Attitudes and capacities towards educational innovation: From the perception of teachers and directors of educational establishments in the Biobío region, Chile *

Angélica Jeannette Vera-Sagredo
Docente investigador Universidad Católica de la Santísima Concepción, Concepción - Chile
avera@ucsc.cl   http://orcid.org/0000-0003-1657-2241

Jaime Aroldo Constenla-Núñez
Docente investigador Universidad Católica de la Santísima Concepción, Concepción - Chile
jconsten@ucsc.cl   https://orcid.org/0000-0002-3373-6888

Pilar Andrea Jara-Coatt
Docente investigador Universidad Católica de la Santísima Concepción, Concepción - Chile
pilarjara@ucsc.cl   https://orcid.org/0000-0002-9975-8713

CIENCIA Y TECNOLOGÍA

ABSTRACT

Innovation in education is essential to respond to the new demands of society, which demands desirable skills from our teachers for this century, this implies not only the use of updated methodologies, but also the integration of new pedagogical models. In this context, the attitudes and capacities of teachers regarding educational innovation have been analyzed from the perception of teachers and directors of educational establishments in the Biobío region, Chile (N=255). Comparative studies of mean differences were performed using ANOVA analysis, Student's t-test, and correlations through Pearson's coefficient. The main results indicate that teachers perceive that for innovation in the classroom it is necessary to dedicate time to preparing their classes, giving feedback to students, working as a team and constant training in innovative methodologies. It was evidenced that ICTs are used for the preparation of teaching material and administrative tasks.

Vera-Sagredo, *et al.*

Attitudes and capacities towards educational innovation: From the perception of teachers and directors of educational establishments in the Biobío region, Chile

Actitudes y capacidades frente a la innovación educativa: Desde la percepción de docentes y directivos de establecimientos educativos de la región del Biobío, Chile

RESUMEN

PALABRAS CLAVE
Innovación; actitudes; capacidades; tecnologías; docentes; directivos

La innovación en educación es imprescindible para dar respuestas a las nuevas exigencias de la sociedad, que demanda de nuestros profesores competencias deseables para este siglo, esto implica, no solo la utilización de metodologías actualizadas, sino que la integración de nuevos modelos pedagógicos. En este contexto, se han analizado las actitudes y capacidades de los docentes frente a la innovación educativa desde la percepción de profesores y directivos de establecimientos educacionales de la región del Biobío, Chile (N=255). Los estudios comparativos de diferencias de medias se realizaron mediante el análisis de ANOVA, prueba t de Student y las correlaciones a través del coeficiente de Pearson. Los principales resultados señalan que el profesorado percibe que para la innovación en el aula es necesario, dedicar tiempo para la preparación de sus clases, retroalimentar a los estudiantes, trabajar en equipo y una formación constante en metodologías innovadoras. Se evidenció que las TIC son utilizadas para la preparación de material didáctico y las tareas administrativas.

Atitudes e capacidades para a inovação educacional: a partir da percepção de professores e diretores de estabelecimentos de ensino na região de Biobío, Chile

RESUMO

PALAVRAS-CHAVE
Inovação; atitudes; capacidades; tecnologias; professores; gestores

A inovação na educação é essencial para responder às novas exigências da sociedade, que exige dos nossos professores competências desejáveis para este século, isso implica não só a utilização de metodologias atualizadas, mas também a integração de novos modelos pedagógicos. Neste contexto, as atitudes e capacidades dos professores em relação à inovação educacional foram analisadas a partir da percepção de professores e diretores de estabelecimentos de ensino na região de Biobío, Chile (N=255). Estudos comparativos de diferenças de médias foram realizados por meio de análise ANOVA, teste t de Student e correlações por meio do coeficiente de Pearson. Os principais resultados indicam que os professores percebem que para inovar em sala de aula é necessário dedicar tempo para preparar suas aulas, dar feedback aos alunos, trabalhar em equipe e treinamento constante em metodologias inovadoras. Evidenciou-se que as TICs são utilizadas para a elaboração de material didático e tarefas administrativas.

1. Introduction

Currently, educational innovation is considered one of the fundamental pillars when it comes to improving teaching-learning processes. In this context, it is expected that innovations in education allow directing learning to the solution of problems of quality, coverage, efficiency, and effectiveness in the educational field through flexible actions that involve efficient improvements to the needs of the school community (Altopiedi and Murillo, 2010; Manola, Reiban and Letamendi, 2017). From this perspective, educational processes require a transformation, which implies for teachers and their community, a change in beliefs, in their knowledge, attitudes, and customs, leading to differentiation and improvement of educational quality, modifying the patterns of recurrent behaviors in professional work (Gil, Antelm and Cacheiro, 2018; Ortega *et al.*, 2007). Therefore, innovation requires new ways of functioning and an update in role functions (Pascual, 2019), and for this, the incorporation of a change agent is fundamental (Garbanzo-Vargas, 2015).

2

In general, it is noticed that despite the difficulties that teachers may present in a scenario unknown to them, innovation is understood as a response to the needs of the context (Altopiedi and Murillo, 2010; Vera-Sagredo, Constenla-Nuñez, Jara-Coatt and Lasalle-Cordero, 2020). Regarding the above, some authors state that teachers carry out innovations, however, these remain on an individual level, and sometimes they are not related to the needs of their educational community, or their practices are isolated (Cárdenas, Farías, & Méndez, 2017; Díaz-Barriga, 2005; Fullan, 2002, 2007; Pérez, Berra, & Cuautle, 2018). Thus, it can be pointed out that for innovation to make sense, the professional exercise must have openness, updating and a proposal for continuous improvement, that is, to consider the learning needs of students and that the innovations incorporated in the teaching-learning processes can be continuous to achieve deep and sustainable changes over time (López, Hinojosa, & Sánchez, 2014). In the same way, it is expected that this innovation is flexible and that there is a capacity for adaptation, for which it is advisable to count on the explicit willingness of the agents of change to be open and updated, for a continuous improvement in student learning (Zabalza, 2003-2004).

