Students' motivation to participate in virtual exchange and its moderating effect on global competence: international cross-cultural assessment

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Resumo
The importance of global and intercultural competence is increasingly evident. In the academic field, more specifically in higher education curricula, global and intercultural competence gain notorious relevance when thinking about future professionals and the global context they face. The concept of Global Citizenship has been adopted by universities precisely to prepare future professionals who are aware of an increasingly dynamic and connected global context. One of the approaches that has gained acceptance in academia is the Virtual Exchange, facilitating interaction and virtual exchange between students and academics of different geographical locations. The construct of Global Competence is understood to comprise three dimensions: Self-Awareness, Intercultural Competence and Global Knowledge. Little is known about the effect of students' motivation to participate in Virtual Exchange as a moderating factor in relation to Global Competence. This study aimed to measure the moderating effect of students' motivation to participate in Virtual Exchange on Global Competence using the Multivariate analysis of variance (Manova) technique to model the relationship of Global Competence with its three dimensions and three types of motivations. Results of the study show a significant moderating effect of students' motivation participating in Virtual Exchange projects on Global Competence, specifically on the Intercultural Competence dimension.

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Abstract

The importance of global and intercultural competence is increasingly evident. In the academic field, more specifically in higher education curricula, global and intercultural competence gain notorious relevance when thinking about future professionals and the global context they face. The concept of Global Citizenship has been adopted by universities precisely to prepare future professionals who are aware of an increasingly dynamic and connected global context. One of the approaches that has gained acceptance in academia is the Virtual Exchange, facilitating interaction and virtual exchange between students and academics of different geographical locations. The construct of Global Competence is understood to comprise three dimensions: Self-Awareness, Intercultural Competence and Global Knowledge. Little is known about the effect of students' motivation to participate in Virtual Exchange as a moderating factor in relation to Global Competence. This study aimed to measure the moderating effect of students' motivation to participate in Virtual Exchange on Global Competence using the Multivariate analysis of variance (Manova) technique to model the relationship of Global Competence with its three dimensions and three types of motivations. Results of the study show a significant moderating effect of students' motivation participating in Virtual Exchange projects on Global Competence, specifically on the Intercultural Competence dimension.

Keywords: Interculturality, Global competence, Global citizenship, Effect, Moderation

Introduction

Research in diverse areas have identified Global Competence and Intercultural Competence as central concepts to the understanding and improving relations across cultures (Hammer, Bennett & Wiseman, 2003). In the context of an intercultural cross relation, communication has developed, according to Deardorff (2009), to a level where a more effective collaboration with people anywhere in the world is more possible than ever before. One of the approaches that have been increasing used to reach that communication and collaboration is Virtual Exchange (Helm & Van der Velden, 2021).

Educational institutions have a key role in preparing students for the global scenario they will face. Different definitions have been given for Global Competence and apparently with no consensus among scholars. Likewise, regarding Intercultural Competence, Morais and Ogden (2011) named it intercultural communication, among different labels and components existing in the literature (Griffith et al., 2016). In this study, there is an understanding that when it comes to intercultural aspects, intercultural communication can be addressed and understood as Intercultural Competence (Deardorff, 2006; Fantini, 2007). Some overlapping of conceptualisation when defining or addressing Global Competence and Intercultural Competence is observed (e.g., Deardorff, 2006; Bennet, 2009; Parkinson, 2009; Spitzberg & Changnon, 2009; Morais & Ogden, 2011; Cascio & Boudreau, 2015; OECD, 2016; Hanada, 2019).

The Global Competence definition refers to having an open mind seeking to understand others in terms of their cultural norms and leveraging the knowledge produced from that understanding to develop effectively outside one's own environment (Morais & Ogden, 2011). In the case of Intercultural Competence, Fantini (2007) defines it as a

complex of abilities that help people to perform effectively and appropriately when interacting with others in terms of language and culture.

Virtual Exchange shows benefits of putting together students and professors from different contexts to communicate and collaborate (Helm & Van der Velden, 2021). Considering Global Competence and Intercultural Competence definitions with their respective components, specifically those components referred to behavioural and attitudes of participants in Virtual Exchange projects that can aid intercultural skills (O'Dowd, 2020), this study aims to address the question: what happens with Virtual Exchange participants when those aspects are considered affecting the participation of students in Virtual Exchange projects and then, moderating the relation among the dimension of Global Competence.

