelman, Weiss and Reitera used the e-mentoring to provide social and emotional support for protégés with disabilities by mentors who also have disabilities (2009). Findings provided support for the potential of electronic mentoring for personal development and empowerment of youth with special needs. Yang and Liu (2004) also investigates the value and effectiveness of online workshops as a tool for creating professional learning communities. The pattern of interaction, mentoring quality and attitude of teacher toward participation in a Web-based Teacher's Professional Development Platform revealed that most participants claimed to have benefited emotionally and intellectually from using telecommunications networks for professional development and support.

Internet use is considered to be an useful element to facilitate the collaboration and mentoring promoting the creation of virtual communities among academics, teachers and other professionals, students in university education (Kenney, Lamontagne, & Seabrooks, 2006). This usefulness of Internet can be transferred to the context of primary education generating also communities of virtual learning. For achieving collaboration in these communities, the interactions based on the social presence are essential.

Participants need to interact with their peers and want to be perceived as being there and being real. The social presence influences online interaction and the learning process as well (Dascalu, Bodea, Lytras, Ordoñez de Pablos, & Burlacu, 2014).

The geographical diversity from Chile has generated educational contexts away from the same opportunities that urban education have. This means that teachers who teach in isolated or semi isolated rural context do not have the possibility of systematic and permanent training that benefit the development of their teaching practices and the resolution of common teaching problems. In the context of this research, it is used the email as the main mean of communication for the process of accompaniment. It should be taken into consideration that due to the recent implementation of Internet service in the town of Llanada Grande, this computer resource is considered the most appropriate to be used in this research.

Therefore this research focuses on exploring the e-mentoring and coaching process for rural school educators from a government isolated semi rural school located in Los Lagos Region, Chile. The main objectives of this research are three:

- To describe common strategies used by teachers in conflicts resolution related to educational work practice in semi isolated conditions
- To analyze the difficulties that teachers present in pedagogical practice in semi isolated areas, and
- To identify the professional teachers' needs from a semi isolated area for problem resolution of their own performance.

2. Methodology

This initiative was carried out using a phenomenological design because the main interest is to investigate the rural teacher's experience through an exploratory approach. It addressed to a qualitative, descriptive and longitudinal research. It was conducted through seven phases of research work from November 2011 to November 2013.

The study took place in a public boarding school from Llanada Grande located in a semi isolated area with difficult access from land and sea. This school receives government funding to operate, and it has 67 students in primary education that principally belong to the low socioeconomic level, of whom more than half live at the school. Unlike private schools, this school also obtain benefits in others areas, for example the integration of technology resources to this community has been obtained through ENLACES Rural (Chilean national project), which in 2011 execute the rural electrification project, which enabled the implementation of a basic Internet service.

The participants were 4 school teachers, two men and two women between 30 and 41 years old, who participate voluntarily in the project. In addition, 4 mentors participate from a private school in Talcahuano, in the Bío Bío Region. This kind of school does not receives government funding to operate, usually has more and better infrastructure, and teachers who work on them have more benefits, like higher incomes. Mentors aged between 29 and 45 years and an average of 12 years of professional experience.

The data collection techniques used in this study were three. The first is a questionnaire, consisting of 5 open questions regarding sociographic e-mentors information and with the systematic communication possibilities via email (see Table 1).

The second is an initial semi structured interview for e-mentors, that is structured based on broad questions that can be modified in the process of gathering information in order to achieve an opening space for communication and establish a link to contribute to the consolidation of the e-mentoring process (Hernández, Fernández, & Baptista, 2006). Subsequently, the process of written dialogue was given particularly each day according to the topics of interest that arose. For that purpose a literal transcription was made, respecting even misspellings and idioms. The third is an acoustic and visual record, used at the moment of closing the investigation, with a filming which lasted 22 min which is both a naturalistic and equitable record of the individual as the researchers themselves in relation to process.

The data was collected and register until achieving saturation of information, that is until it manifests a redundancy of itself, and there are repeated expressions, ideas or comments.