The importance of educational innovations lies in two substantial issues, the first is related to the need for a shared vision between teachers and management teams, for which it is necessary to have a reflective work of the reality of their educational and social context, to develop various actions to establish an innovative culture, where changes are not imposed but are developed with and for the educational community (Fuentealba and Imbarack, 2014; Fullan, 2002, 2007; Granados, Vargas and Vargas, 2020; Margalef and Arenas, 2006). The second question is related to the characteristics of the agent of change, some research reports that an innovative teacher would possess a positive attitude towards students and their educational needs; his or her disciplinary contents would correspond to updated curricula and focus on the development of knowledge, skills, and attitudes; and that this teacher would possess some characteristics such as persistence, autonomy, creativity and the ability to pose and solve problems (Cargua, Posso-Pacheco, Cargua, & Rodríguez, 2019; Lavín-Verástegui & Farías-Martínez, 2012; Ríos, 2004, 2009; Sancho, Ornellas, Sánchez, Alonso, & Bosco, 2008). For Vásquez-Cano, Sevillano, and De Pedro (2019) innovation at present is a normative requirement, but it should be more than that, mainly, because it is an intrinsic need of teaching praxis and educational organization.

In general, teachers are increasingly aware of the importance of adapting teaching and learning to the student's environment and reality. This makes it appropriate to introduce changes in the methodology usually used by teachers (Gómez-Pablos and García-Valcárcel, 2019). Thus, the use of digital resources could be a support for the teacher regarding innovative practices, this does not mean that innovation depends on technology, however, it is a tool that can support this process.

The Chilean Ministry of Education, through Enlaces[1] (2013), created for education professionals basic standards for the use of Information and Communication Technologies (ICT) in the framework of education and terms of teaching practices. One of its areas called the "Pedagogical Dimension" has the purpose of integrating ICT into the teaching-learning processes to give value to the process itself and support student development through its design, implementation, and incorporation. To the Chilean Ministry of Education, "...there is sufficient evidence that the incorporation of ICTs and their use by teachers can foster and develop the potential of new media to promote quality learning" (Enlaces, 2011, p. 37).

Likewise, Sánchez, Pérez, and Pérez (2020) emphasize that ICTs are a fundamental tool in the teaching-learning process since they represent educational effectiveness and efficiency; therefore, they need to be considered by teachers to integrate them into the school environment and achieve autonomous students in the future. Varied studies point out the advantages of the use of technologies in the teaching-learning process of students such as self-management, planning, time organization (Amador and Velarde, 2019; Jaimez-González, 2019), development of social skills (Vértiz-Osores, Pérez-Saavedra, Faustino-Sánchez, Vértiz-Osores and Alain, 2019), reflection and collaboration (Amor, Hernando-Gómez and Aguaded-Gómez, 2011).

Currently, the integration of new pedagogical models that are student-centered is expected, and ICTs are supported in this process since the teacher's professional development is increased to optimize the management of technologies and implement these tools in the teaching processes (Badilla, Vera & Lytras, 2017; Sánchez-Otero, García-Guiliany, Steffens-Sanabria & Palma, 2019). For Cabero and Martínez (2019), the incorporation of technologies in the classroom requires three stages, the first involves contact with technologies and their instrumental learning, the second requires the incorporation of educational practices, and the third requires the transformation of pedagogical practices through the use of ICT. In each of the stages, design, educational use, management and administration, research, and ethics should be considered, and for this reason, the incorporation in each cycle mentioned is a gradual process to achieve the technical and conceptual appropriation of technology.

Vera-Sagredo, *et al.*

Attitudes and capacities towards educational innovation: From the perception of teachers and directors of educational establishments in the Biobío region, Chile

In general, it has been evidenced that teachers present a positive attitude towards the use of technologies to carry out innovative educational practices (Álvarez *et al.,* 2011; Fernández, Hinojo, & Aznar, 2002; Fernández & Bermejo, 2012); however, some difficulties would be observed such as lack of training and time, low student autonomy, insufficient digital resources, as well as poor managerial support (Barrantes, Casas, & Luengo, 2011; Gómez-Pablos & García-Valcárcel, 2019; Sierra-Llorente, Palmezano-Córdoba, & Romero-Mora, 2018; Valencia-Arias, Benjumea, Morales, Silva, & Betancur, 2018). In addition, scientific evidence shows that the use of technology is fundamentally appreciated for instrumental and administrative use and, to a lesser extent, for educational use (Padilla-Beltrán, Vega-Rojas and Rincón-Caballero, 2014; Tapia, 2020). In Chile, the insertion of technologies is a reality in the school context, however, a large part of teachers are illiterate on the subject (Veloso, 2012). The research by Hepp, Pérez, Aravena, and Zoro (2017) shows that effective integration of the use of technological tools in educational centers would depend largely on the leadership of the management teams, as long as there is commitment, motivation, and capacity of those who lead the different educational units, therefore, it is a topic that needs to be reviewed.

According to Álvarez *et al.* (2011), the integration of ICTs in the educational world depends not only on their technical quality and pedagogical possibilities but also on the teaching approach and methodology. For this reason, teachers' knowledge, perceptions, and attitudes toward the media become determining factors when it comes to integrating them into the educational process. On the other hand, and according to what is expressed by González and De Pablos (2015), the use of technological tools is not enough by itself to bring about significant and permanent change, but it is essential to rethink factors such as educational models and their impact on the organization of institutions. Considering the background reviewed, the purpose of this study was to: 1) Analyze the perception of teachers and managers regarding attitudes and capabilities regarding innovation; 2) Identify the differences between gender, years of service, and training related to educational innovation; 3) Examine the existing relationships between the perception of education professionals regarding innovative attitudes and capabilities.

2. Method

2.1. Participants

The sample consisted of 255 teachers and managers from 19 schools in the Biobío region, Chile. The total number of teachers was 194, 58 men (29.9%), 136 women (70.1%) with from 1 year to 41 years of experience (ME= 12.42; SD=10.859); and 61 managers, 33 men (54.1%), 28 women (45.9%) with years of experience ranging from 1 to 45 years (ME=11.93; SD=10.947).

