Assessing teachers and peer teacher students' perceptions of their motivations and participation impact in peer learning projects: the role of content analysis supported by WebQDA

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Abstract.

Introduction: According to literature review, the number of studies focusing on Computer-Assisted Qualitative-Data Analysis Software (CAQDAS) as well as on clear descriptions of how these tools can be used is still scarce. Besides this, despite the recognition of content analysis for its appropriateness to qualitative studies, several authors refer to ambiguity problems, mostly related to the subjectivity of the coding process, which may interfere with the assurance of the validity criteria of stability, reproducibility and accuracy.

Goals and methods: This study is predominately methodological and focuses on a segment of the results of a multiple case study, involving five peer learning projects, implemented in five Portuguese educational institutions; and on the reflection on the role of content analysis, as the chosen data analysis technique, and the support of qualitative analysis software WebQDA, particularly regarding the assurance of the validity criteria of reproducibility and accuracy. By means of a semi-structured interview and a survey by questionnaire, this study aims at assessing teachers and peer teacher students' perceptions of motivations to integrate the projects as well as of the contributions resulting from participation, regarding benefits and major challenges; and analyse the role of content analysis, supported by software WebQDA, in identifying these teachers and peer teacher students' convergent/divergent perceptions.

Results: Results show there is clear convergence of teachers and peer teacher students' perceptions regarding the three variables assessed, particularly as for participation benefits. It is also evident that teachers and peer teacher students' perceptions diverge in matters related to specificities of the role assumed in the projects. The contribution of software WebQDA was particularly significant regarding the transparency, structure and systematization facilitated.

Conclusions: Conclusions enhance the role of content analysis and of software WebQDA for promoting reflexive and in-depth analysis of the collected data and for assuring replication of the study.

Keywords: Multiple case study, Content analysis, CAQDAS, WebQDA, Peer learning projects.

1 Introduction

This study results from reflection on the methods used in a multiple case study that integrates the preliminary research stage of a project developed under Educational Design Research (EDR). It aims at promoting in-depth analysis of a segment of the results found, and presented in Carvalho and Santos (2020), based on the perceptions of the teachers and peer teacher students (PTS) inquired as well as on the use of content analysis, as the data analysis technique that stood out in the process, supported by qualitative data analysis software WebQDA.

According to Kaefer, Roper and Sinha (2015), the number of studies centered on Computer-Assisted Qualitative-Data Analysis Software (CAQDAS) as well as on clear descriptions of how data analysis tools can be effectively used is still scarce, which substantiates the relevance of studies implemented in this field. Simultaneously, and despite the grounded position of reference literature as for the appropriateness of content analysis to qualitative studies (Fraenkel, Wallen & Hyun, 2012; Kolbe & Burnett, 1991), namely to cases studies (Souza, Costa & Souza, 2015), possible ambiguity problems are pointed out (Costa & Amado, 2018; Fraenkel et al., 2012; Krippendorff, 1980; Lima, 2013), particularly regarding the subjectivity associated with the coding process (Fraenkel et al., 2012; Ghiglione & Matalon, 2001; Krippendorff, 2004; Lima; 2013). This fact may interfere with the assurance of the validity criteria established for content analysis, namely "stability", "reproducibility", and "accuracy" (Krippendorff, 2004, p.72), and affect the use of content analysis as a "transparent, public and verifiable" process (Lima, 2013, p.9).

The purpose of the study can, therefore, be segmented into the following goals: to assess teachers and PTSs' perceptions of PTSs' motivations to voluntarily integrate the peer learning projects in focus as well as of the contributions of participation for participants, in general, and for PTS, in particular, regarding benefits and major challenges; to analyse the role of content analysis, supported by software WebQDA, when identifying teachers and PTSs' convergent / divergent perceptions regarding similar matters as well as in the promotion of in-depth, critical and reflexive analysis and interpretation of data; to assess the role of software WebQDA in solving possible ambiguity problems resulting from content analysis procedures and in meeting the established validity criteria, in particular, reproducibility and precision (Krippendorff, 1980; Lima, 2013).

Two research questions were formulated based on the goals previously described: 1. *What are the matters according to which the inquired teachers and peer teacher students' (PTS) perceptions converge / diverge, regarding PTSs' motivations to integrate the selected projects as well as participation impact for participants, in general, and for PTS, in particular?*; and 2. *What is the role of content analysis, as the chosen data analysis technique, and of qualitative data analysis software WebQDA, in the process of assessing teachers and PTSs' perceptions?*

2 Assessing perceptions in educational context and analyzing data by means of content analysis supported by CAQDAS

The subsequent sections provide a theoretical framework of central topics related to the study, more specifically, peer learning, corresponding to the educational context of the selected sample – five peer learning projects, teachers and peer teacher students involved, and content analysis supported by CAQDAS, within the scope of the methodological aspects in focus in the study.

Based on social constructivism principles, peer learning is presented as a pedagogical approach that promotes the development of soft as well as technical skills and facilitates innovative experiences in educational contexts. The development of organizational criteria of peer learning delivery, operated over the last decades, is also highlighted for its relevance in addressing some of the challenges issued to the 21st century educational scene.