Thus, the aim of this study is to measure the moderating effect of students' motivation to participate in Virtual Exchange on the Global Competence according to Morais and Ogden's (2011) construct. Multivariate analysis of variance (Manova) technique is used to model the relationship of three types of motivation to participate in Virtual Exchange (Mandatory, Rewarded and Self-motivation) and Global Competence with its three dimensions (Self-Awareness, Intercultural Communication – assumed as Intercultural Competence – and Global Knowledge). We hope to bring contributions for future studies dealing with the relation of the themes here analysed in a deeper fashion, that is the effect of students' motivation to participate in Virtual Exchange on an increasing more relevant concept for future professionals, in terms of Global Competence. After a brief literature review, the method is presented and followed by results, discussion, and conclusions of the study.

Literature review

Global and Intercultural Competence

In this study, we consider Global Competence as a construct part of a larger structure, namely, the Global Citizenship model (Morais & Ogden, 2011). For Morais and Ogden (2011), Global Competence is related to having an open mind and actively seeking to understand others in terms of their cultural norms and expectations, and along with this, leveraging this knowledge to interact, communicate and work effectively outside one's own environment. In that context, globally competent students are those who recognize their own limitations and abilities for engaging in intercultural encounters, showing intercultural communication skills and abilities to participate successfully in intercultural encounters demonstrating interest and knowledge about world issues and events (Morais & Ogden, 2011).

The construct of Global Competence is composed of 3 dimensions, namely: self-awareness, intercultural communication, and global knowledge. Regarding the first dimension, Self-awareness is related to the recognition of limitations and abilities to engage successfully in intercultural encounters. In the second dimension, Intercultural communication, the relation of this dimension is with the demonstration of intercultural communication skills and with the ability to engage successfully in intercultural encounters. Lastly, the third dimension, Global knowledge, is about displaying interest and knowledge about world issues and events (Morais & Ogden, 2011).

Similar definitions for Global Competence are observed in OECD's (2016) work, where Global Competence is understood as a multidimensional capacity where globally competent individuals can examine local, global, and intercultural issues to understand, and appreciate different perspectives and world views, interacting successfully and

respectfully with others, and taking responsible action toward sustainability and collective well-being.

Yet, for Sälzer and Roczen (2018), scientific theory-building for the construct of Global Competence is relatively new and undeveloped. In terms of the development of global competences and citizenship, for Helm, Baroni and Acconcia (2023), they have generally been addressed through student mobility with international exchanges, volunteering and/or service-learning programs and internationalisation at home approaches in universities.

Regarding the second dimension, that is, intercultural communication, scholars have used different labels and components to refer to it (Griffith et al., 2016). In this study, we follow the understanding that when it comes to intercultural aspects, intercultural communication can be addressed and understood as Intercultural Competence, (Deardorff, 2006; Fantini, 2007).

Fantini (2007. p. 9; 2009. p. 458) claims that Intercultural Competence is a complex of abilities needed to perform effectively and appropriately when interacting with others who are linguistically and culturally different from oneself. Spitzberg and Changnon (2009. p. 7) state that Intercultural Competence is an appropriate and effective management of interaction between people who, to some degree represent different or divergent affective, cognitive, and behavioural orientations to the world. Deardorff (2006) defines Intercultural Competence as effective and adequate communication and behaviour in intercultural situations. Bennet (2009) states that Intercultural Competence is most viewed as a set of cognitive, affective, and behavioural skills and characteristics that support effective and appropriate interaction in a variety of cultural contexts.

There is no consensus on the terminology around Intercultural Competence, an array of definitions has been proposed by different disciplines (Deardorff, 2011; Spitzberg & Changnon, 2009). Therefore, what is understood as Intercultural Competence in a given context may vary in another. Apparently, there is no specific model of Intercultural Competence which could be generally applicable to different disciplines. Besides, Global Competence and Intercultural Competence are used interchangeably. For instance, in Cascio and Boudreau (2015) intercultural aspects are treated in the context of Global Competence needed for global business, the same line followed Parkinson (2009), but in relation to the engineering area. Hanada (2019) addressed the experience of studying abroad in relation to Intercultural Competence.

Also, all the Intercultural Competence definitions mentioned above contemplate latent variables, requiring more work on how to measure the relation of those variables. In this paper, our focus is on understanding the effect of Virtual Exchange when moderating the relation of Global Competence' dimensions, based on the perceptions of higher education students from different countries participating in Virtual Exchange projects that may have implications and contributions for studies addressing several themes related to Global Competence (e.g., global citizenship education, internationalisation of higher education, etc). A gap was identified whereby no works measuring the relation of Global Competence construct and Virtual Exchange like the approach used here were found in the literature and to the best of our knowledge. Also, it is observed that the more used approach is pre and post-test.

