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CONTENT VALIDITY OF THE QUESTIONNAIRE ON LEARNING EXPERIENCES ASSOCIATED WITH THE USE OF DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGIES BY UNDERGRADUATES

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ABSTRACT: This work aims to analyze the validity of the content of the structured questionnaire for identifying learning experiences associated with the use of digital information and communication technologies (DICT) by undergraduates. It also integrates the pilot study carried out within the framework of a larger study on the construction of learner identity through participation in the learning activities mediated by the TDIC. The content validity allows us to analyze the adequacy of the data collection instruments, taking into account the theoretical concepts proposed for evaluation. The methodology of the work is carried out in two phases. In the first phase, the structured questionnaire is elaborated according to institutional reports on the use of the DICT and the results of research on the theoretical concepts of interest that have been published in scientific databases. The second phase consists of carrying out an expert judgment for evaluating the instrument. The group of judges is comprised of 10 people: 5 professionals that have knowledge of the subject and 5 undergraduates from several courses to give us relevant information on the clarity of the instrument. The participants are given a document describing the questionnaire (purpose, theoretical concepts and dimensions of interest) and an instrument to assess each of the items within it. The indices of agreement between the judges are calculated for the questionnaire in totality and for the dimensions studied, and individual interviews are conducted to discuss controversial questions. We find an acceptable index of agreement (higher to 80%) and consider that the participation of the judges from the profile specified has the potential to give us relevant information for constructing the structured questionnaire for use in research.

Key words: Content validity, structured questionnaire, digital information and communication technologies (DICT).

INTRODUCTION

This paper aims to analyze the validity of the content of the structured questionnaire for identifying learning experiences associated with the use of digital information and communication technologies (DICT) by undergraduates. The analysis of the content validity of the instrument integrates the pilot study of larger research on the learning experience impact associated with DICT-mediated activities on learner identity construction.

From the perspective of social constructivists and situated learning, interest in studying how undergraduates construct meaning about themselves as learners through participation in learning activities that take place in several DICT-mediated contexts leads us to propose a mixed method research design which provides qualitative and quantitative procedures for data collection.

This work integrates the first part of the research that refers to the quantitative study on the uses of DICT in various contexts and the learning experiences associated with them. However, beyond the aim of generating data to support understanding of the subject of study, this moment has an en goal of offering relevant information about participants as a way to select a subsample for the second part of the research, which will focus on learning experiences and learner identity construction from a qualitative perspective.

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Subjective experiences are understood as individual experiences in situations in which the subject is learning something, and, from our theoretical approach, we study it through the discursive re-construction of the experience lived in the real or imaginary field (Falsafi, 2011).

With this in mind, we want to be clear that the aim of the questionnaire is not to cover the theoretical and methodological complexity of the subjective learning experiences of the students in several DICT-mediated contexts. The idea is that the instrument provides information about some elements that we consider as constitutive of learning activities from the our theoretical mark (Coll et al, 1992; Colomina et al., 2001; Falsafi, 2011) and aspects that seem to be important in the preliminary approach to subjective learning experiences of undergraduates with a quantitative focus.

In this way, we think that the data collected through the questionnaire, beyond just the opportunity to select a diversified sub-sample with respect to experiences with DICT, allows us to identify elements to be explored through in-depth interviews studying learner identity construction (Aldana, Campos & Valdés, 2015).

From the theoretical mark that we adopt, consider the learner identity (LI) as the recognition of oneself as a learner and the ability to learn in specific contexts and conditions (Falsafi & Coll, 2010). These meanings about oneself are constructed by people through participation in learning activities that take place both inside and outside of formal educational contexts (Lave & Wenger, 1991). Therefore, we understand education as a social practice based on the ideas of Leontiev (1979) about the activity theory, involving the socialization and individualization processes through the construction of shared meanings, motives and goals of the individual participation in social practices, the role of emotions and the presence of others in the activity.

