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Composition of work teams in the active methodology of challenge based learning: enhancing the development of skills in accounting students

Composição de equipes de trabalho na metodologia ativa de challenge based learning: potencializando o desenvolvimento de habilidades em estudantes de contabilidade

Composición de equipos de trabajo en la metodología activa de *challenge based learning*: potenciando el desarrollo de competencias en estudiantes de contabilidad

Jéssica dos Santos Crestani
Mestra em Controladoria e Contabilidade, PGCONT/FCE (UFRGS), Porto Alegre/RS, Brasil
jessica.s.crestani@gmail.com
https://orcid.org/0000-0001-9886-0719

Everton da Silveira Farias*
Doutor em Administração (UFRGS)
Professor do Programa de Pós-graduação em Controladoria e Contabilidade, PPGCONT/FCE (UFRGS), Porto Alegre/RS, Brasil
farias@ufrgs.br
https://orcid.org/0000-0002-6624-2569

Ariel Behr
Doutor em Administração (UFRGS)
Professor do Programa de Pós-graduação em Controladoria e Contabilidade, PPGCONT/FCE (UFRGS), Porto Alegre/RS, Brasil
ariel.behr@ufrgs.br
https://orcid.org/0000-0002-9709-0852

Address of the primary contact for correspondence *
Av. João Pessoa, 52 - Centro Histórico, CEP 90040-000 – Porto Alegre/RS, Brasil

Abstract
This article presents the skills necessary for the accounting professional and a guide (framework) to guide the formation of work teams that enhance the development of skills in Accounting students submitted to active teaching methodologies. A systematic literature review was carried out to identify the relevant skills to be investigated in research in Accounting students. After the execution of a pilot test, a controlled quasi-experiment was carried out, based on the active teaching methodology of Challenge Based Learning (CBL), and questionnaires were applied to groups of Accounting students. A total of 251 students from five Higher Education Institutions (HEIs) in the southern region of Brazil participated in the research. In the analysis of the results, tests of variance (ANOVA), chi-square, Tukey's test and descriptive analyzes were performed to confirm the research hypothesis. A systematic review of the literature presents the skills that must be developed in accounting training, and the results of the article present the main variables in the formation of work teams that promote the development of these skills through the use of active teaching methodologies. The contributions, in addition to the literature review, are to provide a guide to subsidize and guide the formation of work teams to boost the development of these skills. In the practical field, the article indicates which variables, in the formation of work teams, can boost the development of skills with a satisfactory degree of intensity, guiding educational initiatives based on active teaching methodologies, serving in the academic field as a reference.
Keywords: Accounting Education; Skills; Active Teaching Methodologies; Work Teams; Challenge Based Learning

Resumo
Este artigo apresenta as habilidades necessárias ao profissional contábil e um guia (framework) para orientar a formação de equipes de trabalho que potencialize o desenvolvimento de habilidades em estudantes de Contabilidade submetidos a metodologias ativas de ensino. Uma revisão sistemática de literatura foi realizada para identificar as relevantes habilidades a serem investigadas na pesquisa em estudantes de Contabilidade. Após a execução de um teste piloto, foi realizado um quase-experimento controlado, baseado na metodologia ativa de ensino *de Challenge Based Learning (CBL),* e aplicados questionários em turmas de estudantes de Contabilidade. Participaram da pesquisa 251 estudantes de

cinco Instituições de Ensino Superior (IES) da região Sul do Brasil. Na análise dos resultados foram realizados testes de variância (ANOVA), qui-quadrado, teste de Tukey e análises descritivas para confirmação da hipótese da pesquisa. A revisão sistemática da literatura apresenta as habilidades que devem ser desenvolvidas na formação contábil, e os resultados do artigo apresentam as principais variáveis, na formação de equipes de trabalho, que promovem o desenvolvimento dessas habilidades a partir do uso de metodologias ativas de ensino. As contribuições, além da revisão da literatura, são fornecer um guia para subsidiar e orientar a formação de equipes de trabalho para impulsionar o desenvolvimento dessas habilidades. No campo prático o artigo indica quais variáveis, na formação de equipes de trabalho, podem impulsionar o desenvolvimento de habilidades com grau de intensidade satisfatório, norteando as iniciativas educacionais baseadas em metodologias ativas de ensino, servindo no campo acadêmico como uma referência.
Palavras-chave: Ensino de Contabilidade; Potencializar Habilidades; Metodologias Ativas de Ensino; Equipes de Trabalho; *Challenge Based Learning*; Aprendizagem baseada em Desafio

Resumen
Este artículo presenta las competencias necesarias para el profesional contable y una guía (marco) para orientar la formación de equipos de trabajo que potencien el desarrollo de competencias en estudiantes de Ciencias Contables sometidos a metodologías activas de enseñanza. Se realizó una revisión sistemática de la literatura para identificar las competencias relevantes a investigar en la investigación en estudiantes de Ciencias Contables. Tras la ejecución de una prueba piloto, se realizó un cuasi-experimento controlado, basado en la metodología de enseñanza activa de *Challenge Based Learning* (CBL), y se aplicaron cuestionarios a grupos de estudiantes de Ciencias Contables. Participaron de la investigación 251 estudiantes de cinco Instituciones de Educación Superior (IES) de la región sur de Brasil. En el análisis de los resultados se realizaron pruebas de varianza (ANOVA), chi-cuadrado, prueba de Tukey y análisis descriptivos para confirmar la hipótesis de investigación. Una revisión sistemática de la literatura presenta las competencias que se deben desarrollar en la formación contable, y los resultados del artículo presentan las principales variables en la formación de equipos de trabajo que promuevan el desarrollo de estas competencias mediante el uso de metodologías activas de enseñanza. Los aportes, además de la revisión bibliográfica, son brindar una guía para subsidiar y orientar la formación de equipos de trabajo para impulsar el desarrollo de estas competencias. En el ámbito práctico, el artículo señala qué variables, en la formación de equipos de trabajo, pueden potenciar el desarrollo de competencias con un grado de intensidad satisfactorio, orientando iniciativas educativas basadas en metodologías activas de enseñanza, sirviendo de referencia en el ámbito académico.
Palabras clave: Docencia Contable; Habilidades Potencializadoras; Metodologías activas de enseñanza; Equipos de trabajo; Aprendizaje basado en Desafíos

1 Introduction

Competent Accounting Professionals must have technical knowledge, skills, and a set of attitudes that provide them with the understanding they need to perform their tasks (Chaffer & Webb, 2017; IFAC, 2017). However, the constant changes in the accounting profession directly impact the Profile required of Accounting Professionals. Thus, the teaching process needs to keep up with the profession's evolution to provide opportunities to develop the competencies that such professionals will require (Vendramin & Araujo, 2020; Smith, Maguire & Han, 2018).