2.2. Procedure and Instrument

The data collection instrument was applied in a collective, organized, and scheduled manner so as not to affect the academic activities of teachers and directors. To carry out the study, the ethical norms established nationally and internationally for this type of research were considered. In this context, all participants agreed to answer the instrument voluntarily, assuring them of the confidentiality and anonymity of their answers.

For this research, an instrument adapted by the Innovapedia® Center of the Universidad Católica de la Santísima Concepción, Chile, was used. This data collection was conducted in the context of the RITA project 17IIPBB-83356: Classroom Technology Innovation Network, with Central China Normal University of Hubei, funded by the Regional Productive Development Committee (CORFO).

"Attitudes and capabilities of teachers towards Educational Innovation, teachers and managers version (ACDIE)" this instrument was developed to know the perception of teachers and managers about the attitudes and capabilities of educational innovation held by teachers (Traver-Martí and Ferrández-Berrueco, 2016; Santos *et al.,* 2017; De Pablos, Colás and González, 2011). The scale has 34 items divided into two dimensions. The first dimension (20 items) considers attitudes and beliefs towards innovation and educational improvement, it was measured using a Likert-type scale ranging from Strongly Disagree (1) to Strongly Agree (5), of type; "To bring innovative proposals to the classroom, teachers have to be in a continuous process of training and renewal". The second dimension analyzes the Information and Communication Technologies (ICT) standards proposed by the Chilean Ministry of Education (14 items). This part of the instrument was measured through a Likert scale ranging from Not used (1) to Used a lot (5) of type; "I use ICT to support administrative-teaching tasks". The reliability index results are appropriate, showing a value of Cronbach's Alpha, α= .810.

2.3. Data analysis

To establish possible differences between the responses of teachers and managers regarding their attitudes and abilities regarding educational innovation and the use of technologies according to sociodemographic characteristics (gender, years of service, and training), a comparative analysis of their means was carried out to evaluate whether they differed significantly, using Student's t-test for independent groups and ANOVA. In addition, the Pearson correlation coefficient was used to analyze possible relationships between teachers' and managers' opinions regarding sociodemographic characteristics. Before performing the analyses considered within the research objectives, the assumptions of normality, homogeneity, and independence were checked through different statistical tests (Kolmogorov-Smirnov, Levene). SPSS v. 21 software was used for all these analyses.

3. Results

The purpose of the research was to analyze the perception of teachers and managers regarding their attitudes and capabilities concerning innovation; to determine the possible differences between the variables examined for gender, years of service, and training obtained by the teachers; and to review the relationships found between the perceptions of the professionals and the sociodemographic characteristics. The results are presented below according to the purposes of this research.

3.1. Characterization of the sample and associated variables

For the subsequent analyses, it was necessary to characterize the sample to the sociodemographic variables reviewed in this study. The results show that 29.9% of the teachers belong to the male gender and 70.1% to the female gender; of the total number of teachers surveyed, 37.1% have some specialization in topics related to educational innovation. About years of service ranging from 1 year to 41 years, it was observed that the highest percentage is found among teachers who have been working for 5 years (12%), followed by those who have been working for 6 years (7.7%) and 7 years (7.2%). Regarding managers, 54.1% were male and 45.9% were female, with the highest percentage of years of service among those professionals who have been working for 4 years (11.5%). Regarding training in innovation, 68.9% indicated that they had participated in some specialization on the subject.

3.2. Descriptive analysis of competencies in educational innovation as perceived by teachers.

The descriptive analyses indicate that, according to teachers' perceptions, the attitudes and skills on innovation that have the highest agreement among teachers are: the teacher dedicates time to preparing his/her classes to improve student learning (99%); the teacher continually evaluates him/herself to provide feedback on student learning (97%); the teacher uses teamwork as a methodological strategy (95.8%); the students' experiences are related to the course topics (95.3%); for the teacher to bring innovative proposals to the classroom, he/she must be in a continuous process of training and renewal (95.3%); and finally, to improve professional practice, it is necessary to use new teaching methods following the current reality (93.8%). On the contrary, it was observed that the lowest scores observed in the teachers' responses are related to the evaluation only of written tests (6.2%); that evaluation should be limited to the assessment of acquired knowledge (35.6%); and that in class the basic role of students is to be attentive and take notes (39.2%). Regarding the second dimension, it was found that teachers use technology mainly for the preparation of didactic material to support pedagogical practices (85%) and administrative-teaching tasks (84%). In addition, it was found that they handle the basic concepts and functions of the computer (79%). One of the aspects less valued by teachers is related to understanding the ethical and legal aspects associated with digital information and communications through social networks (46.4%).

Regarding the opinion of the directors, it was observed that for them it is essential that teachers dedicate time to prepare classes (98.3%); that they continuously evaluate to provide feedback on student learning (98.3%); that they need a continuous process of training and renewal to create innovative proposals in the classroom (98.3%); that they should use teamwork as methodological strategies (96.7%); and that to improve teaching practice they need to use new teaching methods by the current reality (93.5%). Similarly - as was seen in the teachers' responses - the lowest scores in this dimension were found in the statements that indicate that the evaluation of learning is limited to the assessment of acquired knowledge (6.5%) and that the basic role of students is to be attentive in class and take notes (18%). Regarding the use of technologies, the directors report that they use them mainly to support administrative-teaching tasks (84.7%) and the curriculum (70.5%)

and for the preparation of didactic material for their classroom practices (66%). Finally, it is evident that in this dimension one of the least valued aspects is related to the knowledge of ethical and legal aspects of the use of technologies.