To study learner identity construction through participation in several contexts, consider DICT as an important social-cultural artefact present in the different contexts of activities in which people move. In addition, we assume that the widespread use of DICT has enabled the setting of new social practices, the transformation of communication patterns, and that it drives discussion about what learning means and the development of citizens in the information society (Coll, 2013).

In this manner, we consider that the changes in the communication processes and cultural exchanges generated by DICT development within the framework of the information society (Castells, 1999) increase opportunities for learning both inside and outside of formal educational contexts. Thus, we think that the uses of DICT in the many kinds of tasks realized daily make it possible for people to participate in activities which potentially promote learning experiences and, in this case, not exactly about curricular contents, but on other subjects of individual interest.

Much research has focused the uses of DICT in general daily activities or in specific learning situations in both formal and informal educational contexts (Coll, 2004; Coll & Engel, 2014; Coll, Rochera, Mayordomo & Naranjo, 2007; Erstad, Gilje & Arnseth, 2013; Eynon, 2009; Ito et al., 2008; Mauri & Clarà, 2012; Sefton-Green, 2004).

Reports on the general uses of DICT by the worldwide population have shown an increase of 8% in internet users over the last year (España, 2014). With respect to the European continent, it is estimated that broadband services are available to 95,2% of population and that people use the internet for: sending e-mails (67%), searches for information on property and services (59%), shopping online (47%) and access to professional and social networks (45%). The uses of the internet by the Spanish population is generally similar to that of other Europeans, and the least-used activities for both groups are video calls and search for employment.

Data on the Spanish population's access to and use of DICT show the growth in the purchase of mobile phones, smartphones and tablets, as well as an increase in the use of laptops, reaching 46%. One particularly interesting piece of data for our research is the increase in the number of the homes with internet access (reaching 69,9%) and the site of the home as the main setting in which users access the internet (87,1) as compared with other contexts. At home, the users access internet primarily from laptops (68,4%) and desktops (66,6%).

This data indicates that the activities carried out by using several devices are influenced by the kind of context in which the users connect to the internet, and this is verified by the use of social networks and the downloading of content, which is more practiced at home than in other contexts, especially when compared with the workplace and school or university.

As for the uses of DICT by undergraduates (España, 2006), around 86% use searches, 85,5% send e-mail, 64,4% read the news and 53,4% use it to access public administration websites. The least common activities are video calling (7%), shopping (8,9%) and online games (8,5%).

The Spanish report offers information relevant to our research, considering that it shows that 37,6% of undergraduates have commented on the use of DICT as a tool in aiding them to study, as well as the influence of the different kinds of contexts in which they connect to the internet for activities that help them to study: school (56,5%), public settings (38%), library (49,6%), at home (41,5%), friends and family's home (39,3%), at the workplace (33,4%), cybercafé (36,9%) and others (34,7%).

Research carried out in the United Kingdom (Kirkwood, 2008; Selwyn, 2008) shows that the searching for information is also an activity done often by undergraduates, and that information searches on academic subjects are specifically verified more than searches for other kinds of contents (Selwyn, 2008).

We think that the activity of the academic information search can be a study aid and can potentially generate learning experiences. Significant differences are identified between the frequency of access to the internet for academic information searches according to the context in which undergraduates connect to the internet: there is a higher frequency mentioned by students that access the internet from their own devices, especially a desktop or a laptop than in students who access the internet from shared devices in public settings, such as the library or a computer lab at the university.

Gender and different areas of study are important variables that influence the use of the internet for academic information searches: women stand out when compared to men; and undergraduates of medicine and social sciences stand out more than students of architecture and arts (Selwyn, 2008).

From the idea that the academic information search as well as the several DICT-mediated activities are potentially able to generate the learning experiences, it is very important to clarify complex factors also have an influence, such as the kind of devices used, the quality of the connection in various contexts and the different social demographic profiles that characterize the populations of different countries (Bolliger & Wasilik, 2009; Kirkwood, 2008; Macleod et al., 2002; Marriot, Marriot & Selwyn, 2004; Tella & Mutula, 2008).