Active Methodologies are among the pedagogical practices employed to develop competencies in Accounting students. It promotes the active inclusion of students in the teaching-learning process, aligning the practical aspects of everyday professional life (Heins, Quintana & Cruz, 2019; Rocha & Leal, 2020; Vargas, Scherer & Garcia, 2020). In order to develop skills, the *Challenge Based Learning (CBL)* Active Methodology stands out. It is a teaching methodology aimed at developing skills by motivating students to solve a challenge on a current issue (Binder, Nichols, Reinehr & Malucelli, 2017).

Considering the need to identify new teaching-learning strategies that can assist in the skill development process of Accounting students (Suave, Altoé & Ferreira, 2021; Nagib & Silva, 2020; Butzke & Alberton, 2017), and that studies related to Active Teaching Methodologies show that different forms of work team composition can impact students' skill development (Martin, Rivale & Diller, 2007; Gaskins, Johnson, Maltbie & Rukreti, 2015; Cheng, 2016; Santos, 2016; Binder et al., 2017; Martinez & Crusat, 2017), this study sought to understand "What elements of work team composition drive the development of skills in teaching activities using *CBL* active methodologies applied in Accounting students?".

Thus, this study aimed to present the elements for work team composition in activities based on *CBL* active methodologies that enhance the development of skills in Accounting students.

The research presents the design of a quasi-experiment applied to undergraduate Accounting students. Applying this research method meets the demand to provide didactic-pedagogical experiences aimed at understanding variables that can enhance the development of skills in Accounting students. This

enhancement would be achieved using a specific teaching methodology analyzed based on an experiment or quasi-experiment (Rocha & Leal, 2020; Suave et al., 2021).

Therefore, a quasi-experiment was conducted with Accounting students to identify the main skills developed by them during the application of a teaching activity structured in the *CBL* active methodology considering different work team compositions (gender, size, and way of choosing teams). The study relies on a quantitative approach to validate and analyze the data collected during the quasi-experiment. The latter is supported by the development of a pilot test and the validation of the quasi-experiment script developed for the research.

As such, this study is justified when it seeks to highlight the importance of developing certain skills in accounting education through active teaching methodologies, and it is essential to include the development of these skills in the Pedagogical Projects of Accounting undergraduate programs. Furthermore, this study's main contribution was to present a framework for forming work teams that can enhance the development of skills in Accounting students when they are submitted to teaching activities structured in active methodologies. Therefore, this study's result is a set of elements that can help structure teaching activities - based on active methodologies - which can, according to the composition of work teams, enhance the development of specific skills.

2 Theoretical References

2.1 Systematic Review: Skills required for the Accounting Professional profile

Given the constant change in the Accounting labor market and, consequently, the changes in the performance profile of professionals in the area, a systematic literature review was conducted to identify studies and research that present the main skills which should be developed in accounting education. Furthermore, the systematic review aimed to identify the subsidy variables for conducting the second phase of this research - the experimental phase. Thus, in this Phase 1, a systematic review was conducted in the accounting literature regarding the key skills that must be developed in Accounting students. In order to execute this phase, a search was conducted for peer-reviewed journals' articles relevant to the topic and which presented in their titles the terms "skill" and "ability", using the *Science Direct* and *Web of Science* databases. The methodological procedures for conducting the systematic review are presented in detail in Method section 3.

Forty-four articles dealing with the skills required of the Accounting Professional were analyzed. It was found that the studies conducted on the Skills of Accounting Professionals can be classified into subdivisions regarding the research theme. Some studies presented the skills based on a literature review. Other research has presented the perceptions of students, and/or employers, and/or Higher Education Institutions (HEIs) regarding the skills required of Accounting Professionals and how they are being developed during the students' education. Finally, further studies have presented tools or teaching methods that promote the development of skills required of Accounting Professionals.

In order to identify the main Skills required for the Accounting Professional profile, a list of these skills' quotation frequency was prepared in the reviewed articles, as shown in Table 1. Regarding the skills required for working in the Accounting Profession, in the Accounting students' perception, it is important to develop both Technical Skills (Kavanagh & Drennan, 2008) and Generic Skills, such as Communication and Interpersonal Relationships (Osmani, Hindi, Weerakkody & Al-Esmail, 2017; Smith et al., 2018). On the other hand, in the employers' perception, studies point out that skills such as Communication, Interpersonal Relationships, and Teamwork overlap with Technical Skills (Jackling & Natoli, 2015; Dunbar, Laing & Wynder, 2016).

Based on the result generated through the systematic review, it was observed that both in the students' and employers' perceptions, these skills are not being well developed during the training of Accounting Professionals (Abayadeera & Watty, 2016; Dunbar et al., 2016; Chaplin, 2017). Thus, there is a need to include the development of skills required for the Accounting Professionals Profile during the training of students in Accounting Undergraduate Programs. In addition, the Pedagogical Projects of Undergraduate Programs must contemplate and effectively address the development of these skills throughout the students' training (Lange, Jackling & Gut, 2006; Osmani et al., 2017; Vendramin & Araujo, 2020).

Based on the systematic review results, nine skills required of Accounting Professionals and that are aligned with the CBL Active Methodology were chosen to be used in the second phase of this study as the dependent variables of the quasi-experiment, these being: Written and Oral Communication; Project Management; Time Management; Leadership; Interpersonal Relationships; Problem Solving; Decision Making; and Teamwork.