3.3. Differences between gender, years of experience, and specialization in educational innovation

In the results of the responses to the first dimension evaluated according to gender and teacher specialization, there were no statistically significant differences (see Table 1). However, it can be seen that women value some aspects of innovation more highly than men. In this context, they consider that to carry out educational innovation, teaching should have greater professional recognition; the teacher must be close and accessible to the students; the teacher should use teamwork as a methodological strategy; and the experiences of the students should be considered to relate them to the course topics; that new teaching methods should be used by the current reality; and finally, that the use of ICTs provides greater acceptance in the professional environment. On the other hand, men had a higher evaluation than women in some aspects such as continuous evaluation to provide feedback to students' learning; they consider that the teacher's motivation towards teaching will have repercussions on students' motivation towards learning; they think that the student's role is to be attentive and take notes in class; and that the use of ICTs is necessary to favor students' learning.

Table 1.
Means and comparisons between the various items to gender and specialization of the participants (t-test).

	Women		Men		t	With		Without		t
	M	DE	M	DE		M	DE	M	D	
In order to bring innovative proposals to the classroom, teachers must be in a continuous process of training and renewal.	4.58	.578	4.62	.644	.425	4.61	.571	4.58	.614	.328
The use of Information and Communication Technologies provides greater acceptance in the professional environment.	4.23	.730	4.12	.796	.911	4.06	.785	4.28	.719	2.018
The teacher must use students' experiences to relate them to the topics of the course.	4.61	.598	4.59	.531	.265	4.60	.597	4.61	.569	.108
In order to carry out educational innovation, teaching should have greater professional recognition.	4.20	1.013	4.12	1.339	.451	4.03	1.363	4.26	.938	1.426
The teacher should use teamwork as a methodological strategy.	4.94	4.198	4.66	.515	.516	4.58	.645	5.02	4.416	.826
In order to improve teaching practice, it is necessary to use new teaching methods in accordance with the current reality.	4.61	.646	4.53	.754	.711	4.53	.712	4.62	.660	.943
It is necessary to incorporate the use of Information and Communication Technologies to innovate and improve teaching in the classroom.	4.36	.706	4.31	.730	.446	4.29	.740	4.38	.696	.806
It will be conducive to innovation if the teacher is close and accessible to students.	4.48	.720	4.31	.863	1.397	4.47	.769	4.40	.768	.618
The teacher has to mediate student learning through guidance and orientation.	4.59	.602	4.50	.656	.910	4.50	.650	4.60	.598	1.071
It is essential for students' learning that the teacher dedicates time to prepare his/her classes.	4.85	.401	4.86	.348	.272	4.85	.362	4.85	.400	.091
The teacher must continually evaluate to provide feedback on student learning.	4.72	.513	4.83	.425	1.422	4.82	.387	4.71	.539	1.496

	Women		Men		t	With		Without		t
	M	DE	M	DE		M	DE	M	D	
In class, the basic role of the students is to be attentive and take notes.	2.88	1.187	3.34	1.236	2.452	2.83	1.233	3.13	1.199	1.654
The teacher should use Information and Communication Technologies to promote student learning.	4.25	.686	4.34	.637	.900	4.32	.646	4.25	.687	.654
To be a good teacher, it is necessary to innovate in the teaching strategies used in the classroom.	4.46	.759	4.41	.795	.409	4.38	.830	4.49	.730	1.023
The evaluation of learning is limited to the assessment of acquired knowledge.	2.87	1.200	2.98	1.221	.574	2.69	1.274	3.03	1.147	1.902
Only written tests should be used for evaluation	1.67	.922	1.62	.952	.314	1.60	.744	1.69	1.025	.641
In an environment of innovation, students participate actively in class	4.30	.897	4.45	.753	1.092	4.43	.836	4.30	.869	1.064
In order to carry out educational innovation, there should be support from the school's management.	4.58	.538	4.52	.800	.647	4.58	.622	4.55	.631	.366
In order for a teacher to be able to innovate, the establishment must have technological resources.	4.15	.950	4.22	1.109	.445	4.11	1.056	4.21	.964	.687

Source: Own elaboration.

Regarding the second dimension, which refers to Information and Communication Technology (ICT) standards, statistically, significant differences were only observed for the management and concepts of basic functions and the use of personal computers in favor of the group that has received training (Mcon=4.33, SD=.732, Msin= 3.95, SD=.969; t (194) =2.896, p >.05). Similarly, there was no evidence of differences in innovative capabilities and use of technology to years of specialization. However, it can be seen that professionals who have received some type of specialization in subjects related to innovation, consider to a greater extent than their peers that it is conducive to innovation that the teacher is close and accessible to students, that the teacher should be continuously evaluated to provide feedback on student learning, that in an environment of innovation, students participate in classes and that the use of ICTs favors student learning.

3.4. Correlation between the different competencies analyzed with sociodemographic variables

To review possible relationships between the variables of the quantitative instrument and the sociodemographic variables, Pearson's bivariate correlation coefficient was applied (see Table 2). The results show that there is a direct and significant correlation between gender and the training of professionals (r=-.198, p<.001), between years of experience and training (r=.269, p<.001), and between attitudes and capabilities in innovation concerning the use of ICT (r=.297, p<.001).

Table 2.
Correlation between different variables examined.

	G	Y.E	T	Attitudes and Skills	ICT
Gender	-	-,049	-,198**	-,009	-,001
Years of experience		-	,269**	-,010	,050
Training			-	-,109	,037
Attitudes and Skills				-	,297**
ICT					-

G: Gender; Y.E: Years of Experience; T: Training; Attitudes and Skills; ICT: Information and Communication Technologies**.
Correlation is significant at the 0.01 level (bilateral). Correlation is significant at the 0.05 level (bilateral).
Source: Own elaboration.