As for content analysis, besides a brief historical background on its use, in particular, in the educational field, advantages and disadvantages associated with the use of this data analysis technique are presented, based on literature review. According to the functionalities provided and the potential brought to the process of qualitative data analysis, especially, in the case of content analysis, CAQDAS are also presented, based on the position of reference authors on their strengths and weaknesses.

2.1 Peer learning and the 21st century educational scene

Teaching and learning in the 21st century ought to involve the creation of opportunities that may trigger learners' ability to be co-creators of their learning process and hereby develop not only technical but also soft skills, considered fundamental in educational and labor contexts all over life (Union, 2018).

Based on social constructivism principles like collaboration and communication between peers, cooperation and knowledge sharing in a safe and trustworthy environment (Stigmar, 2016; Topping, 2005), peer learning is a student-centered approach that gives teachers and learners the chance to play new roles, such as managing and monitoring educational activities, in the case of teachers; and teaching and collaborating, in the case of learners (Reigeluth, 2016). From the interaction between peer teacher students (PTS) and peer learners, outcomes such as the promotion of learners' autonomy,

creativity and responsibility for the learning process as well as the strengthening of affective bonds are expected (Falchikov, 2001; Topping, 2005).

According to Topping (2005), the evolution of this educational practice results from the attention given to organizational variables of peer learning delivery, segmented into thirteen dimensions, among which the status, the role of participants, the context, the nature and goals of the tasks, learners' proficiency level, their motivation and institutional support should be highlighted. The potential of peer learning is grounded in evidence-based facts that reinforce the benefits resulting from participation in peer learning programs, particularly under the cognitive, affective, and social dimensions (Duran, 2016; Stigmar, 2016), which also substantiates its relevance, as a pedagogical approach, to addressing current challenges of the educational scene.

2.2 The use of content analysis supported by CAQDAS

In education, the use of content analysis is historically associated with the inspection of textbooks of different origins in order to check for "sexual, racial, and national prejudices" or to assess "the readability and reading interest" of their content (Krippendorff, 1989, p.405). Fraenkel et al. (2012, p.479) refer to the wide applicability of content analysis, among other contexts, when the purpose is to "show how different schools handle the same phenomena differently", "to infer attitudes, values, and cultural patterns in different countries", and "to gain a sense of how teachers feel about their work".

Among the advantages of content analysis use, emphasis is put on the following features: its unobtrusive character (Fraenkel et al., 2012; Kolbe & Burnett, 1991), particularly important when the goal is to analyze communication, for allowing the researcher "to observe without being observed" (Fraenkel et al., 2012, p.488); replication of the procedures (Fraenkel et al., 2012), if implemented under clearly established validity criteria; and its adaptability and flexibility to other more direct and objective research methods that it may complement (Fraenkel et al., 2012; Kolbe & Burnett, 1991).

As for disadvantages, the fact that content analysis is "limited to recorded information" (Fraenkel et al., 2012, p.488) as well as that the reliability of the coding process may be easily open to question, based on the subjectivity associated with the coding process (Fraenkel et al., 2012; Krippendorff, 2004; Lima, 2013), are highlighted. Validity criteria like "objectivity, quantification, sampling, and reliability" (Lima, 2013, p.8) are, therefore, perceived to be of fundamental importance to assuring that the process associated with content analysis is "transparent, public, and verifiable" (Lima, 2013, p.9) and that the three validity criteria of "stability, reproducibility, and accuracy" (Krippendorf, 1980, p.72) are met.

Currently, analyzing data of qualitative nature implies the reduction and treatment of vast amounts of information, in more and more diverse formats, which issues challenges to researchers regarding the need to attend to "organization, structure, and reduction" (Costa & Amado, 2018, p.16-17) and keep the quality of the inferences made. With the acknowledgement of the education community, over the last thirty years (Souza, Costa & Souza, 2015), and with the introduction of advanced functionalities like the Cloud, Big Data, and mobile technologies (Costa & Amado, 2018, p.20),

Computer-Assisted Qualitative-Data Analysis Software (CAQDAS) brought accuracy, systematicity, consistency, and transparency to the process of data analysis, facilitating more efficient management and treatment of large amounts of information as well as the collaborative work of national and international research networks (Costa & Amado, 2018; Costa & Reis, 2017; Kaefer et al., 2015; Souza et al., 2015).

The strengths of CAQDAS are visible in qualitative data analysis software like WebQDA, created in Portugal, and highlighted by Costa & Amado (2018) for its simplicity in terms of usage and adaptation to multiple research designs, integrating different types of data of qualitative nature and promoting synchronous and/or asynchronous as well as autonomous and/or collaborative work. The same authors (2018, p.20) emphasize that the main challenges issued to CAQDAS are connected to three domains, namely, "automated and integrated transcription of multimedia data"; "optimization of online collaboration processes"; and "automated and integrated code processing".