To analyze the data there was used the constant comparison method of any qualitative study, based on three stages.

- The first was an open coding or descriptive, who sought, through comparisons of the data obtained, to identify and describe categories.
- The second was axial coding, that established patterns of relationships between the descriptive categories.
- Finally the third stage of selective coding, sought to identify one or more categories that articulate the categorical system built along the study to generate a theoretical model for understanding the phenomenon.

It was also performed a triangulation process of data integrating the analysis of the content obtained from the group interviews at the end of the investigation, with support from the ATLAS.Ti software.

2.1. Description of the e-mentoring project

The contact with the school was achieved through two key informants who had access to the geographical area. With the permission of the school administration, it was possible to make e-mail contact with every teacher from the school.

At the same time questions of the cultural and social context were asked in the school using the techniques of document analysis (Flick, 2007), with the purpose of having full knowledge of the strengths, disadvantages and opportunities in the area.

After starting the intervention, weekly emails were sent. Each mentor exchanged e-mails with a e-mentoree. Despite the difficulties to keep the fluency in the weekly frequency of the first month of research, this was overcome during the process and more than one e-mail was exchanged at the end of the month. The contact with e-mentors was established through a key informant who was invited to participate in this study and was prepared in his functions and methods to carry out the monitoring process (see Fig. 1).

The closure of the intervention was conducted in a face to face presentation where the participants shared important topic from pedagogical assistance.

3. Results

The results are the product of 4 months of intervention in which couples formed by participants (e-mentors and e-mentoree), were exchanging weekly e-mails, with a break of 10 days approximately that was the e-mentors' winter holydays. On average, about 12 exchange emails were achieved per couple.

The results of this investigation are presented in a relational analysis exposed in two parts. In the first part through an axial coding in which comprehensive models of remarkable aspects are generated of open coding, and a second part (selective coding) in which it is constructed a general diagram that includes the essential elements of the central phenomenon.

Table 1
Questions Initial questionnaire to the e-mentees (councelors).

1.	Describe a brief summary that contains your professional experience in the last 5 years
2.	Facing the research process. What is your expectation of operating the e-mentoring? (frequency of contact with your e-mentor, extension of the communication)
3.	Regarding the access to the Internet for personal use. What is the most common place where you get access? (home, school, public library, other)
4.	How often do you access to Internet during the week?
5.	On average, how much time do you spend online weekly?