As Deardorff (2011) states about Intercultural Competence, there is no silver bullet regarding an assessment tool, given the complexity of the concept, it would be challenging if not impossible for one tool to measure an individual's Intercultural Competence. It follows from this that when assessing Intercultural Competence, it is very important to define this concept within the context in which it will be used (Deardorff, 2011).

We use Morais and Ogden's definition of Global Competence (Morais & Ogden, 2011) and Fantini's (2007. p. 9; 2009. p. 458) definition of Intercultural Competence in this study. Those definitions are used withing a context where it is observed an increasingly dynamic and connected global context which has called the attention of diverse area of research (Hammer, Bennett & Wiseman, 2003). Also, since the Covid-19 health crisis, one of the approaches that has gained acceptance in academia is the Virtual Exchange, facilitating interaction and virtual exchange between students and academics from different contexts/latitudes (Helm et al., 2023). Also, Virtual Exchange is a relevant alternative in countries where costs involved in physical academic mobility may be prohibitive to most (Mendes & Finardi, 2023). Table 1 shows the dimensions and information about the Global Competence model used in this study.

Table 1. Dimensions of the Global Competence model

Dimension	Code	Description	Measuring	Source
Self awareness	SA1	How to develop a place to help mitigate a global environmental or social problem	7 points Likert scale	Morais and Ogden (2011)
	SA2	Ways to make a difference on some of world's most worrisome problems	7 points Likert scale	Morais and Ogden (2011)
	SA3	To make other people to care about global problems	7 points Likert scale	Morais and Ogden (2011)
Intercultural competence	IC1	How much unconsciously adapt behaviour and attitudes when interacting with people from other cultures	7 points Likert scale	Morais and Ogden (2011), Fantini (2007; 2009)
	IC2	How adapt communication style to other people's cultural background	7 points Likert scale	Morais and Ogden (2011), Fantini (2007; 2009)
	IC3	To communicate in different ways with people from different cultures	7 points Likert scale	Morais and Ogden (2011), Fantini (2007; 2009)
Global knowledge	GK1	To be informed of current issues that impact international relationships	7 points Likert scale	Morais and Ogden (2011)
	GK2	To be comfortable expressing views regarding a pressing global problem in front of a group of people	7 points Likert scale	Morais and Ogden (2011)
	GK3	To be able to write an opinion letter to a local media source expressing concerns over global inequalities and issues	7 points Likert scale	Morais and Ogden (2011)

Source: authors

Virtual exchange

Virtual Exchange could be understood as an increasingly used approach in higher education and defined as the engagement of a group of learners participating in online intercultural interactions projects with partners from other cultural contexts or geographical locations as part of their educational programmes (O'Dowd, 2018).

Virtual Exchange is an online learning initiative that concentrates its activities on participant's dialogues and interaction trying to develop skills on intercultural awareness, empathy, collaboration in working groups (Helm & Van der Velden, 2021), and digital

skills, since activities are mediated by technologies. In that context, research on Virtual Exchange has shown positive results regarding Virtual Exchange projects student's participation (e.g., Bassani & Buchem, 2019; Commander et al., 2022; Zheng et al., 2022; Gimeno, 2023).

At least two approaches preceded what is now proposed as a model for Virtual Exchange, e-tandem and telecollaboration. These two approaches apparently fail to deepen the experience of participants in cultural aspects, relegating them to objectives focused on acquiring a second language (O'Dowd, 2020). New proposals for Virtual Exchange seek to prepare global citizens capable of recognizing and developing in diverse cultural scenarios, including those that seek cooperation between participants offering discussions and ways of collaborating on problems that affect both cultures in question (O'Dowd, 2020).

Methodology

This explanatory study has a quantitative approach (Lacruz & Leite, 2023) aiming to measure the moderating effect of students' motivation to participate in Virtual Exchange on the Global Competence construct. This objective was sought with the understanding of student perceptions regarding their participation on Virtual Exchange projects. A survey with undergraduate and graduate student who have participated in Virtual Exchange projects/disciplines from different countries was carried out.

Instrument

A survey with a 7-point Likert scale (from totally disagree to fully agree) questions was built based on Global Competence construct of Morais and Ogden (2011) model and shared with students on the QuestionPro platform (see Appendix A). The students were asked to self-evaluate their global competence according to their participation on Virtual Exchange with students from other countries. The questionnaire was divided in 3 blocks: the first one with questions about the respondent; the second with questions related to the Global Competence construct; and the third, with a question related to the moderating variable of the model, Virtual Exchange

Quantitative approach

Manova technique was used to model the relationship between students' motivation to participate in Virtual Exchange and Global Competence construct' dimensions (Morais & Ogden, 2011). The Pillai trace was used as statistic test because the dependent variables are ordinal and the factor variable has more than two levels (i.e., three: mandatory, rewarded and self-motivation). Also, in order to verify the presence of common bias of variance in the data, the Harman one factor test was carried out (i.e., principal component analysis for ordinal scale items).