3 Methods

The following sections provide detailed characterization of this multiple case study sample, of the data collection tools used as well as of the procedures related to data analysis, implemented with the support of software WebQDA.

As for the study sample, information on the five peer learning projects in focus is provided as well as on the participants inquired, namely peer teacher students (PTS) and the teachers assuming the coordination of the projects.

Regarding the two data collection tools created and validated for the study, more specifically, a semi-structured interview and a survey by questionnaire, focus is placed on the purpose of the tools, their structure and the questions selected from both tools to be analyzed and paired for the purpose of data triangulation.

Due to its relevance within the scope of the study, content analysis is presented in conjunction with the support provided by qualitative data analysis software WebQDA. A sequenced plan of the main stages and subsequent tasks related to the process of collection, treatment, and interpretation of data is provided. Emphasis is also put on the procedures according to which that support was of fundamental importance to assuring that the validation criteria of reproducibility and accuracy would be met, and that the teachers and PTSs' convergent/divergent perceptions would be more effectively assessed.

3.1 A multiple case study: sample characterization

This multiple case study involves five peer learning projects, implemented in four basic & secondary schools and a higher education institution, located in four Portuguese districts, namely Vila Nova de Gaia, Aveiro, Leiria and Santarém. Purposeful sampling was the technique used to select the projects and among the selection criteria described in Carvalho and Santos (2020, p.246), emphasis is placed on the fact that these are "cross level peer learning programs" and on "voluntary participation of PTS in the

projects". The sample includes eight teachers in charge of the projects and sixty- three PTS who participated in the same projects.

Table 1 provides the total number of participants per project as well as the course attended by PTS when they participated in the projects. Secondary education courses were attended by PTS in four of the projects and only in the case of project C were PTS former students of the curricular unit of Multimedia Laboratory 4 (LabMM4), which is part of the curriculum of a Bachelors' degree course in New Communication Technologies of a Portuguese higher education institution.

All participants or their legal representatives, in the case of students under eighteen years old, signed a declaration of informed consent prior to participating in the study.

Table 1. Sample identification.

Peer learning project	Number of teachers	Number of peer teacher students	Course attended by peer teacher students
A	$n = 2$	$n = 6$	Scientific-Humanistic courses
B	$n = 2$	$n = 10$	Scientific-Technological courses
C	$n = 1$	$n = 20$	LabMM4 (former students)
D	$n = 1$	$n = 13$	Scientific-Humanistic and Scientific-Technological courses
E	$n = 2$	$n = 14$	

Own source

3.2 Data collection tools

Based on the purpose of the study, two data collection tools were created and validated by experts, namely a semi-structured interview, designed for the teachers, and a survey by questionnaire, to be answered online by PTS. Data collection happened between December 2018 and January 2019. The interviews were held individually in the schools the projects belonged to.

As mentioned by Carvalho and Santos (2020, p.247), the purpose of the interview was to "gather knowledge of the selected projects regarding the human and organizational variables involved" and "promote teachers' reflection on the experience of having organized and participated in the projects as well as on the contributions resulting from it for the educational community, in general, and for PTSs' academic performance, in particular". In terms of structure, the interview has four sections, namely the introduction, purpose of the project, human and organizational variables, and results. Within the scope of this study, the questions selected belong to the sections "human and organizational variables" and "results" and are listed in Table 2.

The survey by questionnaire was created on Google Forms and answered by PTS online. As mentioned by Carvalho and Santos (2020, p.248), the purpose of this tool was "to identify features of the inquired PTSs' profile"; "get to know their motivations to voluntarily join and participate in the projects over time"; and "find out their perceptions of the experience resulting from participation in the projects and its contributions to their academic performance". As for its structure, the survey by questionnaire has four sections, namely the introduction, sociodemographic data, initial motivation, and

participation in the project, including fifteen open-ended questions and eight closed-ended questions. Three open-ended questions were selected to be analyzed and paired with the questions from the interview, whose content relates to similar matters.

Table 2. Questions from the interview and the survey by questionnaire, whose content was paired and relates to PTSs' initial motivation and contributions of participation in the projects.

Data collection tool	Question	Section
Interview	1. According to your perception, what motivated peer teacher students (PTS) to join the project?	Human and organizational variables
	2. What were the main challenges faced by PTS all over the project?	
	3. What were the main contributions for PTS resulting from participation in the project? (considering the following matters: motivation for learning; motivation for school; collaborative work and communication between peers; ability to revise, organize and share information; other relevant contributions you may want to add)	Results
	4. Can you briefly describe the impact of the project on peer learners and on the remaining educational community?	
Survey by questionnaire	1. What motivated you to voluntarily join the project?	Initial motivation
	2. What were the major challenges you faced all over participation in the project?	Participation in the project
	3. What were the main benefits resulting from your participation in the project?	