Table 1
Skills required for the Accounting Professional profile

Skills	Authors of the analyzed articles
Self-management	Kavanagh & Drennan (2008); Maelah et al. (2012); Osmani et al. (2017)
Profissional Behavior	Stone, Hunton & Wier (2000); Lin, Xiong & Liu (2005); Kavanagh & Drennan (2008); Lin (2008); Salleh & Azis (2014);
Written Communication	May & Arevalo (1983); May & May (1989); Reinstein & Houston (2004); Lin, Xiong & Liu (2005); Kavanagh & Drennan (2008); Jackling & Natoli (2015); Dunbar, Laing & Wynder (2016); Oussii & Klibi (2016); Osmani et al. (2017)
Oral Communication	May & May (1989); Lin, Xiong & Liu (2005); Lange, Jackling & Gut (2006); Maelah et al. (2012); Kargin & Aktas (2012); Bunney, Sharplin & Howitt (2015); Jackling & Natoli (2015); Dunbar, Laing & Wynder (2016); Oussii & Klibi (2016); Osmani et al. (2017); Smith et al. (2018)
Business Management	Kavanagh & Drennan (2008); Lin (2008)
People Management	Dunbar, Laing & Wynder (2016)
Project Management	Carmona, Rivas & Rodríguez (2017)
Time Management	Maelah et al. (2012); Dunbar, Laing & Wynder (2016); Carmona, Rivas & Rodríguez (2017); Osmaniet al. (2017)
Skill in Excel	Ragland & Ramachandran (2014); Dunbar, Laing & Wynder (2016)
Interpersonal Skills	Lin, Xiong & Liu (2005); Lange, Jackling & Gut (2006); Kargin & Aktas (2012); Bunney, Sharplin & Howitt (2015) ; Dunbar, Laing & Wynder (2016)
Leadership	Lin, Xiong & Liu (2005); Kavanagh & Drennan (2008); Maelah et al. (2012); Bunney, Sharplin & Howitt (2015); Dunbar, Laing & Wynder (2016); Smith et al. (2018)
Foreign Language	Lin, Xiong & Liu (2005); Oussii & Klibi (2016)
Analytical Thinking	Zin et al. (2005); Kavanagh & Drennan (2008); Ragland & Ramachandran (2014); Salleh & Azis (2014); Muhamad & Sudin (2015); Dunbar, Laing & Wynder (2016); Osmani et al. (2017); Chaplin (2017)
Creative Thinking	Maelah et al. (2012); Kargin & Aktas (2012)
Critical Thinking	Lin, Xiong & Liu (2005); Maelah et al. (2012); Kargin & Aktas (2012); Ragland & Ramachandran (2014); Salleh & Azis (2014); Kavanagh & Drennan (2008)
Strategic Thinking	Kargin & Aktas (2012); Dunbar, Laing & Wynder (2016)
Meta-cognitive Thinking	Greenberg (1997)
Systemic Thinking	Kargin & Aktas (2012)
Proactivity	Dunbar, Laing & Wynder (2016)
Problem Solving	Maelah et al. (2012); Kargin & Aktas (2012); Ragland & Ramachandran (2014); Jackling & Natoli (2015); Dunbar, Laing & Wynder (2016); Carmona, Rivas & Rodríguez (2017); Kavanagh & Drennan (2008)
Accounting Techniques	Kavanagh & Drennan (2008); Lin (2008); Salleh & Azis (2014); Dunbar, Laing & Wynder (2016); Carmona, Rivas & Rodríguez (2017);
Information Technology	Maelah et al. (2012); Kargin & Aktas (2012); Calayoglu & Aktas (2011); Lin, Xiong & Liu (2005); Greenberg (1997); Dunbar, Laing & Wynder (2016); Kavanagh & Drennan (2008)
Decision Making	Libby & Luft (1993); Lin, Xiong & Liu (2005); Kavanagh & Drennan (2008)
Teamwork	Zin et al. (2005); Kavanagh & Drennan (2008); Maelah et al. (2012); Kargin & Aktas (2012); Bunney, Sharplin & Howitt (2015); Dunbar, Laing & Wynder (2016); Osmani et al. (2017); Smith et al. (2018).

Source: Prepared by the authors

2.2 Challenge Based Learning

The Active Methodology is based on the fact that the student will have the ability to solve problems coming from activities essential to the environment in which they are inserted by using real or simulated experiences (Gobbo, Beber & Bonfligio, 2016). Active Methodologies allow students to be the main actors in the learning process, stimulating their critical thinking, research, reflection, analysis, and decision-making skills (Silva & Scapin, 2011; Vales & Santos, 2018).

The CBL Active Methodology (Nichols & Cator, 2008; Cheng, 2016) can be used as an educational strategy to develop students' skills. The CBL methodology allows students to become familiar with real problems that need solving, with each step that students perform to find solutions motivating them to move on to the next, making CBL an interesting active teaching methodology (Nichols, Cator & Torres, 2016, Binder et al., 2017).

Teaching activities structured in CBL should include three interconnected steps: Engage, Investigate, and Act. At each step, students perform activities that will be required to move on to the next step, and at all steps, students will be expected to reflect, document, and share their actions and ideas. Regarding the length of the challenge and the intensity of each step, Nano CBL is the classification for CBL use between one and seven days (Nichols & Cator, 2008).

Regarding the CBL application in group activities, the literature presents different composition forms regarding the number of team members, the gender, and the participants' training choice. For example, in Binder et al. (2017), Martinez & Crusat (2017), and Santos (2016), the teams had two to five members. While in Cheng (2016), each team comprised 15 to 16 members because it was considered that in real-life situations, work teams would hardly consist of a few members, such as teams of four or five people.

In Martin et al. (2007) and Gaskins et al. (2015), the authors reported a higher concentration of male students in their studies. When applying the CBL Methodology, the teams predominantly comprised the self-declared male gender. However, the authors did not observe that the difference in team composition influenced the students' learning or training.

Regarding team formation choices, Santos (2016) pointed out they should occur naturally, with the number of members of each team, and the choice of team members, being defined by the students. On the other hand, Martinez and Crusat (2017) add that it is important to build mixed teams in terms of the members' training and skills because a multifunctional group will contribute to developing a solution to the challenge.

Considering the studies on the CBL Active Methodology, three variables were observed on work team composition that can influence students' skill development, as follows: (i) participants' gender; (ii) number of members; (iii) choosing of members regarding team participation (Martin et al., 2007; Gaskins et al., 2015; Cheng, 2016; Santos, 2016; Binder et al., 2017; Martinez & Crusat, 2017). Therefore, this study's Hypothesis was formulated based on these variables:

H1: In a teaching activity structured around the CBL Active Methodology, the work team composition does not significantly differ in developing students' Skills.

In order to validate this hypothesis, the next sections present the results' collection, analysis, and discussion.