4. Discussion

Based on the results presented and on the descriptive analysis of the information derived from the questions stated for this study, it can be pointed out that in general, teachers perceive as one of the most relevant characteristics for

Vera-Sagredo, *et al.*

Attitudes and capacities towards educational innovation: From the perception of teachers and directors of educational establishments in the Biobío region, Chile

educational innovation, the need to dedicate time for the preparation of their classes, since this would allow them to improve their students' learning. These results are clearly and directly related to the indications provided by the Chilean Ministry of Education (2008) through the Framework for Good Teaching,[2] these guidelines indicate that teachers should teach, design, select, and organize teaching strategies and their respective evaluations that allow them to appreciate the achievement of student learning and provide feedback on their practices. In the same way, Unicef (2005) states that the results that most influence the good performance obtained by educational centers are the development of planning with their respective activities that do not leave room for improvisation. Another of the most valued characteristics of innovation would correspond to the need for constant feedback to students, these results agree with multiple studies that would indicate that feedback allows students to identify their achievements as well as those aspects in which they need to improve, that is, they could monitor their strengths and weaknesses to modify or improve more efficiently the task, in this way the student acquires a more active and central role within their learning process (Canabal and Margalef, 2017; Osorio and López, 2014; Valdivia, 2014; Vives-Varela and Varela-Ruiz, 2013).

Teamwork and constant renewal of teacher training have also been variables positively valued as characteristics of innovation. In addition, it is considered that to improve professional practice, the use of new teaching methods in line with the current reality is necessary. Like the perception of teachers, managers consider that to bring innovative proposals to the classroom, teachers should dedicate time to <preparing their classes, providing feedback to students, working as a team, and using new methodological strategies. These results are in agreement with López *et al.* (2014) who indicate that for innovation to make sense, professionals with openness and permanent updating are needed.

Regarding the use of ICT, teachers indicate that it is mainly used for the preparation of didactic material and administrative-teaching tasks. As stated by Padilla-Beltrán *et al.* (2014) and Tapia (2020), technologies in the educational context are directed toward instrumental and administrative use and, to a lesser extent, towards educational use. One of the aspects that were less valued regarding the use of technologies in these school contexts is related to the lack of information on the ethical and legal aspects of their use. This situation is somewhat worrying, since students are expected to be able to decide on the legal and ethical limits to avoid possible risks, a situation that has been expressed by the Ministry of Education of Chile (2013) through the ICT Skills Matrix for learning, therefore, if the teacher is not clear about these aspects, it will be difficult to provide adequate guidelines to the students.

An interesting finding in the results is that no statistically significant differences were found in practically none of the innovation characteristics concerning the sociodemographic variables reviewed. However, higher scores were observed in the group of women in terms of the importance for them of professional recognition in their teaching work, the closeness and experience of their students, teamwork, and teaching methodologies in line with the current reality; they also consider that the use of technologies allows them greater acceptance in the professional environment. These results could be since in the educational environment, the teaching of disciplines is only a part of what it means to educate. Flórez, Castro, Galvis, Acuña and Zea (2017) state that there should be a concern for an appropriate classroom environment that allows a good human relationship between teacher and student, effective situations, empathy, and recognition of the training agents with a work based on a socio-affective dimension, which apparently for them these characteristics would have greater importance than for males.

Regarding the dimension of the use of Information and Communication Technologies, it was only observed that teachers who have received some type of training would have a greater knowledge of the basic functions and use of personal computers. In addition to the above, it was found that, to a greater extent than their peers, they consider it conducive to innovation that the teacher should be close to the students, that there should be constant feedback, and that the use of technologies would favor student learning. The latter is related to the results of different investigations that account for the benefits of the use of technologies in the classroom (Amador and Velarde, 2019; Amor *et al.,* 2011; Jaimez-González, 2019; Vértiz-Osores *et al.,* 2019).

Finally, it could be observed that there is a direct and significant relationship between gender and the years of experience of the participants regarding training. And an interesting relationship for this study for attitudes and innovation capabilities with the use of ICTs. In general terms, this would mean that people with greater characteristics in educational innovation would be those who use technologies to a greater extent in their teaching work.

5. Conclusion

In response to the first question of this study, it can be seen that teachers and principals would give greater importance to some of the characteristics of an innovative teacher. For both, the time dedicated to the preparation of classes would be transcendental, in the same way, they would state that teamwork is one of the most appropriate methodologies in the development of their teaching profession and that there would be a need for training and renovation in the teaching methodologies used that are following the current reality. An interesting finding was that teachers would not agree that written evaluations would be the best way to review students' learning and that this would be a passive entity in the classroom, which would also be a difficulty. Regarding the use of Information and Communication Technologies, it is mainly used for the preparation of didactic material and administrative tasks.

The second research question that expected to show statistically significant differences for the sociodemographic variables. It was observed that there were no differences between the gender of the teachers; however, women would have a greater perception than men that teachers need greater professional recognition, that the teacher should be close to the student, and that the teacher should use teamwork as a methodological strategy. On the other hand, men would give greater importance to continuous learning feedback, the teacher's motivation towards teaching, and that the student should be a passive entity and only take notes in class. From this perspective, it would be interesting to consider the expectations that female teachers have about professional recognition since it would seem to be a relevant point for better professional performance. On the other hand, men seem to be more traditionalist in agreeing with the passivity of the students.

One of the limitations of this research is related to the context in which the participants of the study are inserted, therefore, the results could show another profile in other educational realities. Considering the above, it would be plausible that for further research the analysis of the same dimensions, but in other educational contexts, could be considered. In addition, the integration of the students' perceptions regarding the characteristics that an innovative teacher should possess and the use of qualitative methods allow for a deeper understanding of the opinions of all those involved in education.

Notes

1. Enlaces is the Education and Technology Center of the Chilean Ministry of Education, which aims to contribute to the improvement of the quality of education through educational informatics and the development of a digital culture.
2. The Framework for Good Teaching (MBE), a single document for the entire Chilean school system that aims to guide the professional teaching policy and to inform the community about the standards that teachers must achieve.

Conflict of Interest

The authors declare no conflict of interest.