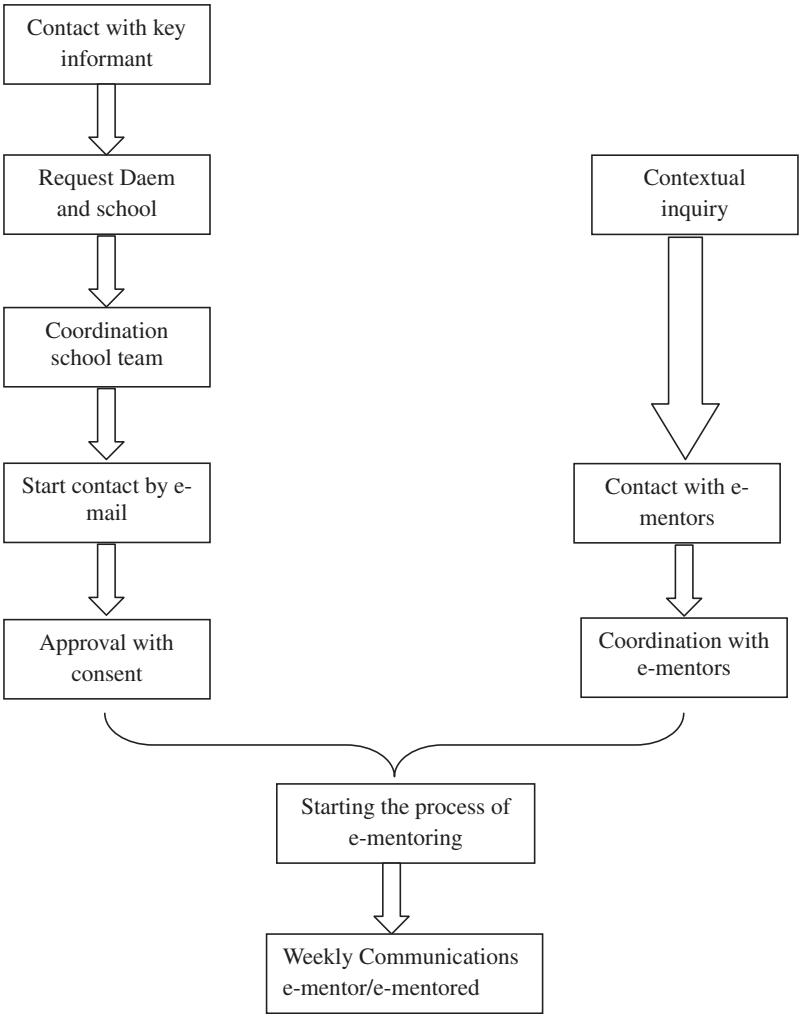

Fig. 1. Methodological procedure of e-mentoring process.

3.1. Axial coding

Fig. 2 presented a relational analysis of data organized into five main aspects:

The e-mentoring as a virtual educational accompaniment process enabled the e-mentoree to specifically identify the educational needs that they have in relation to their performance, which was mediated according to the results, considering a skill profile which e-mentors have (see Fig. 3). They were able to recognize the meanings that e-mentoree shared in their e-mail exchanges.

Considering the asynchrony of the process, it is essential according to this study that the e-mentor manifest the ability to use a language that express closeness and empathy with their e-mentoree, this will encourage the development of the specific helping request and generates satisfaction of e-mentoree, building feedback from the e-mentor's performance, who reinforces their expressions via email.

The effect given by the expressions in written language identified in this study has coherence with the theoretical references used. The use of language in the various processes of communication and in this case the virtual communication evidences a dialogical relationship between the e-mentee and e-mentor, this relationship has necessarily actions and processes that are shared and that give meaning to development of written language composed of various cultural elements that enrich the meanings (Silvestri, 2002). The meanings are those who share participants mutually and with them a sense of communication is formed.

Another key point of this research is to ratify the reflective process of e-mentoree as a valuable part of the effectiveness of the accompaniment. As described in other studies (Rhodes & Spencer, 2010) is in this reflection that the e-mentoree identifies its requirements, therefore, it is the protagonist of virtual accompaniment and not the e-mentor who will determine what should be *contributed* to the e-mentoree.

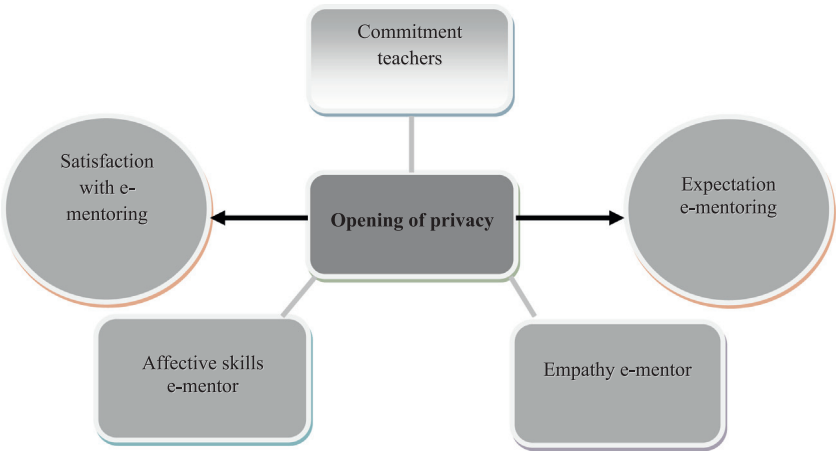

Fig. 2. Relationship between e-mentor's skills and attitudes regarding teachers opening to his privacy for the achievement of expectations and satisfaction.