3 Method

3.1 Research Phase 1 - Systematic Review of the Literature

This study was divided into two Phases. In Phase 1, a systematic review was conducted regarding skills required for the Accounting Professional profile, presenting state-of-the-art and indicating a research agenda on the topic (Webster & Watson, 2002). Thus, the study was classified as qualitative in its approach, descriptive in its objectives, and documentary in its procedures (Raupp & Beuren, 2014; Richardson, 1999).

Therefore, a search was conducted for peer-reviewed journals' articles relevant to the topic using the *Science Direct* and *Web of Science* databases. In order to conduct the article search, the terms *skill* and *ability* were chosen because they comprise the concept of skill in the English language. In addition, the term *accounting* was used because it translates the concept of Accounting into English.

Each term set was employed once for each database, using the parameters '*' to identify variable words to the term used and '*AND*' to search only for articles containing both words in their titles. The search filters 'title only' and 'articles only' were also used to perform the search because they aimed to concentrate only on articles related to the proposed theme. Table 2 illustrates the operationalization and results of the systematic searches.

Table 2
Operationalizing the Systematic Review

	Database				
	Science Direct		**Web of Science**		
Article selection parameters	**Search Term**				
	skill* AND accounting	**ability* AND accounting**	**skill* AND accounting**	**ability* AND accounting**	**Total**
"title only"	29 articles	12 articles	69 articles	45 articles	155 articles
"articles only"	17 articles	4 articles	39 articles	28 articles	88 articles
Exclusion according to title/abstract	1 article	1 article	15 articles	24 articles	41 articles
Repeated articles	-	-	-	3 articles	3 articles
Final Result	**16 articles**	**3 articles**	**23 articles**	**1 article**	**44 articles**

Source: Prepared by the authors

Based on the systematic search for the indicated terms and with the parameters and filters used, 21 articles were collected from the *Science Direct* and 67 articles from the *Web of Science,* totaling 88 articles. The next step involved translating the title and abstract of the 88 articles to verify whether the articles' content was aligned with the proposed review theme. Thus, 45 articles were excluded from the research sample, 41 were unrelated to this review's theme, and three were excluded because they were repeated.

Hence, the final sample comprised 44 articles. Data analysis was carried out based on reading and summarizing techniques, which were then analyzed using document analysis (Richardson, 1999) to identify

the frequency in which the skills required for the Accounting Profession were presented in the journals analyzed.

Therefore, 24 skills required for the Accounting Professional Profile were identified. Among these, nine skills were selected to comprise Phase 2, which aims to apply a teaching activity structured around the *CBL* active methodology in a quasi-experiment. The selection of these nine (9) skills for Phase 2 occurred because they are the skills found in both the systematic literature review on skills and the studies addressing the *CBL* active methodology. In addition, according to Nichols & Cartor (2008), these skills can be developed when using this active methodology in the classroom.

3.2 Research Phase 2 - Quantitative and Qualitative Steps

In Phase 2, part of the data was treated quantitatively and analyzed using statistical techniques. In contrast, another part of the data was analyzed using qualitative techniques to understand and analyze the participants' perceptions of the variables in a quasi-experiment (Richardson, 1999). The qualitative step used the content analysis technique, which allows the drawing of knowledge inferences using systematic and objective procedures to describe the content of messages prepared by the survey participants (Bardin, 2011).

Thus, regarding procedures and methodological classification, Phase 2 was structured using mixed methods with quantitative and qualitative approaches (Creswell, 2007). It is a descriptive-exploratory research because it aims to describe the characteristics of establishing relationships between variables (Silva & Menezes, 2001). It also aims to clarify which factors contribute in some way to the occurrence of a certain phenomenon, assuming the findings of the descriptive research as the basis for the explanations that will be the study's result (Vergara, 2009).

In an experiment, it is possible to investigate people's behavior in teaching environments and verify new methods and educational measures that are more or less effective (Gil, 2010). Much like in an experiment, a quasi-experiment also analyzes whether one or more independent variables affect one or more dependent variables. Thus, this study used the quasi-experimental method because there was no control group (all participants received the experiment treatment) during the research execution (Sampieri, Collado & Lucio, 2006; Sani & Todman, 2006). Instead, the study used a convenience sample, and the quasi-experimental treatments were randomly assigned to the participants using drawing techniques. Following the draw results, participants were assigned to receive one type of treatment, with each participant undergoing only one quasi-experimental treatment during the research study (Shadish, Cook & Campbell, 2002).

In order to carry out the study, three independent and nine dependent variables were identified from the literature to guide the quasi-experiment design, as shown in Table 3.

Table 3

Experiment Variables	
Independent Variables	Gender, Number of Team Members, and Way of Choosing Teams
Dependent Variables	Written Communication; Oral Communication; Project Management; Time Management; Leadership; Interpersonal Relationships; Problem Solving; Decision Making; and Teamwork

In order to manipulate more independent variables simultaneously, a factorial survey (Anjos, 2004) was conducted, considering the three independent variables of the study. Thus, the gender factor (A) was opened on the levels: female (A1), male (A2), and mixed (A3). The number of members (B) factor was opened in two levels: teams with 3 (three) to 4 (four) participants (B1) and teams with 7 (seven) to 8 (eight) participants (B2). Finally, the team formation choice factor (C) was opened in two levels: teacher-imposed participation (C1) or student choice (C2).

When each level of a factor combines with each level of other factors, we have a cross-classification factorial survey (Anjos, 2004). Therefore, this research used a "3 x 2 x 2" factorial design (Creswell, 2007). The combination of levels of different factors comprised twelve treatment cells of the quasi-experiment (Anjos, 2004), as shown in Table 4. The study was organized so that each treatment cell had at least 20 participants, totaling a minimum sample size of 240 students (Hair, Black, Babin, Anderson & Tatham, 2009).

Two hundred and fifty-one (251) students participated in the study for the research sample, with each student participating only once in the quasi-experiment. The research was carried out with Accounting undergraduate students through an extension activity in partnership with five HEIs in the South of Brazil. Eight applications of the quasi-experiment were conducted at participating HEIs during the second semester of 2018, with each activity application lasting three hours and thirty minutes.