References

1. ALTOPIEDI, Mariana; MURILLO, Paulino. Prácticas innovadoras en escuelas orientadas hacia el cambio: ámbitos y modalidades. Revista de curriculum y formación del profesorado, 2010, vol. 14, n.1, p. 47-70. https://www.redalyc.org/pdf/567/56714113004.pdf
2. ÁLVAREZ, Susana; CUÉLLAR, Carmen; LÓPEZ, Belén; ADRADA, Cristina; ANGUIANO, Rocío; BUENO, Aantoni; COMAS, Isabel; GÓMEZ, Susana. Actitudes de los profesores ante la integración de las TIC en la práctica docente. Estudio de un grupo de la Universidad de Valladolid. Revista Electrónica de Investigación Educativa, 2011, vol. 35. https://doi.org/10.21556/edutec.2011.35.416
3. AMADOR, Carlos; VELARDE, Leticia. Competencias para el uso de las TIC en estudiantes de educación superior: un estudio de caso. Revista iberoamericana para la Investigación y el Desarrollo Educativo, 2019, vol. 10, n. 19 ,p. e014. https://doi.org/10.23913/ride.v10i19.515.
4. AMOR, María; HERNANDO-GÓMEZ, Ángel; AGUADED-GÓMEZ, Ignacio. La integración de las TIC en los centros educativos: percepciones de los coordinadores y directores. Estudios pedagógicos (Valdivia), 2011, vol. 37, n. 2, p. 197-211. https://dx.doi.org/10.4067/S0718-07052011000200012.
5. BADILLA, María, VERA SAGREDO, Angélica; LYTRAS, Miltiadis. Pre-service teachers' skills and perceptions about the use of virtual learning environments to improve teaching and learning, Behaviour & Information Technology, 2017, vol. 36, n. 6, p. 575-588. https://doi.org/10.1080/0144929X.2016.1266388.
6. BARRANTES, Gerardo; CASAS, Luis; LUENGO, Ricardo. Obstáculos percibidos para la integración de las tic por los profesores de infantil y primaria en Extremadura. Revista de Medios y Educación, 2011, vol. 39, p. 83-94. https://idus.us.es/bitstream/handle/11441/45672/file_1.pdf;jsessionid=E5C858412E8E8520E0A64EAB0628612D?sequence=1.

Vera-Sagredo, *et al.*

Attitudes and capacities towards educational innovation: From the perception of teachers and directors of educational establishments in the Biobío region, Chile

7. CABERO, Julio; MARTÍNEZ, Almudena. Las Tecnologías de la Información y Comunicación y la formación inicial de los docentes. Modelos y competencias digitales. Profesorado: Revista de currículum y formación del profesorado, 2019, vol. 23, n. 3, p. 247-268. https://dx.doi.org/10.30827/profesorado.v23i3.9421.

8. CANABAL, Cristina; MARGALEF, Leonor. La retroalimentación: la clave para una evaluación orientada al aprendizaje. Profesorado. Revista de Currículum y Formación de Profesorado, 2017, vol. 21, n. 2, p. 149-170. https://www.redalyc.org/pdf/567/56752038009.pdf

9. CÁRDENAS, Claudia; FARÍAS, Gabriela; MÉNDEZ, Georgina "¿Existe relación entre la Gestión Administrativa y la Innovación Educativa? Un estudio de caso en Educación Superior". Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación, 2017, vol.15, n. 1, p. 19-35. https://repositorio.uam.es/handle/10486/676774

10. CARGUA, Alexandra; POSSO-PACHECO, Richar; CARGUA, Nancy; RODRÍGUEZ, Ángel. La formación del profesorado en el proceso de innovación y cambio educativo. OLIMPIA, 2019, vol. 16, n. 54, p. 140- 152. https://dialnet.unirioja.es/servlet/articulo?codigo=7000700

11. DE PABLOS, Juan; COLÁS, Pilar; GONZÁLEZ, Teresa. Bienestar Docente e Innovación con Tecnologías de la Información y la Comunicación. Revista de Investigación Educativa, 2011, vol. 29, n. 1, p. 59-81. https://revistas.um.es/rie/article/view/100131

12. DÍAZ-BARRIGA, Ángel. El profesor de educación superior frente a las demandas de los nuevos debates educativos. Perfiles Educativos, 2015, vol. 27, n. 108. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-26982005000100002

13. ENLACES. Competencias y Estándares TIC para la profesión docente. Santiago de Chile: Ministerio de Educación. 2011. https://bibliotecadigital.mineduc.cl/bitstream/handle/20.500.12365/2151/mono-964.pdf?sequence=1&isAllowed=y

14. FERNÁNDEZ, Francisco; HINOJO, Javier; AZNAR Inmaculada. Las actitudes de los docentes hacia la formación en tecnologías de la información y comunicación (TIC) aplicadas a la educación. Contextos educativos, 2002, vol. 5, p. 253-270. https://pdfs.semanticscholar.org/dc33/d9ff2c325619a5a0fc5ffb0a24b8685b538a.pdf

15. FERNÁNDEZ, José; BERMEJO, Blas. Actitudes docentes hacia las TIC en centros de buenas prácticas educativas con orientación inclusiva. Enseñanza & Teaching, 2012, vol. 30, n.1, p. 45-61. https://dialnet.unirioja.es/servlet/articulo?codigo=4092271

16. FLÓREZ, Rita; CASTRO, Jaime; GALVIS, Deisy; ACUÑA, Luisa; ZEA, Liced. Ambientes de aprendizaje y sus mediaciones en el contexto educativo de Bogotá. 2017. Bogotá: Instituto para la Investigación Educativa y el Desarrollo Pedagógico, IDEP. http://www.idep.edu.co/sites/default/files/libros/Libro%20%20IDEP%20-%20Ambientes%20de%20aprendizaje.pdf

17. FUENTEALBA, Rodrigo; IMBARACK, Patricia. Compromiso docente, una interpelación al sentido de la profesionalidad en tiempos de cambio. Estudios Pedagógicos, 2014, vol. 40 n. (Especial), p. 257-273. https://dx.doi.org/10.4067/S0718-07052014000200015.

18. FULLAN, Michael. El significado del cambio educativo: un cuarto de siglo de aprendizaje. Profesorado: Revista de currículum y formación del profesorado, 2002, vol. 6 (1–2), p. 1-14. https://www.ugr.es/~recfpro/rev61ART1.pdf.