It was sought to measure the relation of the variables Self-awareness, Intercultural competence and Global knowledge with the variable Virtual Exchange, variable in this study considered as moderator in the model. Thus, the idea was to find out the moderating effect of the variable Virtual Exchange (Aguinis, 1995; Aguinis & Gottfredson, 2010).

According to Aguinis and Gottfredson (2010.p.1) the direction or strength of a relationship (i.e., first-order relationship) depends upon or is contingent upon other factors, labelled as moderator variables because the first-order relationship is moderated as the moderator variable changes.

The equation below represents variables interaction of the model:

$$S_T = S_\alpha + S_\beta + S_{\alpha.\beta} + S_w$$

Where: S = the sums-of-squares matrices
α = the first factor
β = the second factor
$\alpha.\beta$ = the interaction of the two factors
W = within the groups

The research model is show as follow (Figure 1).

Figure 1. Model

Source: authors
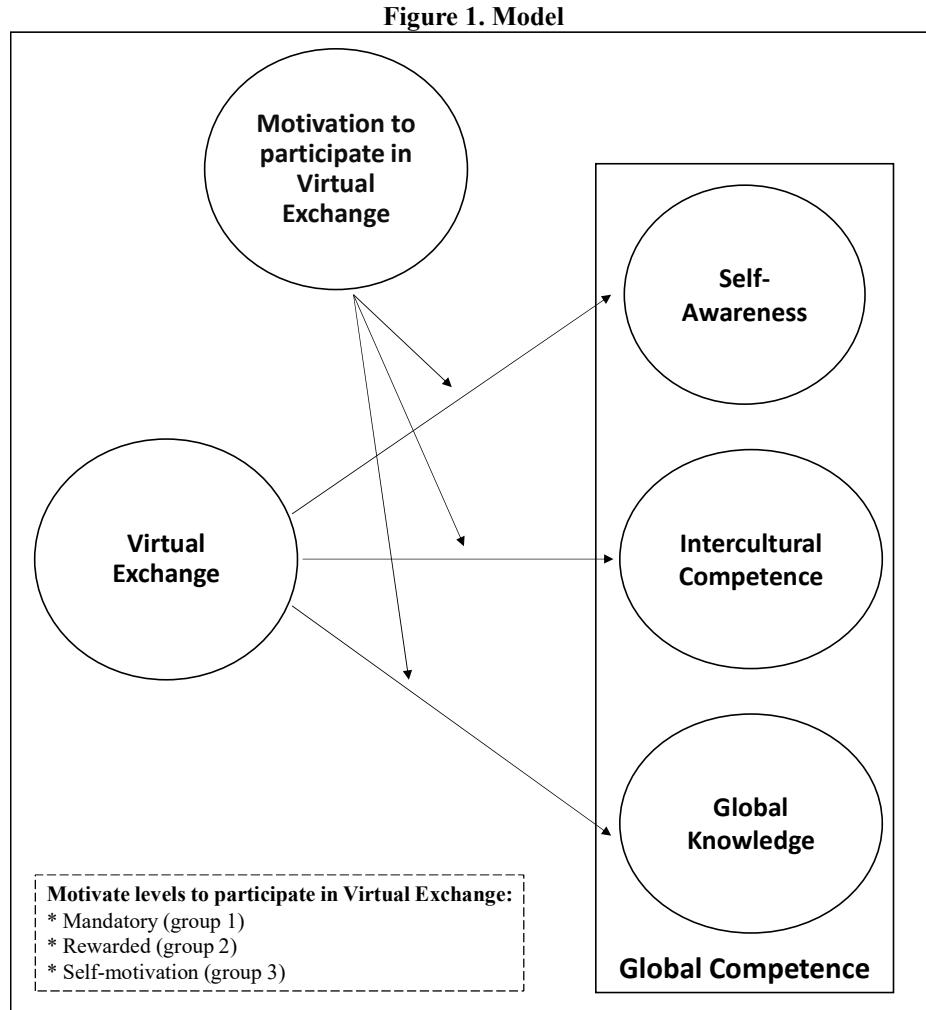
Sample

The link with the survey was sent to the students in November 2023 and remained open until March 2024. Regarding the participants of this research study, they are all undergraduate and graduate students' level from different countries with the common objective of placing them in collaborative scenarios in cultural terms, in addition to specific objectives according to each Virtual Exchange project. Table 2 depicts some characteristics of the participants in this study. With the analysis made in this work, we seek to go beyond understanding the experience and benefits perceived by Virtual Exchange participants, to understand the extent to which the participants' motivation moderates and affects the skills of these students in terms of global competence.