In order to ensure that the students received the quasi-experiment treatment in a randomized manner, a draw was conducted. First, the students participated in a draw to designate whether they would join teams imposed by the teacher or freely chosen. The draw was divided according to gender, and the labels were placed in two containers, one with a male indication and one with a female indication. According

to the drawn number designation, students who drew a number other than 1 (one) were to form a Team. The students who drew the number 1 (one) from the container were grouped on one side of the room and instructed to choose their teams, considering the premises indicated by the teacher, regarding gender and number of team members.

Table 4
Research Group Composition

	Group Composition	Quasi-experiment treatment	N of Group samples
GROUP 1:	Mixed group, imposed with 3 to 4 members.	A3B3C3	20
GROUP 2:	Mixed group, free with 3 to 4 members.	A3B3C3	20
GROUP 3:	Mixed group, imposed with 7 to 8 members.	A3B3C3	22
GROUP 4:	Mixed group, free with 7 to 8 members.	A3B3C3	23
GROUP 5:	Female group, imposed with 7 to 8 members.	A1B1C1	21
GROUP 6:	Female group, free with 7 to 8 members.	A1B1C1	21
GROUP 7:	Female group, imposed with 3 to 4 members.	A1B1C1	20
GROUP 8:	Female group, free with 3 to 4 members.	A1B1C1	20
GROUP 9:	Male group, imposed with 3 to 4 members.	A2B2C2	20
GROUP 10:	Male group, free with 3 to 4 members.	A2B2C2	21
GROUP 11:	Male group, free with 3 to 4 members.	A2B2C2	22
GROUP 12:	Male group, imposed with 7 to 8 members.	A2B2C2	21
			Total: 251

Caption regarding the variables:
Gender: Mixed Group - comprised of female and male members/Female Group/Male Group
Team Formation: Imposed by the researcher (draw)/Free - students' choice.
The number of Team Members: from 3 to 4/from 7 to 8.

Source: Prepared by the authors

In order to provide the setting for the quasi-experiment, a teaching activity was developed using the concept proposed by Nichols and Cator (2008) of Nano CBL. Thus, a Pilot Study was applied to a Management Information Systems II (MIS II) course in the Accounting undergraduate program at the Federal University of Rio Grande do Sul (UFRGS) to verify the adequacy of the Research Experiment Protocol (REP) (Creswell, 2007).

Based on the Pilot Study's results, it was possible to adjust the REP by establishing: the steps to carry out the teaching activity, the duration time of each step, and the identification of the experiment's extraneous variables, which are those that can influence an experiment's result (Hernandez, Basso & Bradão, 2014), as shown in Table 5.

The REP was structured to be applied in three hours and thirty minutes. It was divided into 11 chronological steps that had to be accomplished during the study. Regarding extraneous variables, the aim was to keep all the variables that could influence the research results during the activity constant. Thus, environmental variables such as classroom structure, temperature, student food, and weather were standardized for the days of the study (Hernandez et al., 2014; Dancy & Reidy, 2019).

Three research instruments were developed for data collection. The first was a closed questionnaire, with a block of 37 questions using a 5-point Likert scale that sought to identify the students' perception of their abilities and a block of questions related to their socioeconomic profile. The data obtained from Questionnaire 1 was analyzed, and sentence validity was assessed through the correlation between the scale formed by the main questions and the control questions. The instrument's reliability was operationalized using the *Reliability* function of the IBM SPSS statistical *software* Version 22[1], which assesses the correlation between the items comprising the scale, with a *Cronbach's Alpha Coefficient* of 0.814, and thus within the acceptance limit for the instrument's reliability (Hair et al., 2009). Finally, the data from Questionnaire 1 was analyzed using descriptive analysis, using statistical methods such as mean and percentage to describe the research participants' profile (Colauto & Beuren, 2014).

The second research instrument was designed to measure the students' individual perceptions regarding developing their skills during the quasi-experiment. Instrument 2 was divided into two blocks, with open and closed questions. Hence, Block 1 used the Gallego (2015) model and presented nine skills in a structured questionnaire with the Visual Analog Scale (VAS), which had values of 0 (zero) and 10 (ten) and different colors for each value (Couper, Tourangeu & Conrad, 2006).

In order to analyze the Block 1 results of Questionnaire 2, Analysis of Variance (ANOVA) and descriptive analysis were used to treat the descriptive data. Therefore, the IBM SPSS statistical software version 22 was employed using the students' responses regarding the perceived development of nine skills. Each skill was included in the software as a factor, and the numerical data was included separately, considering the experiment's twelve (12) treatment cells. After inserting the data into the IBM SPSS statistical software version 22, the ANOVA test and the Tukey HSD Post Hoc test were performed, which

allowed multiple comparisons of the results between the Groups based on the differences in the means observed in the ANOVA test (Hair et al., 2009).

Table 5
Research Experiment Protocol

Time	Activity steps	Activities Description	Resources Used
15 minutes	1. Teacher Presentation	Presenting the teacher, the CBL methodology, and the learning objectives.	PowerPoint/Oral Communication
15 minutes	2. Students' Presentations	Students present their perceptions of their abilities.	Oral Participation of Students
15 minutes	3. Fraternization	The moment for students to socialize - to interact with their peers.	*Coffee- Break* items
10 minutes	4. Team Division	Divide the class into work teams. (Drawing of the experiment treatments).	Draw
5 minutes	5. Engagement	Presentation of the theme that will be worked on by the students.	Video/PowerPoint/Oral Communication
10 minutes	6. *Brainstorming*	Each team will brainstorm on the challenge theme.	Office Sheet/Post-It
30 minutes	7. Investigation	The teams must research the challenge theme and how to solve it.	Electronic Equipment/Books/Articles/Laws/Standards
30 minutes	8. Action	The teams must start solving the challenge.	Electronic Equipment/Sheets
20 minutes	9. Questionnaire 2	Students will answer a Questionnaire on the development of their skills.	Questionnaire 2
30 minutes	10. Presentation	The teams must present their challenge solution to the class.	Oral Communication - students
15 minutes	11. Activity Completion	The teacher will conclude the lesson which has just been held.	Oral Communication - teacher.
Extraneous Variables Control			
Classroom structure: board, computer for the teacher, projector, internet access for the teacher and students, desks, air conditioning, and good lighting. **Student meals**: Coffee Break **Climate**: Dry - sunny or cloudy/do not perform the experiment on rainy days. **Air conditioning temperature**: 22 ºC.			