19. FULLAN, Michael. Los nuevos significados del cambio en la educación. 2007. Barcelona: Octaedro.

20. GARBANZO-VARGAS, Guiselle. Desarrollo organizacional y los procesos de cambio en las instituciones educativas, un reto de la gestión de la educación. Revista Educación, 2015, vol. 40, n. 1. https://dx.doi.org/10.15517/revedu.v40i1.22534.

21. GIL, Alfonso; ANTELM, Ana; CACHEIRO, María. Análisis de la capacidad de innovación escolar desde la perspectiva del profesorado de educación secundaria. La escuela como organización que aprende. Educar, 2018, vol. 54, n. 2, p. 449-468. https://raco.cat/index.php/Educar/article/view/v54-n2-gil-antelm-cacheiro

22. GÓMEZ-PABLOS, Verónica; GARCÍA-VALCÁRCEL, Ana. Opinión del profesorado hacia proyectos colaborativos con Tecnologías de la Información y Comunicación: un estudio Psicométrico. Educ. Pesqui., São Paulo, 2019, vol. 45. https://doi.org/10.1590/s1678-4634201945213768.

23. GONZÁLEZ PÉREZ, Alicia; DE PABLOS PONS, Juan. Factores que dificultan la integración de las TIC en las aulas. Revista de Investigación Educativa, 2015, vol. 33, n. 2, p. 401-417. http://dx.doi.org/10.6018/rie.33.2.198161

24. GRANADOS ROMERO, John; VARGAS PÉREZ, Catalaina; VARGAS PÉREZ, Renan. La formación de profesionales competentes e innovadores mediante el uso de metodologías activas. Universidad y Sociedad, 2020, vol.12, n.1, p. 343-349. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202020000100343

25. HEPP, Pedro; PÉREZ, Máximo; ARAVENA, Felipe; ZORO, Bárbara. 'Desafíos para la integración de las TIC en las escuelas: Implicaciones para el liderazgo educativo ' Informe Técnico No. 2, 2017. Lideres educativos, Centro de Liderazgo para la Mejora Escolar: Chile.

26. JAIMEZ-GONZÁLEZ, Carlos. Instrumento de evaluación para materiales didácticos digitales de apoyo al proceso de enseñanza-aprendizaje de tipos de datos abstractos. Revista iberoamericana para la Investigación y el Desarrollo Educativo, 2019, vol. 9, n. 18. https://doi.org/10.23913/ride.v9i18.433

27. LAVÍN-VERÁSTEGUI, Jesús; FARÍAS-MARTÍNEZ, Gabriela. Perfil y prácticas educativas del docente orientado a la innovación en las escuelas de negocios en México. RIES, 2012, vol. 6, n. 3, p. 117-127. http://www.scielo.org.mx/pdf/ries/v3n6/v3n6a6.pdf

28. LÓPEZ, María; HINOJOSA, Eva; SÁNCHEZ, Dolores. Evaluación de la calidad de los proyectos de innovación docente universitaria. Profesorado: Revista de currículum y formación del profesorado, 2014, vol. 18, n. 3, p. 377-391. http://www.ugr.es/~recfpro/rev183COL10.pdf

29. MARGALEF, Leonor; ARENAS, Andoni. ¿Qué entendemos por innovación educativa? A propósito del desarrollo curricular. Perspectiva educacional, 2006, vol. 47, p. 13-31. https://www.redalyc.org/pdf/3333/333328828002.pdf

30. MANOLA, Johana; REIBAN, Román; LETAMENDI, Carmen. Innovación en la educación superior. Revista Publicando, 2017, vol.11, n. 1, p. 719 -731. https://revistapublicando.org/revista/index.php/crv/article/view/623/pdf_424

31. MINISTERIO DE EDUCACIÓN. Marco para la buena enseñanza. Santiago de Chile: CPEIP: Centro de Perfeccionamiento, Experimentación e Investigaciones Pedagógicas, 2008. https://www.cpeip.cl/wp-content/uploads/2019/05/Marco-buena-ensenanza.pdf

32. MINISTERIO DE EDUCACIÓN. Matriz de habilidades TIC para el aprendizaje. Santiago de Chile: Centro de Educación y Tecnología, Enlaces, 2013. https://bibliotecadigital.mineduc.cl/handle/20.500.12365/2165

33. ORTEGA, Pedro; RAMÍREZ, María; TORRES, José; LÓPEZ, Aana; SERVÍN, Citlali; SUÁREZ, Liliana; RUIZ, Blanca. Modelo de innovación educativa. Un marco para la formación y el desarrollo de una cultura de la innovación. RIED, 2007, vol.10, n. 1, p. 145- 173. https://www.redalyc.org/pdf/3314/331427206010.pdf

34. OSORIO, Karime; LÓPEZ, Alexis. La Retroalimentación Formativa en el Proceso de Enseñanza-Aprendizaje de Estudiantes en Edad Preescolar. Revista Iberoamericana de Evaluación Educativa, 2014, vol. 7, n. 1, p. 13-30. https://revistas.uam.es/riee/article/view/3383

35. PADILLA-BELTRÁN, José; VEGA-ROJAS, Paula; RINCÓN-CABALLERO, Diego. Tendencias y dificultades para el uso de las TIC en educación superior. Entramado, 2014, vol. 19, p. 272-295. http://www.scielo.org.co/pdf/entra/v10n1/v10n1a17.pdf

36. PASCUAL, Javier. Innovación Educativa: Un proceso construido sobre relaciones de poder. Revista Educación, Política y Sociedad, 2019, vol. 4, n. 2, p. 9-30. https://repositorio.uam.es/bitstream/handle/10486/687976/REPS_4_2_2.pdf?sequence=1

37. PÉREZ, Mónica; BERRA, Eduardo; CUAUTLE, José. Método de innovación educativa para promover desarrollo de invenciones en instituciones de educación superior. Revista UPIICSA Investigación Interdisciplinaria, 2018, vol. 4, n. 1, p. 35-42. https://www.ruii.ipn.mx/index.php/RUII/article/view/54

38. RÍOS, Daniel. Rasgos de personalidad de profesores innovadores: autonomía, persistencia y orden. Revista Latinoamericana de Estudios Educativos, 2004, vol. XXXIV, n. 2, p. 95-112. https://www.redalyc.org/pdf/270/27034205.pdf