Table 2. Virtual Exchange participants

Country of birth	
Brazil	64,89%
England	1,06%
Italy	3,19%
Switzerland	3,19%
Turkey	9,57%
Other	18,9%
Country of study when participating in the Virtual Exchange	
Brazil	59,57%
England	2,13%
Ireland	1,06%
Italy	2,13%
Spain	1,06%
Switzerland	3,19%
Turkey	8,51%
Other	22,34%
Degree (when participating in the Virtual Exchange)	
Undergraduate level students	80%
Graduate level students	20%
Gender	
Female	66%
Male	32%
Binary or diverse	1%
Prefer not to answer	1%
Course area	
Business course	9%
Education course	63%
Other courses	28%
Number of languages (apart from your native language and English)	
One	75%
Two	20%
Three	4%
Four	0%
Five	1%
More than five	0%
Sample size	
Total number of participant students	175
Total of valid answers for statistical procedures	93

Source: authors

The minimum sample size for a Manova applying the Pillai trace, considering 3 dependent variables, 3 groups for the factor variable, significance level of 0.05, statistical power of 0.8 and effect size (η^2) of 0.1- considered small – was estimated at 82 observations (Statistics-Kingdom, 2024). A total of 175 questionnaires were received, with 93 valid observations. Eighty-one of the questionnaires were eliminated due to dropout and one because was considered "suspicious" (time taken to complete of 63 seconds and because it had the same score in all opinion variables). Thus, the sample of this study is greater than the minimum sample size required (n = 93 > 82). All data and materials have been made publicly available through the Harvard Dataverse platform and can be accessed at: *<link omitted to preserve authors' anonymity>*. Table 3 shows the descriptive statistics of the construct and the grouping variable.

Table 3. Descriptive statistics

Construct	Variable	Mean	Standard deviation	Minimum	Maximum
Self-awareness	SA1	4.69	1.367	1	7

	SA2	4.77	1.312	1	7
	SA3	4.95	1.280	1	7
Intercultural competence	IC1	5.58	1.097	2	7
	IC2	5.59	1.066	2	7
	IC3	5.69	0.978	3	7
Global knowledge	GK1	5.28	1.237	1	7
	GK2	4.75	1.487	1	7
	GK3	4.69	1.546	1	7

Frequencies by Group		
Groups	**Counts**	**% of total**
Mandatory	27	29.03
Rewarded	24	25.81
Self-motivation	42	45.16

Source: authors

Results and discussion

The 93 valid observations obtained in the survey were processed in the Software R (R Core Team, 2022) – see Appendix B for R script – and three Manova were carried out so that to find the moderating effect of student`s motivation to participate in Virtual Exchange on the 3 dimensions of Global Competence construct (i.e., Self-awareness, Intercultural competence, and Global knowledge). More specifically, Manova were carried out separately using the Pillai trace, which is considered an appropriated test when data are ordinal, or the factor variable has more than two levels. In the case of this study, data are ordinals, and the factor variable has 3 levels named as Mandatory, Rewarded, and Self-motivation.

Before processing the Manova, the Harman one factor test (i.e., principal component analysis with polychoric matrix) was carried out and as a result, the presence of common bias of variance in the data was ruled out (cumulative variance = 43.4% < 50%).

Regarding the Manova carried out for the Self-awareness dimension, results showed no significant effect of student`s motivation to participate in Virtual Exchange on it (p-value = 0.436). The same situation was observed in dimension Global knowledge (p-value = 0.235). Thus, the motivation to participate in Virtual Exchange projects did not affect participants' perception of Self-awareness and Global knowledge. These results suggest that these aspects may be stable in specific educational contexts and/or that the duration of the Virtual Exchange project was not enough to provoke changes in these dimensions among the groups with distinct motivation. Yet, the role of academics responsible for activities in the Virtual Exchange, which might affect and change student`s motivation before and during the Virtual Exchange, did not affect participants' perception regarding Self-awareness and Global knowledge.