Source: Prepared by the authors

Block 2 of research instrument 2 contained five (5) open questions on the students' individual perceptions regarding the CBL methodology. This set of open questions was analyzed using the Content Analysis methodology based on the four steps indicated by Bardin (2011): (i) analysis organization; (ii) coding; (iii) categorization; (iv) inferences. Thus, data collection from each group was conducted with a question form comprising five (5) open questions using the WhatsApp© Mobile Application. The audios collected using the Research Form were transcribed into Microsoft Word©. The data was treated, coded, and analyzed, seeking inferences on the students' individual perceptions regarding the active methodology applied and on the perception of the workgroups that undertook joint participation during the CBL teaching activity. These inferences were used to complement the results obtained in the quantitative phase of the quasi-experiment in an attempt to identify whether the results aligned with the students' experiences (Bardin, 2011).

In order to organize and clarify the results obtained in this research phase, the students' answers are presented in section 4.3 using the nomenclature "Student" with the addition of a letter. In turn, the teams' answers are presented using the nomenclature "Group" with the addition of a number.

4 Analysis and Discussion of Results

This section presents this study's main results and their analyses. First, there is the participants' characterization. Then, the results obtained from the quasi-experiment are presented regarding the development of students' skills, considering different work team compositions, in a teaching activity structured in the CBL active methodology.

4.1 Sample Characteristics and Descriptive Analysis of Skills Perception

The research included 251 students. Regarding gender, 51% of the participants were female and 49% male. Regarding the students' age, 56.8% are up to 24 years old, and 22.4% are older than 30. A total of 23.5% of the students already had a technical or higher education degree, and 15.7% were in their second undergraduate program. Regarding the students' professional activities, 28.2% do not have a paid job, and

of those who do work professionally, 12.2% are public employees, and 37.7% work as permanent employees.

The students were asked about their perceptions of their skills in performing tasks related to the accounting profession. For the oral communication skill, 35.05% found it difficult to communicate with people they do not know, and 61.75% said they did not like to speak in public. For the writing skill, 62.94% consider themselves communicating well or very well and being grammatically correct. For the problem-solving skill, 82.07% showed this capability well or very well developed, 74.90% believe they can solve problems with a higher degree of difficulty when necessary, and 52.58% indicated they are used to, always or almost always, making decisions daily.

Regarding time management and project management skills, 58.96% of the students evaluated that they could manage a project from start to finish, 76.49% showed to meet their goals within the deadlines, but 31.87% considered having difficulties in organizing themselves to follow a schedule.

Regarding interpersonal relationship skills, 77.69% of the students consider themselves sociable, 51.39% like to work in teams, and 88.04% point out that they always, or almost always, respect their colleagues' opinions when working in teams. Also, 43.02% consider that they can position themselves as a team leader when working in a team. Most students (99.2%) considered it essential to develop their skills during undergraduate studies to act as Accounting professionals. The results align with the literature, which points out the need to develop accounting students during their academic training (Jackling & Gut, 2006; Osmani et al., 2017; Vendramin & Araujo, 2020).

4.2 Skill Development based on the CBL Active Methodology

The experiment's first result demonstrates the development of Accounting students' skills when subjected to an activity using the CBL Active Methodology. The groups showed different development degrees among the nine skills tested, with the Oral Communication (7.231 ± 2.3517), Leadership (7.100 ± 2.5271), Interpersonal Relationships (7.873 ± 1.9616), Problem Solving (7.323 ± 2.2829), Decision Making (7.430 ± 2.1758), and Teamwork (7.657 ± 2.1490) skills showing a high degree of development.

Written Communication (5.729 ± 2.8011), Project Management (6.717 ± 2.4124), and Time Management (6.984 ± 2.4738) skills have shown a moderate development in the students' development. Given the students' skill development results during the teaching activity, there is a ranking of the skills students perceived as having developed the most. The two groups showed the highest average development for each skill, as shown in Table 6.

Table 6
Ranking of skills developed by students.

Skills	Average	Total Standard Deviation	Group	Average	Total Standard Deviation
Interpersonal Relationships	7.87	± 1.96	Group 1:	8.75	± 1.16
			Group 11:	8.63	± 1.36
Teamwork	7.65	± 2.14	Group 8:	8.75	± 1.29
			Group 7:	8.70	± 1.06
Decision Making	7.43	± 2.17	Group 1:	8.50	± 1.53
			Group 5:	8.09	± 1.81
Problem Solving	7.32	± 2.28	Group 1:	8.80	± 1.15
			Group 8:	8.55	± 1.57
Oral Communication	7.23	± 2.35	Group 1:	8.15	± 1.72
			Group 8:	8.00	± 2.33
Leadership	7.10	± 2.52	Group 8:	8.25	± 1.74
			Group 10:	7.81	± 2.80
Time Management	6.98	± 2.47	Group 8:	8.25	± 1.65
			Group 1:	7.95	± 2.43
Project Management	6.71	± 2.41	Group 11:	8.09	± 1.72
			Group 5:	7.33	± 2.17
Written Communication	5.72	± 2.80	Group 1:	7.35	± 2.10
			Group 8:	6.75	± 2.86

Source: Prepared by the authors

Based on the average skill development obtained by the student groups, the CBL active methodology is a teaching tool that can help classroom teachers develop in the students the skills required for the accounting professional's profile demanded by the labor market. These results converge with the findings of Cheng (2016), Santos (2016), and Martinez & Crusat (2017). They observed the development of skills such as Oral Communication, Problem Solving, and Teamwork when they applied the CBL methodology in other undergraduate programs and positively observed the development of skills in students exposed to this active methodology.

4.3 Skill Development Regarding Work Team Composition

Based on the results of the ranking of the groups, Group 1 (mixed, imposed, 3 to 4 members) was the group with the highest degree of skill development. It was followed by Group 8 (female, free, 3 to 4 members). Regarding the frequency of the groups in the ranking, Group 11 (male, free, 3 to 4 members) presented the highest frequency in the classification of 8 (eight) skills. The ANOVA test and Tukey's Post-Hoc Test were used to identify whether the groups showed significant differences in developing the nine skills.

In the ANOVA test, the null hypothesis is the equality of means of a dependent variable across Groups (Hair et al., 2009). This study performed the ANOVA test considering a significance level of 5%, represented by the value of *p*. Thus, Table 7 presents the ANOVA test results.