Own source (translated from original language of the data collection tools)

3.3 Data analysis

The content of the questions listed in Table 2 was analyzed by means of the technique of content analysis and the process was supported by qualitative data analysis software WebQDA. It should be mentioned that the data presented in this study correspond to a specific part of the data collected and analyzed within the scope of this multiple case study, in which content analysis, supported by software WebQDA, assumed a significant role among the data analysis techniques used, as mentioned by Carvalho and Santos (2020). For this reason, a sequenced plan of the main stages and subsequent tasks related to the process of collection, treatment, and interpretation of data is provided in Table 3, as previously presented by Carvalho and Santos (2020, p.249), and according to which the role of software WebQDA was of fundamental importance to accomplishing the goals established for the process of data analysis.

Table 3. Procedures of software-assisted content analysis implemented with the support of WebQDA.

Procedure	Tool(s)	Additional information
1. Transcribing the content of the interviews	*Transcribe*[1]	8h of audio recording
2. Creating a documentary corpus	*Microsoft Word*	Content of the interview (I.) and of part of the survey by questionnaire (Q.)
3. Importing the documentary corpus into WebQDA	WebQDA: "Internal sources"	8 files (1 per I.) and 1 file with sociodemographic data and content of open-ended questions of the Q.
4. Pre-reading the documentary corpus		Initial deductive coding: based on pre-established themes, categories, and subcategories
5. Beginning the coding process	WebQDA: "Coding"	Creation of "Code trees"
6. Rereading the documentary corpus and repeating the coding process		Insertion of emerging categories under the functionality "tree codes"
7. Adding descriptors	WebQDA: "Descriptors"	Inclusion of sociodemographic data from the documentary corpus of the Q. (age, gender, school grade, course)
8. Implementing the data query process:	WebQDA:	
a) Most frequent word count;	"Most frequent words"	Per project; per tool; I. and Q. pairing (20 and 50 most frequent word count);
b) Identification of indicators;	"Code search"	Generating 64 codes based on the documentary corpus of the I..;
c) Creation of matrices.	"Matrices"	Generating 20 matrices with sociodemographic data and categories of the documentary corpus of the Q.
9. Visualizing and interpreting the analyzed data:	WebQDA:	

[1] https://transcribe.wreally.com/

a)	Word frequency lists and word clouds;	"Most frequent words"	Exported from WebQDA in pdf and/or picture format;
b)	Counting the references associated with the indicators identified;	"Tree codes" functionality	Consulting the "tree codes" map;
c)	Data pairing and interpretation;	*Microsoft Excel*	Creating a table based on the categories/subcategories and indicators resulting from content analysis of the I. and Q. regarding similar matters;
d)	Interpreting data provided by the matrices generated.	"Matrices"	Exported from WebQDA in pdf format.

Own source (translated from Carvalho and Santos, 2020, p.249)

The use of software WebQDA sought to assure that the validity criteria reported in literature review, in particular, "objectivity, systematicity and generality" (Ghiglione & Matalon, 2001, p.208) would be met. The determined coding units were the semantic level and the sentence (Ghiglione & Matalon, 2001). Particular emphasis laid on the scope "what was said" (Costa & Amado, 2018) by each of the inquired participants regarding the same matters, and as for the equivalence criteria, focus was placed on the context of inquiry and the reference framework of the participants – in the case of the teachers, all responsible for managing the peer learning projects, and, in the case of PTS, all students or former students who were still participating or had participated in the projects less than a year before. In order to control subjectivity, the criterion of stability was followed (Krippendorff, 1980), which implied the rereading of the documentary corpus and the repetition of the coding process within a time span of five months.

Regarding the procedures related to the assistance provided by software WebQDA within the scope of this study, also described by Carvalho and Santos (2020, p.251), emphasis should be put on the following steps: importing the documentary corpus into the "internal sources"; the inclusion of the themes, categories and subcategories of analysis, previously established in the corpus, and later, the insertion of emerging categories and indicators resulting from content analysis; the use of the "data query" section, within the scope of which functionality "code search" must be highlighted for having facilitated the process of category and/or subcategory identification in the corpus of the interview, due to its length and to the detail of the data collected.

According to the purpose of this study, in-depth analysis of the data collected was sought by means of pairing the themes, categories and/or subcategories of analysis of the interview and of the questionnaire with stronger evidence of meaning correspondence, and, simultaneously, by means of providing an overview of central aspects related to the implementation of peer learning projects, such as PTSs' voluntary participation and motivation to integrate the projects as well as the contributions resulting from it, either in terms of main benefits or of major challenges faced. Hence, and as mentioned by Carvalho and Santos (2020, p.253), two themes identified in the corpus of the

interview, namely "human and organizational variables" and "results" were found to correspond to the themes "initial motivation" and "participation in the project" identified in the corpus of the questionnaire. Among these, the subcategories related to PTSs' motivations to voluntarily integrate the projects were the ones according to which stronger evidence of correspondence was found between the content analyzed in both corpora.

4 Results

4.1 Peer teacher students' motivation to voluntarily integrate the peer learning projects

Based on the teachers and peer teacher students' (PTS) perceptions regarding PTSs' motivations to voluntarily integrate the peer learning projects in focus, seven different groups of indicators were identified, as listed in Table 4.