Our main aim in this work is to construct a powerful instrument to collect data that will help us to understand the learning experiences associated with the use of DICT in different contexts, as well as the interest of analysing the content validity of the questionnaire from the theoretical mark adopted and the various research projects on the use of this technology by undergraduates. In this way, we understand that the content validity allows us to make the necessary adjustments to the instrument, considering the theoretical concepts focused on and the clarity of the language, taking into account the characteristics of the public to which it is addressed (Alexandre & Coluci, 2011; Escobar-Pérez & Cuervo-Martínez, 2008; Rubio et al., 2003).

METHODS

In this paper, we analyse the content validity of the Portuguese version of the "Questionnaire on the use of digital information and communication technologies and learning activities", addressed to Brazilian undergraduates, through a panel of experts. We consider a panel of experts to be an effective way of evaluating the content validity of the instruments largely employed in the research of Psychology (Escobar-Pérez & Cuervo-Martínez, 2008).

Participants

In the literature, the studies do not show agreement on the number of judges needed to evaluate the instruments (Escobar-Pérez & Cuervo-Martínez, 2008). A group of two people considered to be experts on the research subject is recommended, with the end goal of analysing the theoretical relevance; however, if possible, it is also important to add other people that are not theoretical experts on the subjects and can contribute in improving the linguistic clarity of the instrument, taking into account the public to whom it is addressed.

In the interest of achieving both purposes, in this paper, a group of 10 people have participated: 2 professionals from a Spanish university that have experience with research and DICT-mediated teaching; 3 teachers and researchers from one of Brazil's public university with experience in teaching with DICT-mediated activities; 5 undergraduates from different degrees (Law, Architecture, Product Engineering, Psychology and History).

Procedures

The analysis of the content validity has been led through three phases that have instrument construction and panel of experts using quantitative and qualitative procedures as end goals (Polit & Beck, 2006). All three phases will be described below.

Phase 1: Construction of the Instruments

This phase involves the construction of the “Questionnaire on the use of digital information and communication technologies and learning activities” (originally called “Questionario sobre o uso das tecnologias digitais da informação e comunicação”), addressed to Brazilian undergraduates, as well as the “Instrument for the assessment of the Questionnaire on the use of digital information and communication technologies and learning activities” for its evaluation by the experts.

It is very important to reiterate that the main goal of “Questionnaire on the use of digital information and communication technologies and learning activities” is to provide relevant information on the learning experiences of undergraduates associated with the use of DICT in various activity contexts. In addition, the main goal of “Instrument for the assessment of the Questionnaire on the use of digital information and communication technologies and learning activities” is evaluate the instrument addressed to undergraduates with regard to the theoretical relevance and linguistic clarity.

Both instruments were made in the online version made through the computer tool called Limesurvey (version 2.05) that allows us to create inquiries online.

Phase 2: Panel of Experts

This phase consists of the analysis of the two instruments by the judges in agreement as previously described: the Questionnaire on the use of digital information and communication technologies and learning activities” addressed to undergraduates and the “Instrument for the assessment of the Questionnaire on the use of digital information and communication technologies and learning activities” that the participants should answer.

The participants were contacted previously, we explained how they could help with our research by participating in the process of the analysis of the content validity of the instrument. Following that, we sent an e-mail with the links to access the online versions of both instruments.

Before the presentation of the items to the judges, the necessary instructions for replying to the instrument are given, as well as explanations about the questionnaire being analysed (the main aims, theoretical concepts and dimensions of the interest, assistance and application conditions).