Table 7
ANOVA test result for each dependent variable

		ANOVA				
		Sum of Squares	Df	Mean Square	Z	*p-value*
Teamwork	Among Groups	113.243	11	10.295	2.363	0.009
	In the Groups	1041.291	239	4.357		
	Total	1154.534	250			
Project Management	Among Groups	103.792	11	9.436	1.669	0.081
	In the Groups	1351.124	239	5.653		
	Total	1454.916	250			
Time Management	Among Groups	188.834	11	17.167	3.059	0.001
	In the Groups	1341.102	239	5.611		
	Total	1529.936	250			
Oral Communication	Among Groups	93.482	11	8.498	1.576	0.107
	In the Groups	1289.116	239	5.394		
	Total	1382.598	250			
Written Communication	Among Groups	164.951	11	14.996	1.995	0.030
	In the Groups	1796.627	239	7.517		
	Total	1961.578	250			
Interpersonal Relationships	Among Groups	97.803	11	8.891	2.459	0.006
	In the Groups	864.118	239	3.616		
	Total	961.920	250			
Decision Making	Among Groups	91.506	11	8.319	1.821	0.051
	In the Groups	1092.023	239	4.569		
	Total	1183.530	250			
Leadership	Among Groups	101.553	11	9.232	1.476	0.141
	In the Groups	1494.957	239	6.255		
	Total	1596.510	250			
Problem Solving	Among Groups	180.488	11	16.408	3.494	0.000
	In the Groups	1122.372	239	4.696		
	Total	1302.861	250			

Source: Prepared by the authors

After the ANOVA test (p=0.05), the Project Management (p=0.081), Oral Communication (p=0.107), Decision Making (p=0.051), and Leadership (p=0, 141) Skills showed no significant mean differences between the Groups. Thus, the Null Hypothesis that work team composition does not significantly differ in developing such skills can be accepted.

Teamwork (p=0.009), Time Management (p=0.001), Written Communication (p=0.030), Interpersonal Relationships (p=0.006), and Problem Solving (p=0.000) Skills showed significant mean differences between the groups. This result indicates that the groups presented different perceptions regarding developing each of these skills during the research. Therefore, the Null Hypothesis is rejected for these variables, and the Alternative Hypothesis is accepted, considering that the Groups ' composition differs significantly in developing these skills.

Thus, Tukey's Post-Hoc test was performed to identify which groups showed significant differences in skill development, as shown in Table 8.

Table 8
Tukey's Post-Hoc Test Result

Skills	Tukey's Post-Hoc Test Result
Written Communication	There was no significant difference among the groups (p=0.05), except between Groups 1 and 12 (p=0.025).
Oral Communication	There was no significant difference among the groups (p=0.05).
Project Management	There was no significant difference among the groups (p=0.05), except between Groups 11 and 12 (p= 0.044).
Time Management	There were significant differences between Groups 8 and 4 (p=0.044) and Groups 8 and 12 (p=0.018).
Leadership	There was no significant difference among the groups (p=0.05), except between Groups 8 and 12 (p=0.049).
Interpersonal Relationships	There was no significant difference among the groups (p=0.05).
Problem Solving	There were significant differences between Groups 1 and 4 (p=0.003), Groups 1 and 12 (p=0.006), Groups 4 and 8 (p=0.010), and Groups 8 and 12 (p=0.023).
Decision Making	There was no significant difference among the groups (p=0.05), except between Groups 1 and 12 (p=0.048).
Teamwork	There were significant differences between Groups 7 and 12 (p=0.029) and Groups 8 and 12 (p=0.022).

Source: Prepared by the authors

Tukey's Post-Hoc test results showed that the groups that presented differences in skill development could be identified. Thus, it related the results to the three variables of the quasi-experiment: number of team members, way of choosing teams, and gender composition of the teams. Furthermore, the groups presenting significant differences in skill development also presented differences in work team composition. Thus, the answers of the students participating in these groups were analyzed regarding the formation of the ideal team to develop their skills.

Regarding the number of team members, the students in Group 12, in which the teams had 7 to 8 participants, considered that the team size should be between 3 and 5 members. They believed that more participants could shift the focus of the activity, as noted in the speech of the students in Group 12: "More than four students can be too many and dilute the focus on the challenge" (Student A). "No more than three members. Too many members lose focus on the activity" (Student B).

The students in Groups 7 and 8 agreed that 3 to 4 members would be the ideal size to develop teamwork. As noted in the speech of the students in Group 7: "Between 3 and 4 students. In Groups with more than four there are always people who do not do anything. Less than three can be quite overwhelming, depending on the task" (Student D). And from Group 8: "I believe that between 3 or 4 people is good. Given the number of tasks, the number of participants was enough to develop the activity" (Student E)

These findings are in line with Santos (2016) and Binder et al. (2017), who consider that in a *CBL* teaching environment, work teams should have between 2 and 5 members. Therefore, it is suggested that, for activities using the concept of *Nano CBL*, the team composition should have 3 to 4 members to enhance the development of students' skills.

Regarding the way of choosing the team composition, the speech of Groups 1 and 4 was evaluated. A student from Group 1 points out that the way the group is chosen "Does influence it, but we managed to integrate ourselves. Today I talked to colleagues that I had never talked to before" (Student F). On the other hand, the student from Group 4 considered that "It influenced me because I was already close to some colleagues, and I was able to express myself better" (Student G).

Based on the students' narrative, it can be noted that in both groups, the students felt that the imposed or free formations influenced the team interaction. Regarding the team formation choice, Santos (2016) recommends that the formation should be done naturally, and the students should define the choice of team members.

The interaction between the groups formed by the students' choice was faster during the experiment. However, during the activity, it became evident that teams receiving teacher-imposed training focused more on performing the activity, and interaction occurred naturally over time.

In the *CBL* methodology, performing teamwork is a means of developing students' skills (Nichols et al., 2016). Therefore, the imposed training is considered more challenging because it deconstructs the students' comfort zone by simulating a real work team, making the student think about their behavior when working in a team other than the one they are used to work. Thus, the teacher must impose work team formation in an active *CBL* activity.

Similarly, the students were asked about their opinion on working in a team containing only people of the same gender as theirs. Some students from Group 12 said they would prefer working in a mixed-gender team and that some feminine skills may have been lacking during the activity. As shown in the speech of Group 12 members: "It would be better to have a mixed team with a plurality of ideas" (Student H); "It was troublesome, there was a lack of diligence" (Student G). However, other students considered this factor irrelevant to performing the activity: "Irrelevant, I think the results would be similar" (Student K); "Normal, I believe gender does not interfere with the work" (Student L).