Out of the seven groups, correspondence between the teachers and PTSs' perceptions was found evident in four of those groups, more specifically, "humanist/humanitarian reasons", "academic achievement and performance of a new role", "recreational interests", and "influence of others". Among these, emphasis laid on the first two groups mentioned, both for the considerably higher number of references from teachers and PTS of all projects and for the general consensus identified regarding motivational reasons like "the joy of helping others" and "the willingness to give the support once received back to others", among the "humanist/humanitarian reasons"; and the joy "to help others" and "to contact with younger schoolmates", "curiosity" and "willingness to learn", exemplified, according to PTSs' perceptions, by the "development of didactic competences" and "the opportunity to revise content", within the scope of "academic achievement and performance of a new role". Motivational reasons related to "recreational interests" and "influence of others" were also mentioned by teachers and PTS, despite being less representative of the general perceptions of the sample.

No correspondence was found between teachers and PTSs' perceptions regarding motivational reasons related to "characteristics of the projects", "personal development", and "promotion of someone else's academic achievement", since only PTS referred to that.

Table 4. Indicators resulting from content analysis of the corpora analyzed regarding peer teacher students' motivation to participate in the projects.

	Teachers' perceptions	**Peer teacher students' perceptions**
Nature of the motivational reasons	Humanist/humanitarian reasons	
Indicators	- Joy of helping others/altruism	- Joy of helping others/volunteering - Joy of giving the support once

	- Willingness to contribute to peer learners' academic achievement - Reciprocation of the support once received	received back to others - Willingness to contribute to a better future - Willingness to continue with the project
Nature of the motivational reasons	Academic achievement and performance of a new role	
Indicators	- Assuming a new role at school - Curricular improvement - Willingness to learn - Curiosity	- Joy of teaching younger schoolmates - Joy of interacting with younger schoolmates - Opportunity to revise content - Curiosity - Possibility of finding methods to clear doubts - Possibility of sharing knowledge
Nature of the motivational reasons	Characteristics of the project	
Indicators	----------	- Nature and potential of the project - Informal atmosphere and context of the peer learning sessions - Interaction between peers and facilitated sharing of doubts - The team and their features
Nature of the motivational reasons	Personal development	
Indicators	----------	- Possibility of learning new things and of sharing knowledge - A new experience - A personal challenge
Nature of the motivational reasons	Recreational interests	
Indicators	- Opportunity to spend free time doing something interesting - Willingness to be part of an innovative initiative	- Interesting way of spending free time
Nature of the motivational reasons	Promotion of someone else's academic achievement	
Indicators	---------	- Joy of promoting change in someone's life - Joy of motivating others to learn
Nature of the motivational reasons	Influence of others	

Indicators	- Influence of teachers - Influence of other people's opinion on the project	- Willingness to take up a challenge issued by a teacher

Own source (translated from original language of the data collected)

4.2 Contributions of participation in the peer learning projects

Major challenges faced by peer teacher students

Regarding the major challenges faced by peer teacher students (PTS), indicators whose scope belongs to eight different groups were identified, as listed in Table 5.

Teachers and PTSs' perceptions were found to converge as for five out of those eight groups, more specifically regarding "effective communication and appropriate choice of instruction methods", "impact on peer learners' attitudes", "peer teacher students' knowledge mastery", "availability and consistency over time", and "logistical issues". In this scope, the first group mentioned is the one that stands out for the consensus identified, particularly among PTS, and especially regarding the "choice of adequate strategies and terms for the content shared and for promoting its comprehension", "clarifying peer learners' doubts", and "teaching adequately". These aspects were more generically identified based on teachers' perceptions regarding PTSs' ability to "implement activities of peer learning sessions". Among the remaining groups of indicators, emphasis should be placed, for the unanimity identified, on the "impact on peer learners' attitudes", more specifically on "keeping up with their motivation and concentration levels", which is perceived by the teachers as PTSs' difficulty in "promoting behavioral change".

In terms of challenges related to peer learners' "attitudes/behavior", "learning difficulties" and "interpersonal relationships", no convergence of perceptions was found, since only PTS referred to matters within this scope. Among these, emphasis should be put, for its representativeness, on the group of indicators related to "peer learners' attitudes/behavior", in particular on these students' "lack of motivation".

Table 5. Indicators resulting from content analysis of the corpora analyzed regarding the major challenges faced by peer teacher students all over participation in the projects.