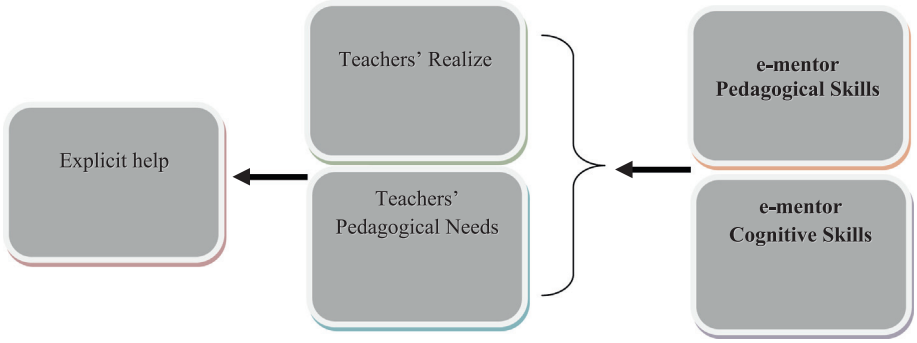

Fig. 3. Relationship between e-mentor's abilities with teacher's cognitive processes.

From this investigation it was found that once the virtual relationship is established, is the e-mentoree, who proposed the topics of interest to work on both at the methodological level and the request of specific materials of the teaching need that were identified in the classroom.

In the same line, it is also recognized as a central element the horizontality in which the e-mentoring process should be given, which implies that the expertise of the e-mentor is at the service of the e-mentoree. This enables the mentoree to fulfill their educational needs, developing supporting management. This means that due to the relationship between the two, mentor and mentee, either participant may suggest extending the helping request to other networks; this can be done through the e-mentor who has quick and easy access to consolidate the specific support required.

Related to the horizontality, this benefits the development of what from this study can be called virtual confidence climate, which is related to the space containing the participation of empathy expressed by the e-mentor in his/he written speech (which reflects a communication style), raising the expression of emotion from the e-mentoree, expressed also from the written language where they realize about the feelings, emotions and desires of the e-mentoring.

This confirms the findings of other studies related to mentoring process that establish similar characteristics to the ones found on this study. To succeed in the process of accompaniment Schwartz, Rhodes, Chan, and Herrera (2011) described that within the most significant predictors in a mentoring process, it seems to be that the development of a close and trusting relationship between the participants, can explain the propitious conditions that make possible a climate of reflective dialogue. In this research, this climate occurs virtually, as defined by Rísquez and Sánchez-García (2012), who established from their findings that it is possible to generate emotional closeness and an emotional style that reflect confidence among those involved in a communication process from the virtually.

The circuit network management support is another central level shown in this study (see Fig. 4). The findings allow establishing that the support given from the e-mentoring should not be conceived from a paternalistic or directive perspective, it should conceived from the reflection of the e-mentoring, who must be protagonists in the request for extension of support networks. This does not exclude the horizontal e-mentor's participation to offer the creation of networks according to the needs to be resolved.

It is not less important than one of the areas that was also affected by the virtual accompaniment, was the transference of specific teaching methodologies for the students' learning from the school (see Fig. 5). In the stories written by email, and in the group interview, teachers who received the e-mentoring realized that their pedagogical practices had changed, especially with students with special educational needs, recognizing that they had achieved in different ways realized how to improve their teaching methods This confirms the statement made by Nuñez, Pino and Lopez (2011) in relation to what is generated in the reflective process mediated by an e-mentor.