The data was processed through Limesurvey (Version 2.05). For data analysis, it calculated the agreement index among the judges by using the following equation, in which $\sum A$ is the sum of the agreements obtained among the judges and $\sum D$ is the sum of the disagreements:

$$\frac{\sum A}{\sum A + \sum D} \times 100.$$

As data analysis criteria, 80% was adopted as the minimum acceptable value for the index of agreement among the judges (Polit, Beck & Owen, 2007). Moreover, in addition to the questions with values below 80%, we intend to reformulate all questions that have not been evaluated as “Very relevant” and “Very clear”, taking the qualitative data (comments by participants in the instrument and interviews) into account.

Phase 3: Interviews to Agree on Questions

Individual interviews were conducted with the judges to reach an agreement on the questions with values below 80%, trying to improve the instrument and to adjust it to the proposal of the research. As before, the interviews were about the questions that obtained index of agreement rates of below 100% among the judges, taking on the comments and advice identified in the qualitative analysis of the instrument under evaluation as key points for discussion.

RESULTS and FINDINGS

Construction of the Instruments

The construction of the “Questionnaire on the use of digital information and communication technologies and learning activities” is based on the assumption that the use of DICT in learning activities affects the organisation of the joint activity (Coll, Mauri & Onrubia, 2008). In effect, from the individual's learning experiences associated with learning activities, a source of meanings for the construction of the learner identity comes about (Coll & Falsafi, 2010).

Beyond the theoretical exploration explained, the elaboration of the instrument was guided by the systematic revision of the articles and reports currently published on the use of DICT in different contexts by participants with varying profiles (Centro de Estudos sobre as Tecnologias da Informação e Comunicação [CETIC.br], 2013; CETIC.br, 2010; Coll, Mauri & Onrubia, 2008; España, 2015; España, 2014; Ito et al., 2008; Kirkwood, 2008; Marriot, Marriot & Selwyn, 2004; Selwyn, 2008; Tapia, 2009).

From the above-mentioned purpose and based on the perspective of social constructivists and learning as situated, the theoretical approach to understanding activities and learning experiences (Coll et al. 1992; Colomina et al., 2001; Falsafi, 2011), the items of the questionnaire have been set out to obtain data on the following aspects or dimensions: social demographic profiles (gender, college career, face-to-face teaching or distance education, university campus or centre of distance education, place of birth and current residence, as well as living situation); the use of DICT (devices used for access, frequency of use and the various contexts in which various devices are used); DICT-mediated activities in which the undergraduates participate (characteristics of activity, the contexts in which they take place, aims, learning experiences associated with them, contents of learning and emotional impact of the activities); DICT as tools for learning (characteristics of DICT to support learnings).

The structured questionnaire is made up of 57 items that cover the social demographic profile of the participants and all of the previously cited dimensions. The instrument that presented to the judges ("Instrument for the assessment of the Questionnaire on the use of digital information and communication technologies and learning activities") was made from the organisation of the items in a table in which the participants value the theoretical relevance and linguistic clarity of each item presented, attributing a number on a scale of 1 to 3. With regard to the theoretical relevance, it is possible to select from three options: 1 – Not relevant; 2 - Little relevant; 3 – Very relevant. In reference to clarity, there are the following choices: 1 – Not clear; 2 – Little clear; 3 – Very clear.

Furthermore, for this quantitative value, the instrument is made up of a part in which the participants should comment on the reasons that justify their answer to each item, especially in the cases that they think that the items aren't "very relevant" and "very clear" (Option 3 in the scale of value).

Analysis of the instrument by experts

In accordance with procedures, was used an equation to calculate the index of agreement among judges. The index of agreement among the judges was calculated for the instrument in general, for the three dimensions analysed and for each individual question. In this way, we find the index of agreement to be 90,33% for the total questionnaire and the following values for the dimensions analysed: 86,66% for the use of DICT; 90,67% for DICT-mediated activities in which undergraduates participate; 100% for DICT as tools for learning.