Most students in Groups 7 and 8 considered it irrelevant to work in a female-gender team, highlighting that they did not perceive any influence of this variable on the result delivered by the team. "It does not influence because one's opinion on the subject is unrelated to gender" (Student M). "I do not think it influenced anything, regardless of gender, there was integration and participation" (Student N). Other students found participating in a female team positive, pointing out that it was easier to communicate and develop ideas during the activity. "I thought it was good. Same-gender people tend to have more aligned thoughts" (Student P). "It was easier to develop the ideas, and the interaction was very good" (Student Q).

Martinez and Crusat (2017) suggest that mixed team composition enables students to jointly develop skills aimed at forming a multidisciplinary group and learning throughout the challenge process. In this context, the mixed composition can even be considered regarding the gender variable because, according to Lange et al. (2006) and Osmani et al. (2017), female and male gender people may have different skill levels. Thus, considering the results of all groups, the teams should be formed by members of both genders to complement the team members' skills, enhancing the development of their skills (Osmani et al., 2017; Martinez & Crusat, 2017).

Considering the results obtained from conducting the quasi-experiment on work team composition regarding skill development, Table 9 presents a *framework* for using the *CBL* active methodology for developing the nine skills studied here. Furthermore, it demonstrates two team compositions that showed greater development for each skill. Finally, considering the results, the work team composition that can be used to develop skills better using the *CBL* active methodology is pointed out.

Table 9
Framework for Team Composition and Skill Development

Intensity	Skills to develop	Team Formation Ranking	Formation by gender	Formation by size	Team formation type
HIGH	Interpersonal Relationships	1st place	Mixed	3 to 4 members	Imposed
		2nd place	Male	3 to 4 members	Free
	Problem Solving	1st place	Mixed	3 to 4 members	Imposed
		2nd place	Female	3 to 4 members	Free
	Teamwork	1st place	Female	3 to 4 members	Free
		2nd place	Female	3 to 4 members	Imposed
	Oral Communication	1st place	Mixed	3 to 4 members	Imposed
		2nd place	Female	3 to 4 members	Free
	Decision Making	1st place	Mixed	3 to 4 members	Imposed
		2nd place	Female	7 to 8 members	Imposed
	Leadership	1st place	Female	3 to 4 members	Free
		2nd place	Male	3 to 4 members	Free
LOW	Written Communication	1st place	Mixed	3 to 4 members	Imposed
		2nd place	Female	3 to 4 members	Free
	Time Management	1st place	Female	3 to 4 members	Free
		2nd place	Mixed	3 to 4 members	Imposed
	Project Management	1st place	Male	3 to 4 members	Free
		2nd place	Female	7 to 8 members	Imposed
	Overall	**1st place**	**Mixed**	**3 to 4 members**	**Imposed**

Source: Prepared by the authors

According to the results observed in the quasi-experiment, it is possible to identify that work teams with 3 to 4 participants, comprising female and male students, and having the students belonging to the team chosen by the teacher showed a higher degree of development in the skills tested in this study. Therefore,

using this team composition model is recommended in group teaching activities aimed at maximizing the development of skills in accounting students.

5 Conclusion

Given the need to develop skills during the training of accounting students, this study conducted a systematic review to highlight the main skills required for the accounting professional's profile. Furthermore, the systematic literature review on this topic allowed the identification, in important accounting journals, of the main skills guiding the quasi-experiment applied in this research.

Thus, this study conducted a quasi-experiment with Accounting students to present what elements of work team composition drive students' skill development in teaching activities using Nano CBL active methodologies.

Regarding the use of *Nano CBL*, the study found that this methodology enables the development of accounting students' skills, with the **Interpersonal Relationships**, **Teamwork**, **Decision Making**, **Leadership**, and **Problem Solving** Skills being developed with a satisfactory degree of intensity. On the other hand, considering the students' perception, the **Written Communication**, **Time Management**, and **Project Management** Skills showed low development in using *Nano CBL*. Therefore, based on the results, applying *Nano CBL* presents itself as a positive methodology regarding the skill development of accounting students.

Based on the quasi-experiment, the work team composition has significantly differed in the students' skill development. Therefore, it is considered that in a teaching environment that uses the *Nano CBL* active methodology, the best format for team composition is: **the choosing of team members should be imposed by the teacher; the team should comprise members of both genders, male and female; and the team should have 3 to 4 participants**. This finding is important considering that the accounting profession has undergone constant changes, and HEIs must be prepared to train professionals who are prepared for the market's demands, such as having a range of skills that must be developed during the accounting professional's training. Thus, identifying a work team model that enhances the development of skills in students during group activities allows teachers and HEIs to identify a new way to develop skills in the classroom, especially when using active teaching methodologies.

Therefore, these results point to an advance in using active methodologies to develop skills, especially regarding the *Nano CBL* methodology. Furthermore, these results provide the basis for Accounting Agencies and HEIs to identify such methodology and other active methodologies and develop students' skills in Accounting programs. Not only at the undergraduate level but also in Continuing Education, delivering the necessary development and improvement to the profile required of Accounting Professionals.

For future research, it is recommended to reapply the study in other Higher Education Institutions (HEIs) in Brazil to identify whether the results of this quasi-experiment are consistent. Moreover, regarding the use of active methodologies and the development of skills, it is indicated to consider other variables of the teaching environment, such as the influence of *Smartphones* and Social Media as a support for developing the skills of Accounting students.

This study was limited because the experimental method was not used but rather a quasi-experiment since there was no control group to compare the data between the groups receiving the experimental treatments. Furthermore, the control of external variables is a limitation. Therefore, even though such variables were identified and parameterized during the research, it was impossible to fully control the external variables to conduct the quasi-experiment.

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AUTHORSHIP CONTRIBUTION
Conception and elaboration of the manuscript: J. S. Crestani, E. S. Farias, A. Behr
Data Collection: J. S. Crestani, E. S. Farias
Data Analysis: J. S. Crestani, E. S. Farias, A. Behr
Discussion of results: J. S. Crestani, E. S. Farias, A. Behr
Review and Approval: J. S. Crestani, E. S. Farias, A. Behr

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