Regarding the second dimension of the Global Competence construct, that is, Intercultural Competence, a different result was obtained, where there was a significant effect of students' motivation to participate in Virtual Exchange on Global Competence (p-value = 0.04). Therefore, results suggest that there are differences between groups of the factor moderating variable, that is, student`s motivation to participate in Virtual Exchange. Thus, the motivation to participate in Virtual Exchange projects impacted participants' perception regarding the development of skills to interact in distinct cultural contexts.

It must be informed that it was possible to assume the homogeneity of the covariance matrix using the Box's test (p-value 0.351) and that the hypothesis of multivariate normality was rejected using the Shapiro-Wilk test (p-value < 0.001). It is

worth to mention that homogeneity and normality test results are in line with our option of using the Pillai trace to process the Manova.

Table 4 shows results of the Manova using the Pillai trace test with a significant effect of students' motivation to participate in Virtual Exchange on the Intercultural Competence dimension and Table 5 shows the univariate tests for variables of the Intercultural Competence dimension (i.e., IC1, IC2 and IC3).

Table 4. Manova – Intercultural Competence

Multivariate tests

		value	F	df1	df2	p-value
Groups	Pillai trace	0.141	2.26	6	178	0.040

Source: software

Table 5. Univariate tests Intercultural Competence

	Dependent variable	Sum of squares	df	Mean square	F	p-value
Groups	IC1	9.60	2	4.798	4.27	0.017
	IC2	4.35	2	2.177	1.96	0.147
	IC3	3.57	2	1.787	1.91	0.155
Residuals	IC1	101.05	90	1.123		
	IC2	100.12	90	1.112		
	IC3	84.38	90	0.938		

Source: software

Table 4 shows that the multivariate analysis revealed a difference between the groups for Intercultural Competence and Table 5 (univariate analysis) shows that only for variable IC1 this difference is statistically significant (p-value = 0.015). Complementary, so as to verify which groups were different (variable IC1), a post-hoc analysis was carried out using the nonparametric Kruskal Wallis test and Dwass-Steel-Critchlow-Fligner pairwise comparation test (see Table 6 and 7).

Table 6. Kruskal-Walli's test (IC1 variable)

	χ^2	df	p-value	ε^2
IC1	7.768	2	0.0206	0.0844

Source: software

Table 7. Dwass-Steel-Critchlow-Fligner pairwise comparison (variable IC1)

		W	p-value
1	2	3.1992	0.0613
1	3	-0.1096	0.9967

Table 7. Dwass-Steel-Critchlow-Fligner pairwise comparison (variable IC1)

		W	p-value
2	3	-3.7403	0.0223

Source: software

Variable IC1 showed a significant effect on the second dimension of Global Competence construct, that is Intercultural Competence. The epsilon-square value (0.06 $< \varepsilon^2 < 0,14$) indicates that the effect size is moderate (Barros et al., 2018). The IC1 variable is related to how much unconsciously students adapt their behaviour and attitudes when interacting with people from other cultures. More specifically, the Kruskal Wallis post hoc test indicates that there are differences between groups regarding this IC1 variable (p-value = 0.0206).

To find out where those differences were, the Dwass-Steel-Critchlow-Fligner pairwise comparison test was carried out and results are shown in Table 6, indicating a significant difference between group 2 and group 3 (p-value = 0.0223). Regarding the comparison between group 1 and 2, no significant difference was identified at level 0.05. However, a significant result is obtained at the mildest level of 0.10 (p-value = 0.0613). In relation to the comparison between group 1 and 3, no significant differences were identified neither (p-value = 0.9967). In other words, groups 1 and 3 are not statistically different and group 2 is distinguished from the others.

Additionally, the mean and the confidence interval demonstrate that the mean of of Group 2 > Group 1 > Group 3 (see Table 8).

Table 8. Confidence interval of mean

Variable	Group	Mean	95% Confidence Interval		90% Confidence Interval	
			Lower	Upper	Lower	Upper
	1	5.41	4.97	5.84	5.04	5.77
IC1	2	6.13	5.83	6.42	5.88	6.37
	3	5.38	5.03	5.73	5.09	5.67

Source: authors

Before going deeper into the significant difference found between groups 2 and 3, all the groups of the moderating factor variable are reminded:

- Mandatory (group 1) = I just participated in the Virtual Exchange because it is a mandatory discipline in my course.
- Rewarded (group 2) = I just participated in the Virtual Exchange because although it is not a mandatory discipline, it gives me credits that I need for my discipline/course.
- Self-motivation (group 3) = I decided to participate in the Virtual Exchange because even though it is not a mandatory discipline and does not give me any credit for my participation, I wanted to.