The data analysis showed values considered acceptable for the content validity of the questionnaire in general and for the dimensions analysed, taking on the data analysis criteria designated which is 80% of agreement (Polit, Beck & Owen, 2007). However, analysing the index of agreement among the judges for each question separately, we find values below 80%, which are shown in Table 1.

Table 1 – Questions With Inferior Values to 80%

Dimension	Question (In Original Language)	Index of Agreement (%)
The uses of DICT	Vídeo game	67,5
	<i>Ipod</i> , MP3, MP4	72,5
	<i>E-book</i>	75
	Câmera digital	72,5
	Instituições sociopolíticas (sedes de partidos, ateneu, etc.)	75
	Outros lugares (na casa de outras pessoas, local de trabalho, na rua, lojas, festas, viagens, bancos, restaurantes, <i>lan house</i> , etc.)	70
DICT- mediated activities		70
	Contactar e conhecer novas pessoas	70
	Participar de debates sobre	65

	temas políticos e sociais Tirar e editar fotos Utilizar folhas de cálculo	
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The qualitative analysis of the comments by participants has contributed important information to support the revision of the questions with the aim of improving clarity, taking into account the public to whom the questionnaire is addressed. Thus, we redraw the questions with index of agreement below 80% and, we then held individual interviews with the judges to reach an agreement on the changes introduced. In continuation, we talk about the process of the revision and reformulation of the questions and mention examples in Tables 2 and 3.

Redrawing of the Questions from the Interviews of Agreement among judges

The process of revision and reformulation of the items considered the contributions from the judges that indicated the need to add a brief description of the devices or examples to help the respondents identify them easily in daily activities. As follows, Table 2 demonstrates examples of the questions reformulated with the advice given by the judges.

Table 2 – Redraw of Question With Inferior Values to 80%

Dimension	Question (In Original Language)	Redraw (In Original Language)
The uses of DICT	Videogame <i>E-book</i> Tirar e editar fotos	Videogame (<i>Playstation, Nintendo Wii, etc.</i>) <i>E-book</i> (Leitor de livros digitais) Tirar e editar fotografias (<i>Instasize, Pic Collage, etc.</i>)
DICT- mediated activities	Utilizar folhas de cálculo	Utilizar folhas de cálculo (<i>softwares</i> con planilhas eletrônicas para dados numéricos, como o <i>Excel</i>)

In accordance with the procedures described, beyond the questions that have an index of agreement below 80%, the qualitative data analysis has considered all of the comments and advice from the judges for all of the questions, even though it has obtained acceptable achievement values. Table 3 shows examples of changes in these last cases.

Table 3 – Redraw of Questions With Superior Values to 80%

Dimension	Question (In Original Language)	Redraw (In Original Language)
The Uses of DICT	Diariamente (ao menos 5 dias por semana) Semanalmente (menos de 5 dias por semana)	Diariamente (uso igual ou superior a 5 dias por semana) Semanalmente (uso igual ou inferior a 4 dias por semana)
DICT- Mediated Activities	Bastante importante	Medianamente importante

The reformulation of the questions presented in Tables 2 and 3 demonstrates the importance of the procedure in improving the clarity of the questionnaire and the role that the analysis of content validity plays in the construction process of research instruments. The clarity and relevance of the questions can mark the boundaries between the adjustment of responses by participants (provided by the adequacy of the instrument) and the data collected that does not provide scientific information pertinent to the subject of study.

CONCLUSION

The analysis of the content validity of “Questionnaire on the use of digital information and communication technologies and learning activities”, Portuguese version addressed to Brazilian undergraduates, demonstrates the potential of the instrument for data collection about the subject of study. The comments and advice from the judges have led us to adjust items with the end goal of increasing its quality as an instrument of data collection to achieve the aims in both phases of the research. In addition to the relevance of the questionnaire constructed from a strong theoretical basis and the systematic analysis of several publications on the subject, it is very important to use procedures that can guarantee the understanding of the public to whom the instrument is addressed.

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