Another level of analysis is cross cutting exchange among the e-mentoree themselves in relation to their feelings and perceptions arose from the process of e-mentoring. In this investigation it was learned, which were the results of the different processes of accompaniment between pairs when they share their shared experiences that were living from the e-mentoring. The analysis of the

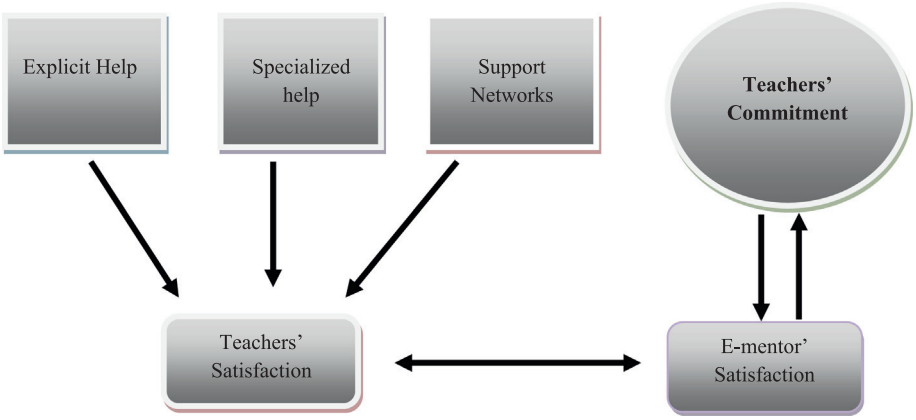

Fig. 4. Circuit of supporting management.

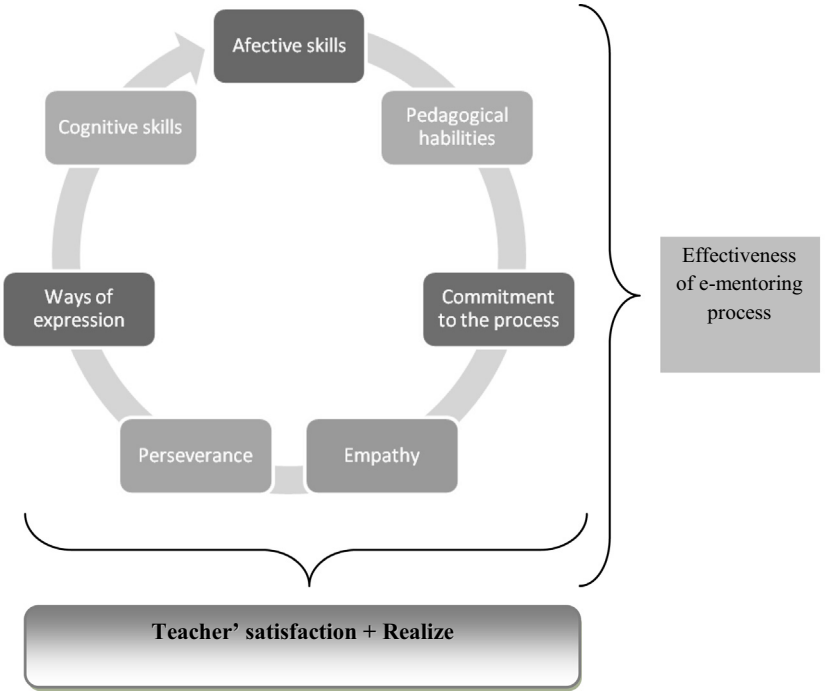

Fig. 5. Pedagogical effectiveness in the process of e-mentoring.

group interview conducted in the closing of this research explicitly express a proposal emerged from participants themselves based on shared experiences from the e-mentoring and that can be translated into a model that can be transfer to colleagues who work in similar conditions in the same area, where they could play a pedagogical role.

Another level of analysis is the one that occurs in continuous teaching training in a semi rural life context; the model built from this research allows the visualization of the evident needs and possible and systematic alternatives for development ofeffective teaching practices in semi isolated contexts (see Fig. 6). This situation is not deeply considered in the MINEDUC Rural Education program in Chile.

3.2. Selective coding

Based on the above findings it is proposed the model shown in Fig. 7, where the model becomes relevant since the beginning when it is identified the contextual difficulties where teachers (e-mentoree) from a semi isolated areas work. These issues are described on the previous paragraphs (geographical, technological and time constraints). This complicates their work when setting their own educational needs, making hard to look for solutions or means to fulfill these needs. When an external participant appears, that virtually assists their personal processes (e-mentor) from an asynchronous exchange of written language; this facilitates the process of consciousness of the e-mentoree (defined in this study as a cognitive process of the mentoree where it makes awareness of what happens both in the pedagogical and personal role which it is expressed trough written language) that is reinforced by the pedagogical needs of e-mentoree.