	Teachers' perceptions	**Peer teacher students' perceptions**
Scope of the challenges	Effective communication and appropriate choice of instruction methods	
Indicators	- Communicating effectively - Implementing activities of the peer learning sessions	- Fear of being unable to share content appropriately - Choice of adequate strategies and terms for the content shared and for promoting its comprehension - Clarifying peer learners' doubts - Teaching adequately

		- Clearly explaining the tasks of peer learning sessions to peer learners
Scope of the challenges	Peer learners' attitudes/behavior	
Indicators	----------	- Lack of motivation - Behavioral and/or personality traits - Concentration problems - Poor attendance
Scope of the challenges	Impact on peer learners' attitudes	
Indicators	- Being able to effectively help peer learners - Promoting behavioral change	- Keeping up with peer learners' motivation and concentration levels - Promoting peer learners' effort and interest in learning - Promoting peer learners' autonomy
Scope of the challenges	Peer learners' learning difficulties	
Indicators	----------	- Lack of prerequisite knowledge and skills
Scope of the challenges	Peer teacher students' knowledge mastery	
Indicators	- Feeling insecure about performing the role of peer mentor - Fear of not being able to help schoolmates	- Lack of in-depth knowledge of specific content - Doubts about content learnt for a long time - Fear of being unable to help peer learners
Scope of the challenges	Availability and consistency over time	
Indicators	- Lack of availability	- Lack of availability to prepare for peer learning sessions
Scope of the challenges	Logistical issues	
Indicators	- Organizational issues	- Logistics of peer learning sessions - Time-limited schedule of peer learning sessions - Dealing with unexpected situations
Scope of the challenges	Interpersonal relationships	
Indicators	----------	- Dealing with younger schoolmates

Own source (translated from original language of the data collected)

Main benefits resulting from participation in the projects

In regard to the main benefits resulting from participation in the projects, teachers and PTS were invited to reflect on the global advantages of participation to participants, in general, and to PTS, in particular. The indicators identified were clustered into six distinct groups, listed in Table 6. Out of these, only one of the groups showed no evidence of correspondence between teachers and PTSs' perceptions, more specifically, the group "organizational and pedagogical features of the project", in the scope of which teachers enhanced matters of the pedagogical and organizational domains, such as "the pedagogical framework of the project" and its "recognition" from the educational community.

Among the remaining five groups, more specifically, "matters of PTSs' teaching and learning process", "PTSs' personal development", "humanist/humanitarian reasons", "matters of the social domain" and "matters of peer learners' teaching and learning process", the first group mentioned stood out for the unanimity and consensus identified in the perceptions of teachers from all projects and for the representativeness among PTSs' viewpoints. According to this, the teachers emphasized "PTSs' growing interest in the subjects involved", the fact that this was an opportunity for them "to develop technical skills and study habits", and that assuming a new role had promoted "these students' more proactive attitudes at school". Under the same topic, PTS added the possibility of "revising content" and the development of their "knowledge sharing ability" as the main benefits to be highlighted.

The group of indicators related to "PTSs' personal development" followed the previous one in terms of unanimity and consensus based on PTSs' perceptions, in particular regarding "the development of soft skills", the opportunity provided by the experience to "help themselves", and "build their self-esteem". In this scope, teachers' perceptions were more generic, despite the unanimity identified when they mentioned "the opportunity of personal and emotional development" provided by the experience to the students who integrated the projects.

As for the indicators related to "humanist/humanitarian reasons", "helping others" should be highlighted for the concurrence achieved among PTSs' perceptions, which resonates with the teachers' reference to "greater tolerance in dealing with the difference".

Regarding "matters of the social domain", unanimity is found, in the case of the teachers' perceptions, on "the receptiveness of younger students to their older peers" and on "the strengthening of affective bonds", and, in the case of PTSs', on "the development of the ability to interact with others".

Despite being less representative of the sample's perceptions, in terms of "matters of peer learners' teaching and learning process" the teachers enhanced the opportunity of "learning by doing", provided to these students, and PTS placed particular emphasis on "the improvement of academic results", under the main benefits resulting from peer learners' participation in the projects.

Table 6. Indicators resulting from content analysis of the corpora analyzed regarding the main benefits resulting from participation in the projects.

	Teachers' perceptions	**Peer teacher students' perceptions**
Scope of the benefits	Matters of peer teacher students' (PTS) teaching and learning process	
Indicators	- Growing interest in the subjects involved - Opportunity to develop technical skills and study habits - Opportunity to use knowledge in practical situations - Promotion of proactive attitudes at school - Better comprehension of school life - Improvement of the ability to transfer knowledge - Consolidation of prior knowledge - Increase of PTS's autonomy	- Opportunity to revise content - Development of knowledge sharing ability - The experience of mentoring younger peers - Better perception of collaborative work environments - Promotion of knowledge mastery and acquisition - Better perception of the teaching and learning process - Contact with new subjects - Development of organizational skills
Scope of the benefits	PTSs' personal development	
Indicators	- Opportunity for personal and emotional development - Higher focus on their own strengths - Development of communication and problem-solving skills - Decrease in prejudice levels	- Development of soft skills - Growing ability to help themselves - Self-esteem building
Scope of the benefits	Humanist/humanitarian reasons	
Indicators	- Greater tolerance in dealing with the difference - Creation of a sense of community	- Helping others - Developing a sense of self-help
Scope of the benefits	Matters of the social domain	
Indicators	- Receptiveness of younger students to their older peers - Strengthening of affective bonds - Learning how to better deal with others - Dealing with students with different profiles - Learning about captivating other people's attention	- Developing the ability to interact with others - Promoting peer learners' integration at school - The relationship with peer learners - Peer learners' recognition for PTSs' work