The significant result in the comparison between group 2 and group 3 (at significance level α = 0.05) and between group 2 and group 1 (at significance level α = 0.10), leads us to understand that there are differences between students' motivation to participate in a Virtual Exchange project/discipline expecting a reward for that

participation (group 2) or because the participation is mandatory (group 1) and students who participated for a self-motivation and no rewards are expected from them (group 3) when it comes to Global Competence goals. The above-mentioned results are related to Intercultural Competence and, more specifically, related to how much unconsciously students adapt their behaviour and attitudes when interacting with people from other cultures.

This finding is quite important for academics organizing Virtual Exchange projects because students' motivation play a crucial role in the development of Virtual Exchange activities. What the result of this study suggests is that significant differences exist when there are students waiting for rewards or when the participation in the Virtual Exchange is mandatory and those who participate because they want to, having also important implications for Global Competence goals of a specific Virtual Exchange project.

Indeed, O'Dowd (2020) states that Virtual Exchange projects seek to prepare global citizens capable of recognizing and developing in diverse cultural scenarios, with the possibility of offering discussions and ways to collaborate with problems that affect cultures. Therefore, how Virtual Exchange projects are organised and how goals are setting down are aspects to pay attention before starting any Virtual Exchange initiative.

There is considerable research finding good overall results in Virtual Exchange projects (e.g., Bassani & Buchem, 2019; Commander et al., 2022; Zheng et al., 2022; Gimeno, 2023). However, in this study, instead of using the pre and post-test normally applied in studies about Virtual Exchange, we decided to tackle students' motivation for participating in Virtual Exchange projects regarding Global Competence goals.

It is interesting to notice that the significant finding of this study is in the Intercultural Competence dimension of Morais and Ogden's Global Competence construct. Both, Global and Intercultural Competence are relevant concept when we think about how to equip students for the global scenario.

Thus, thinking about the definition of Global Competence, which refers to having an open mind seeking to understand others in terms of their cultural norms (Morais & Ogden, 2011) and Fantini's (2007) definition of Intercultural Competence as a complex of abilities that help people to perform effectively and appropriately when interacting with others, again, it is clear the importance of planning and preparing Virtual Exchange projects to try to involve all the students so that to reach the best results in term of participation and engagement for Global Competence construction among students.

Conclusions

In this study, we sought to measure the moderating effect of students' motivation to participate in Virtual Exchange on the Global Competence construct of Morais and Ogden's (2011) model. The Manova technique was used to model the relationship of Global Competence with its three dimensions: Self-Awareness, Intercultural Competence and Global Knowledge and the variable considered as moderating factor, that is students' motivation to participate in Virtual Exchange.

Results of this study suggest that there is a statistically significant difference between group 2 (Rewarded) and groups 1 (Mandatory) and group 3 (Self-motivation) of the moderating factor variable of the model, that is students' motivation to participate in Virtual Exchange, on the Intercultural Competence dimension of Global Competence construct. Thus, when it comes to building Intercultural Competence students' motivation for participating in Virtual Exchange has a significant effect depending on the type of that motivation.

The statistically significant difference was found between those students who participate expecting a reward for their participation in the Virtual Exchange (group 2) and students who participated for a self-motivation and no rewards were expected from them (group 3) at significance level $\alpha = 0.05$, and students who participated because it is a mandatory discipline (group 1) at significance level $\alpha = 0.10$. No statistically significant differences were found when comparing group 1 and 3. From that result, we could understand that better results are expected from student with self-motivation when participating in Virtual Exchange that seek to prepare and equip students in terms of Global Competences and less could be expected in terms of involvement from the students who expect a reward for their participation or because Virtual Exchange is a mandatory discipline.

From a practical stance, results of this study suggest that it is important to pay attention to students' engagement in the activities not just during the Virtual Exchange, but perhaps more importantly before starting any Virtual Exchange initiative seeking to build Global Competence skills among students. Perhaps, one possibility for professors working with Virtual Exchange projects is to show to students results from other Virtual Exchange experiences so that motivate them before starting the new endeavour. Using past Virtual Exchange projects as an argument it is also useful for academics in terms of learned lessons that can be used for future projects.

This work was not exempt of limitation, some of them related to any study applying a survey, where some features of the sample should be considered. In our case, although our sample is representative having data from different countries, there is a concentration of data in one of them, Brazil. Future studies should be aware of that limitation and may try to obtain a more well distributed sample. Also, the effect of student's participation in Virtual Exchange on their Global competences, as moderator or as a response variable in the model, could be addressed using the structure equation modelling (SEM) technic. Using SEM technic also could allow to find out effects in the relation between all the latent variables included in the model. Also, longitudinal studies could reveal the long-term effects of Virtual Exchange projects, just to mention some possibilities for future studies.