To succeed facilitating this process, the e-mentor must have certain requirements that are unique in the profile of an e-mentor or virtual accompaniment (skills, attitude, communication style) which are described in detail in this research and that is expressed in the written language of e-mails.

In addition, the emergence of the process of consciousness of the e-mentoree, plus the profile of the e-mentor, allows to generate

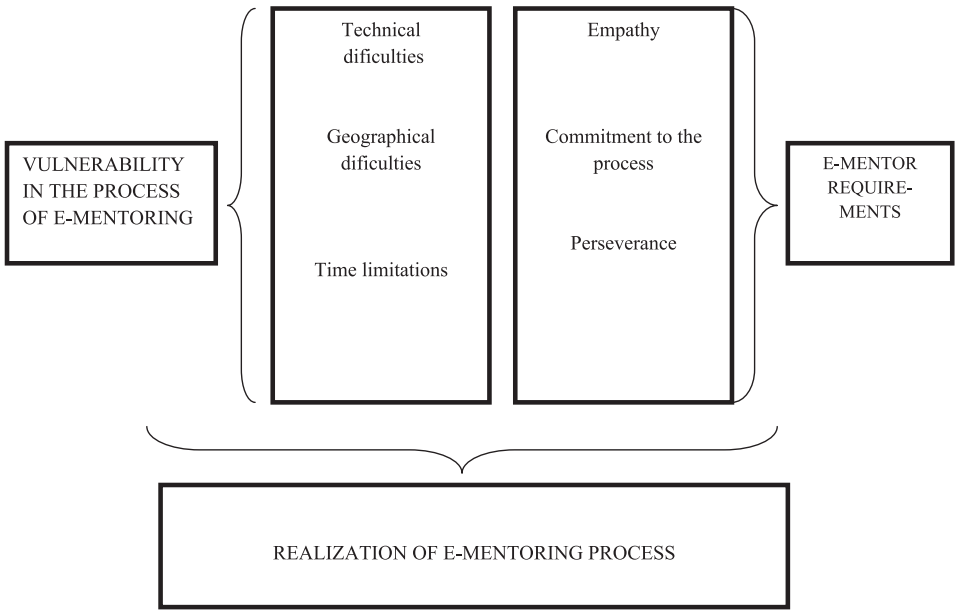

Fig. 6. Realization of e-mentoring process in relation to the vulnerability in the process and requirements of e-mentor.

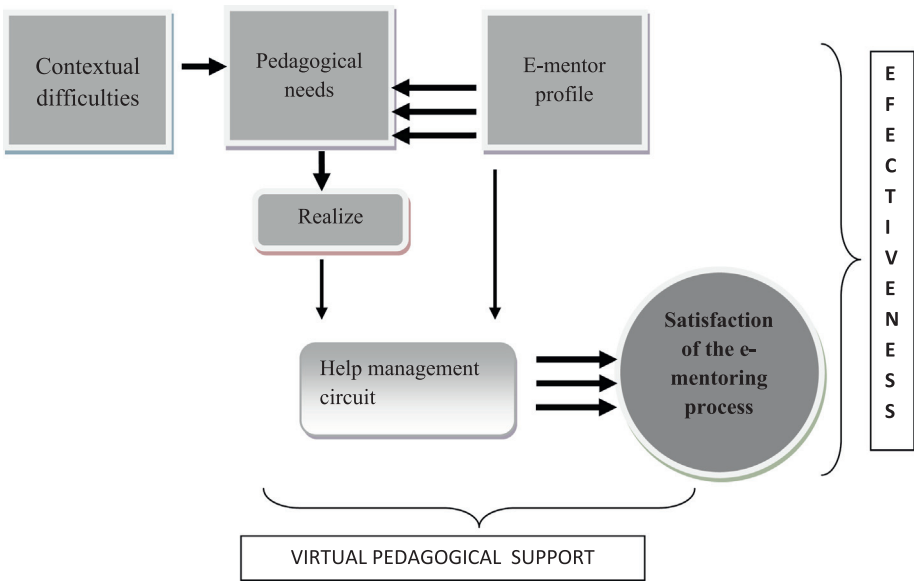

Fig. 7. Model of virtual accompaniment for teachers that work in semi-isolated areas.