	- Satisfaction of all participants	
Scope of the benefits	Matters of peer learners' teaching and learning process	
Indicators	- Learning by doing experiences	- Improvement of academic results - Development of study habits
Scope of the benefits	Organizational and pedagogical features of the project	
Indicators	- Pedagogical framework of the project - Project recognition	----------

Own source (translated from original language of the data collected)

5 Discussion

As to the first research question, *What are the matters according to which the inquired teachers and peer teacher students' (PTS) perceptions converge / diverge, regarding PTSs' motivations to integrate the selected projects as well as participation impact for participants, in general, and for PTS, in particular?*, it becomes clear that teachers and PTSs' perceptions tended to converge, and that no parameter was found according to which these perceptions totally diverged. Under the variables analyzed, namely "PTSs' motivation to voluntarily integrate the projects" and "contributions of participation" regarding major challenges faced by PTS and main benefits resulting from it, the teachers and PTS mentioned similar matters regarding more than half of the indicators identified.

In the case of variable "PTSs' motivation to voluntarily integrate the projects", convergence of perceptions was found in four out of the seven groups identified, and within that scope emphasis laid, for the consensus on the matter, on the "humanist/humanitarian reasons", in particular "the joy of helping others" and "the willingness to give the support once received back"; as well as on the "academic achievement and performance of a new role", especially regarding "the joy of teaching" and of "interacting with younger schoolmates", along with the "curiosity" and "willingness to learn" and "the opportunity provided by the experience to revise content". The motivational reasons perceived by the inquired teachers and PTS reflect constructivism principles like collaboration and self-help, connected to the essence of peer learning reported in literature review (Stigmar, 2016; Topping, 2005). Although only PTS mentioned motivational reasons related to "characteristics of the projects", indicators like the "informal atmosphere and context of peer learning sessions" as well as "the interaction between peers and facilitated sharing of doubts" are in line with the position of authors like Stigmar (2016) and Topping (2005) when these enhance, among the evidence-based benefits of peer learning, the opportunity provided to students to share knowledge in a safe and trustworthy environment.

Considering variable "contributions of participation" regarding major challenges faced by PTS, teachers and PTSs' perceptions converged as for five out of the eight groups of indicators identified. Within that scope, emphasis laid on "effective communication and appropriate choice of instruction methods", for the unanimity found in participants' viewpoints, particularly regarding "PTSs' fear of being unable to

effectively communicate and clear doubts", regarding "peer learners' attitudes/behavior", specifically in the case of lack of "motivation", "concentration" and of "poor attendance"; and finally regarding "the impact caused by participation and PTSs' influence on peer learners' attitudes". Once again it is evident that the teachers and PTSs' perceptions of the major challenges faced by PTS are in line with the vision of reference authors in terms of what is expected from the interaction between PTS and peer learners, in particular regarding the promotion of learners' autonomy and responsibility for the learning process (Falchikov, 2001; Topping , 2005).

In the case of variable "contributions of participation" regarding the main benefits resulting from it, teachers and PTSs' perceptions converged as for five out of the six groups of indicators identified. It is also evident that this was the variable according to which higher level of unanimity was found. Based on literature review, the evidence-based benefits of peer learning experiences are particularly noticeable under the following dimensions: the affective, with emphasis on self-esteem building, the promotion of learners' emotional intelligence, motivation, trustworthy relationship between peers, feeling of belonging and sense of responsibility (Burton, 2012; Stigmar, 2016); and the social dimension, namely regarding the promotion of communicative and collaborative skills, interpersonal skills, social interaction and the creation of a sense of community (Ayşe, 2014; Stigmar, 2016; Williams & Fowler, 2014). Based on literature review, extensive benefits are also found under the cognitive dimension (Duran, 2016; Stigmar, 2016), especially due to the encouragement of the processes of information monitoring and revision, as well as of reflexive knowledge building, promoted, in ideal situations, by the interaction between PTS and peer learners and responsible for facilitating the development of learners' critical and reflexive thinking. However, several authors refer to the fact that evidence of peer learning impact on learners' academic results is still scarce, especially for the complexity of isolating variables in the teaching and learning context and, hence, of identifying cause-effect relations (Stigmar, 2016; Williams & Fowler, 2014).

Curiously, among the study sample, emphasis laid, for the consensus and representativeness verified, on the group related to "matters of PTSs' teaching and learning process", much centered on aspects of the cognitive dimension, namely "PTSs' growing interest in the subjects involved", "the opportunity to develop technical skills and study habits", and the "promotion of proactive attitudes", associated with "the performance of a new role at school", in line with the position of authors like Reigeluth (2016), together with "the opportunity of revising content" and "the development of knowledge sharing ability" promoted by the experience. The remaining groups, according to which teachers and PTSs' perceptions coincided, relate to aspects of the affective and social dimensions, such as "PTSs' personal development", particularly regarding "the development of soft skills", "PTSs' growing ability to help themselves", and "self-esteem building"; and as for "humanist/humanitarian reasons", especially indicator "helping others"; along with "matters of the social dimension" related to "the receptiveness of younger students to their older peers", "the strengthening of affective bonds", and "learning how to better deal with others".