With this work we bring contributions for future studies dealing with Virtual Exchange and Global Competence topics in general and more specifically for the inclusion of students' motivation when it comes to study the Virtual Exchange approach. Also, we bring contributions for studies addressing how Virtual Exchange projects are prepared and planned, where students' motivation we believe should be considered so that to achieve their goals in terms of Virtual Exchange and Global Competence.

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Appendix A

Questionnaire

Checking question

Have you participated or are you participating in a Virtual Exchange?

----Yes　　　　----No

Demographic questions

With what gender do you identify most?

---- Female　　-----Male　----Binary or diverse　----I prefer not to answer

What country are you from?

In what country do you study? (when participating in the Virtual Exchange)

How many languages do you speak apart from your native language and English? (Assuming Virtual Exchange in English)

----1　----2　----3　-----4　----5　----more than 5

Please, indicate your course area.

----Business or Economics　-----Education　----Other (which one) ------------------

Please, indicate your degree when participating in the Virtual Exchange

----Undergraduate　----Master　----PhD　----Post Doctoral

GLOBAL COMPETENCES (Likert scale 7)

Self-awareness

Q1 = I know how to develop a place to help mitigate a global environmental or social problem.

Q2 = I know several ways in which I can make a difference on some of this world's most worrisome problems.

Q3 = I am able to get other people to care about global problems that concern me.

Intercultural competence

Q4 = I unconsciously adapt my behaviour and attitudes when I am interacting with people from other cultures.

Q5 = I often adapt my communication style to other people's cultural background.

Q6 = I am able to communicate in different ways with people from different cultures.

Global knowledge

Q7 = I am informed of current issues that impact international relationships.

Q8 = I feel comfortable expressing my views regarding a pressing global problem in front of a group of people.

Q9 = I am able to write an opinion letter to a local media source expressing my concerns over global inequalities and issues.

Virtual Exchange

Q10. Please, indicate one of the options below why you decided to participate in the Virtual Exchange discipline or project.

----I just participated in the Virtual Exchange because it is a mandatory discipline in my course.

----I just participated in the Virtual Exchange because although it is not a mandatory discipline, it gives me credits that I need for my discipline/course.

----I decided to participate in the Virtual Exchange because even though it is not a mandatory discipline and does not give me any credit for my participation, I wanted to.

Appendix B
R script

```
#Import dataset -----
library(readr)
dataset <- read_delim(
  "dados.csv",
  delim = ";",
  escape_double = FALSE,
  trim_ws = TRUE)

#Harman's one-factor test -----
library(psych)
pca <- pca(
  dataset [,2:10],
  nfactor=1,
  cor="poly",
  fm="wls",
  rotate = "none")
pca$loadings # Cumulative variance < 50%

#Descriptive -----
library(jmv)
descriptives(
  data = dataset,
  vars = vars(SA1, SA2, SA3, IC1, IC2, IC3, GK1, GK2, GK3),
  desc = "rows",
  n = FALSE,
  missing = FALSE,
  median = FALSE)

descriptives(
  data = dataset,
  vars = Group,
  freq = TRUE)

#Manova -----
##SA
mancova(
  data = dataset,
  deps = vars(SA1, SA2, SA3),
  factors = Group,
  multivar = "pillai",
  boxM = TRUE,
  shapiro = TRUE)

##IC
mancova(
  data = dataset,
  deps = vars(IC1, IC2, IC3),
```

```
  factors = Group,
  multivar = "pillai",
  boxM = TRUE,
  shapiro = TRUE)

##GK
mancova(
  data = dataset,
  deps = vars(GK1, GK2, GK3),
  factors = Group,
  multivar = "pillai",
  boxM = TRUE,
  shapiro = TRUE)

#Kruskal-Wallis and post-hoc test (IC1) -----
anovaNP(
  formula = IC1 ~ Group,
  data = dataset,
  es = TRUE,
  pairs = TRUE)

#Confidence interval of mean
descriptives(
  formula = IC1 ~ Group,
  data = dataset,
  desc = "rows",
  n = FALSE,
  missing = FALSE,
  median = FALSE,
  sd = FALSE,
  min = FALSE,
  max = FALSE,
  ci = TRUE,
  ciWidth = 95) # IC 95%

descriptives(
  formula = IC1 ~ Group,
  data = dataset,
  desc = "rows",
  n = FALSE,
  missing = FALSE,
  median = FALSE,
  sd = FALSE,
  min = FALSE,
  max = FALSE,
  ci = TRUE,
  ciWidth = 90) # IC 90%
```