the collaborative circuit between them, which implies direct support from the professional expertise of e-mentor (responding with specific methodological support or pedagogical materials) and from the search of assistance through networks by the mentoree' initiative or by e-mentor's request to expand the search.

The assistance management that is developed, leads in both types of participants (e-mentored/teacher) satisfaction in e-mentoring process, which is translated into effectiveness, being this finally a virtual mentoring process between pairs, due to the sense of horizontality given between them, rather than hierarchical from e-mentor towards the e-mentoree.

The sense of virtual support is given by the meaning of the contextual difficulties that generate educational needs that are unsatisfied due to the difficulty of access to assistance resources which might respond to them. At this point this research finds that the educational needs, the ones that are mediated by the e-mentor (with a specific profile described in this study), promotes the central phenomenon which is the reflection that allows the e-mentoree realize of their educational processes; and in this way it is possible to simultaneously benefit and generate the assistance networks which results in satisfaction for the ones that fulfill their needs and the ones that support as mentors. This allows demonstrating the effectiveness of e-mentoring process.

4. Conclusions and discussion

The main results of this research stated that the process of educational accompaniment is essential in the professional teaching development. This study recognizes that it is possible to perform an accompaniment making use of new information technologies that can be put at the service of rural education.

Clearly associated to the identification of needs for its part, this research concludes that teachers are able to realize of a number of events that happen their daily practice and they are also able to recognize specific needs of a pedagogical nature. However, it important to consider the implementation specific assistance networks such as social organization, pedagogical groups, among others, to thereby effectively meet the challenges that are presented.

Considering initial investigation the problem, it is confirmed the statement made by Rísquez and Sánchez-García (2012) in relation to which it is possible to carry out a process of asynchronous accompaniment allowing expression of central elements of a face to face accompaniment, such as emotional comfort and closeness. This study reveals the importance of having empathy and interest at emotional level of the participants that are being accompanied as well as Bierema and Merriam mentioned in their research (2002).

The selective model generated showed that an effective implementation that can occur in virtual accompaniment contexts of teachers from semi isolated areas, considering not only contextual difficulties and needs but also to include a specific determined profile of the e-mentor that with his/her skills can generate satisfaction in all participants and this helps to provide feedback to assistance process. Teachers in this study acknowledged that the accompaniment follow-up by email, influenced positively in their beliefs, skills, and instructional practices as well as Kopcha argued (2012).

Among the possibilities to develop this virtual accompaniment, there are multiple formats and platforms that could be considered, however, in the semi isolated context, there should be a previous evaluation of the level technology integration into the educational community to achieve an efficient and effective process.

The use of the email as a technological mean at the service of the virtual accompaniment is perfectly possible and viable in e-mentoring processes, which is completely opposite to what is stated by Puerta and Sánchez (2010) who argued that the use of the e-mail can generate a one side speech. However, it should be noticed that the e-mentor must have certain essential characteristics that described in the results, such as commitment and perseverance.

It is also possible to conclude, the importance of active participation of the e-mentoree in the process of educational accompaniment to encourage the facilitation, as described by Nieto (2000) in the description of accompaniment models that exist in different institutions and areas. In this sense, the findings are confirmed by Rodríguez (1996) regarding the role that mentors should pursue, that is, a mediator of personal reflections to improve practices. Therefore, it seems to be relevant to consider both the active participation of who is assisted in a process such as in this study, and the flexible and mediator posture of who assist.

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