In regard to teachers and PTSs' perceptions according to which no convergence was found, it is clear that in the case of variables related to motivation and major challenges,

PTS tended to mention aspects that were not perceived by the teachers, namely "characteristics of the projects" and "personal development", within the scope of PTSs' motivation to integrate the projects; and peer learners' "attitude/behavior" and "difficulties" as well as matters of "interpersonal relationships" connected to the interaction between PTS and peer learners, within the scope of the major challenges faced by PTS all over the projects. This fact may result from the personalization promoted by giving PTS the chance to reflect on how they experienced the situations related to the performance of the new role they assumed at school, just like referred to by Reigeluth (2016), connected to teaching and collaborating. Only in the case of variable "main benefits resulting from participation in the projects", did the teachers perceive aspects not mentioned by PTS, specifically those related to "organizational and pedagogical features of the projects" like their "pedagogical framework" and "recognition" from the education community, which may result from the teachers' managerial experience and resonates with Reigeluth's position (2016) as for the role expected from teachers regarding the management and monitoring of educational activities.

As regards the second research question, *What is the role of content analysis, as the chosen data analysis technique, and of qualitative data analysis software WebQDA, in the process of assessing teachers and PTSs' perceptions?*, results show that due to the size and tenor of the content analyzed, connected to perceptions and educational variables, the technique of content analysis promoted, by means of its unobtrusive character (Fraenkel et al., 2012; Kolbe & Burnett, 1991), in-depth reflection, preserving the content and features of the data collected, especially regarding values, points of view and also feelings expressed by the teachers and PTS as for the variables in consideration. The access to "systematic and objective procedures for describing the content of the messages" (Bardin, 1979, p.42) facilitated the process of making inferences and, in line with the purpose of the study, "clearly and effectively showed the convergent and/or divergent position of teachers and PTS based on their perceptions of similar matters (Carvalho & Santos, 2020, p.254) as well as contributed to accomplishing the principles of this data analysis technique (Bardin, 1979; Krippendorff, 1980).

All over this process, the support of software WebQDA contributed to the attempt to meet, even though partially, the validity criteria established for content analysis, as advocated by reference authors (Costa & Amado, 2018; Fraenkel et al., 2012; Krippendorff, 1980; Lima, 2013), in particular, the criterion of reproducibility, by means of trying to preserve the "objectivity, systematicity and generality" (Ghiglione & Matalon, 2001, p.208) of the coding process, repeated within a time span of five months; and the criterion of precision, promoted by the clear and detailed description of the coding and data query procedures (Costa & Amado, 2018), fundamental in a process of such subjective and inferential nature, as expected by the contribution of a qualitative data analysis software (Kaefer et al., 2015) predominantly to qualitative studies.

6 Conclusions

Based on study results, regarding the assessment of teachers and PTSs' perceptions, it may be inferred that convergence of viewpoints is stronger under variable "benefits resulting from participation in the projects", and that also within that scope, the indicators identified are in line with the position of reference authors with respect to the dimensions according to which proven evidence of participation in peer learning experiences is clear, namely the affective, social, and cognitive dimensions.

In regard to the indicators based on which no converge of perceptions was found, it becomes evident that both teachers and PTS tended to make reference to aspects related to the role they assumed within the scope of participation in the peer learning projects, which was particularly clear in the case of PTS, by adding complementary ideas to those mentioned by the teachers in three groups related to variables "PTSs' motivation to voluntarily integrate the projects" and "major challenges faced".

It is also clear that both the technique of content analysis and the support provided by software WebQDA were determining in providing for the accomplishment of the purpose of the study and for preserving the reliability of qualitative research, as advocated by Souza, Costa and Souza (2015), generally speaking, by means of the following procedures: triangulation of sources, based on pairing teachers and PTSs' perceptions of similar matters; repetition of the coding process within a time span of five months; clear flow of evidence, according to which the indicators identified were systematized and clustered based on their content, under each of the three variables assessed; the pursuit of transparency, structure and systematization when implementing the coding procedures followed with the support of software WebQDA; and the facilitation resulting from software-assisted content analysis when querying and interpreting the data collected as well as when describing the whole process, which is expected to promote the reproducibility of the research in similar contexts.

Possible limitations of the study relate to its exploratory character and due to chronological and resource constraints, the preclusion to fully implement the strategies leading to meeting the validity criteria established for content analysis.

As for the main contributions of the study, it is expected to add valuable input into the gaps identified in literature review (Kaefer et al., 2012) regarding the lack of clear descriptions of how CAQDAS can be effectively used and of studies in this field. Besides this, with its findings, this study is sought to stress the relevance of qualitative research, in general, and of content analysis, in particular, towards preserving the essence and tenor of the data collected and promoting reflexive and in-depth analysis.

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