39. RÍOS, Daniel. Características personales y profesionales de profesores innovadores. Revista Latinoamericana, 2009, vol. XXXIX, n. 1-2, p. 153-169. https://www.redalyc.org/pdf/270/27015065007.pdf

40. SÁNCHEZ DOMÍNGUEZ, Magally; PÉREZ HERNÁNDEZ, Jacinta; PÉREZ PADRÓN, María. El uso de las tecnologías de la información y la comunicación y la comprensión lectora: tendencias. Revista Conrado, 2020, vol. 16, n. 72, p. 376-386. http://scielo.sld.cu/scielo.php?script=sci_abstract&pid=S1990-86442020000100376

41. SÁNCHEZ-OTERO, Madelin; GARCÍA-GUILIANY, Jesús; STEFFENS-SANABRIA, Ernesto; PALMA, Hugo. Estrategias Pedagógicas en Procesos de Enseñanza y Aprendizaje en la Educación Superior incluyendo Tecnologías de la Información y las Comunicaciones. Información Tecnológica, 2019, vol. 30, n. 3, p. 277-286. https://dx.doi.org/10.4067/S0718-07642019000300277.

42. SANCHO, Juana; ORNELLAS, Adirana; SÁNCHEZ, Joan; ALONSO, Cristina; BOSCO, Alejandra. La formación del profesorado en el uso educativo de las TIC: una aproximación desde la política educativa. Praxis, 2008, vol. 12, p. 10-22. https://www.redalyc.org/pdf/1531/153112902002.pdf

43. SANTOS REGO, Miguel; JOVER OLMEDA, Gonzalo; NAVAL, Concepción; ÁLVAREZ CASTILLO, José; VÁZQUEZ VERDERA, Victoria; SOTELINO LOSADA, Alexandre. Diseño y validación de un cuestionario sobre práctica docente y actitud del profesorado universitario hacia la innovación (CUPAIN). Educación XX1, 2017, vol. 20, n. 2, p. 39-71. https://doi.org/10.5944/educxx1.19031.

44. SIERRA-LLORENTE, José; PALMEZANO-CÓRDOBA, Yenerys; ROMERO-MORA, Boris. Causas que determinan las dificultades de la incorporación de las TIC en las aulas de clases. Revista Panorama, 2018, vol. 12, n. 22, p. 32 - 41. http://dx.doi.org/10.15765/pnrm.v12i22.1064

45. TAPIA, Carolina. Tipologías de uso educativo de las Tecnologías de la Información y Comunicación: una revisión sistemática de la literatura. EDUTEC. Revista Electrónica de Tecnología Educativa, 2020, vol. 71, p. 16-34. https://doi.org/10.21556/edutec.2020.71.1489.

46. TRAVER-MARTÍ, Juan; FERNÁNDEZ-BERRUECO, Reina (2016). Construcción y validación de un cuestionario de actitudes hacia la innovación educativa en la universidad. Perfiles Educativos, 2016, vol. XXXVIII, n. 151, p. 86-103. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-26982016000100086

47. UNICEF. Buenas prácticas para una pedagogía efectiva. Fondo de Naciones Unidas para la Infancia, UNICEF. 2005. http://archivos.agenciaeducacion.cl/Guia_de_apoyo_para_profesores_UNICEF.pdf.

48. VALDIVIA, Sylvana. Retroalimentación efectiva en la enseñanza universitaria. En Blanco & Negro, 2014, vol. 5, n. 2, p. 20-24. https://revistas.pucp.edu.pe/index.php/enblancoynegro/article/view/11388

49. VALENCIA-ARIAS, Alejandro; BENJUMEA, Martha; MORALES, Daniela; SILVA, Alejandro; BETANCUR, Piedad. Actitudes de docentes universitarios frente al uso de dispositivos móviles con fines académicos. Revista Mexicana de Investigación Educativa, 2018, vol. 23, n. 78, p. 761-790. http://www.scielo.org.mx/scielo.php?script=sci_abstract&pid=S1405-66662018000300761&lng=es&nrm=iso

50. VÁSQUEZ-CANO, Esteban; SEVILLANO, Luisa; DE PEDRO, Francisco. Análisis de propuestas de innovación educativa en el prácticum del grado en pedagogía. Contextos educativos, 2019, vol. 23, p. 11-29. http://doi.org/10.18172/con.3555

51. VELOSO, Álex. Incorporación de las TIC en el sistema educacional chileno. Revista Educación y Tecnología, 2012, vol. 1, p. 151-164. https://revistaschilenas.uchile.cl/handle/2250/92

52. VERA-SAGREDO, Angélica; CONSTENLA-NUÑEZ, Jaime; JARA-COATT, Pilar; LASALLE-CORDERO, Adrián. Emprendimiento e innovación en educación técnico profesional: percepción desde los docentes y directivos. Revista Colombiana de Educación, 2020, vol. 1, n. 79, p. 85-108. https://doi.org/10.17227/rce.num79-8605

53. VÉRTIZ-OSORES, Ricardo; PÉREZ-SAAVEDRA, Segundo; FAUSTINO-SÁNCHEZ, Miguel; VÉRTIZ-OSORES, Jacinto; ALAIN, Lineth. Information and Communication Technology in Primary School Students within the Framework of Inclusive Education at a Special Basic Education Center. Propósitos y Representaciones, 2019, vol. 7, n. 1, p. 83-94. https://doi.org/10.20511/pyr2019.v7n1.266.

54. VIVES-VARELA, Tania; VARELA-RUIZ, Margarita. Realimentación efectiva. Inv. Ed. Med., 2013, vol. 2, n. 6, p. 112-114. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-50572013000200008

55. ZABALZA, Miguel. Innovación en la enseñanza universitaria. Contextos Educativos, 2003- 2004, vol. 6, n. 7, p. 113 – 136. https://publicaciones.unirioja.es/ojs/index.php/contextos/article/view/531/0