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ANALYSIS OF THE EFFECTS OF COMMUNICATION SKILLS ON STUDENT SATISFACTION AND PERCEIVED LEARNINGS IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT. Teaching in Higher Education, especially the role of communication, has changed over the last couple of years. Therefore, this study analyzes the effects of communication skills on student satisfaction in online sessions. Furthermore, we want to uncover how students perceive their performance and learning progress when they are involved in online lectures. Data were generated via an online questionnaire by using validated measurement instruments, resulting in $N = 117$ responses from German students in 2024. Data was analyzed by using partial least squares structural equation modeling (PLS-SEM). Results highlight that social competences with other learners are significantly related to learner-learner interaction ($\beta = .470$, $p < .001$), while social competences with instructors are associated with learner–instructor interaction ($\beta = .621$, $p < .001$). Learner–learner interaction is significantly related to motivation for learning ($\beta = .412$, $p < .001$), which is associated with student satisfaction ($\beta = .300$, $p = .001$). Student satisfaction significantly mediates the relationship between motivation and perceived learning ($\beta = .203$, $p = .002$). Satisfied students are strongly related to perceived learning ($\beta = .678$, $p < .001$). This study contributes a new validated conceptual framework on communication in online learning, which highlights the superior role of interaction and communication in online learning.

JEL Classification: A20, A22, A23, I21, I23

Keywords: communication skills, students, teachers, perceived learning, higher education institutions (HEI), online learning, motivation for learning, PLS-SEM, eLearning, Germany

Introduction

In the last couple of years, the way of how students and instructors communicate with each other changed dramatically, especially due to the further development of technology as well as due to the COVID-19 pandemic (Dreer et al., 2020). Therefore, the virtual learning environment is fast becoming a key instrument in higher education. Prior research showed, that

in higher education more than 30% of students took at least one course in an online environment (Seaman et al., 2018). Thus, online learning is of increasing interest for students as well as for instructors. Online learning is not just using technical tools like blackboards (Alfehaid & Omar, 2023), it requires good communication skills from both students and instructors.

According to Campeanu et al. (2023, p. 316) it is a "big challenge to identify ways to transfer and to consolidate knowledge in a remote manner". Therefore, the influence of communication skills on the learning outcome can play an important role in addressing the issue of students' perception of their own learning progress and their satisfaction with the learning outcome. Liu (2019) uncovered that the willingness and readiness of students for online learning is a key factor. Readiness means that students prepare themselves in a good manner to take part in online sessions and to perform learning.

New models were developed like "inclusive online collaborative learning environments" (Kaufmann et al., 2022) or just learning orientation designs (Liu, 2019). Online collaborative environments lead to sharing authority and acceptance of everyone in a group. Additionally, interactions are becoming more vital for progress in learning and performance of team members. As a prerequisite for collaboration and interaction we can consider learning oriented designs that might focus on technical equipment but even more important on students' readiness for online learning. According to Demir Kaymak & Horzum (2013) a strong relationship was found between readiness for online learning and perceived interaction.

Derived from those ideas and models, our overarching aim of this paper is twofold: First, we want to analyze the effects of communication skills on student motivation, satisfaction in online sessions and second, we want to uncover how students perceived their progress in learning and consequently their performance. Additionally, a key factor in this context is how interactions between both, students and instructors, have an influence on the outcome. Alqurashi (2019) identified that interaction plays an important role in online education since interaction was mostly absent in early stages of distance education. In the context of higher education, where the complexity of subject matter increases and the diversity of student populations is broader, the role of effective communication becomes even more critical. Thus, higher education institutions are in the limelight of this analysis.

Derived from the context above the following research question was formulated:

RQ1: What are the effects of communication skills on student motivation, satisfaction and perceived learnings in higher education institutions?

Current research calls for answering this question, since there is an open knowledge gap referring to the antecedent constructs of student motivation (Kołodziej & Kołodziej-Durnaś, 2024). Moreover, according to Venze et al. (2023, p. 1882) further "studies can be designed to explore the effects of online learning activities". Since existing studies focus on fully online courses (Alqurashi, 2019), this study concentrates on hybrid study programs in Germany.

Thus, this study contributes to knowledge by developing a new conceptual framework on communication in online learning, which will be validated by partial least squares structural equation modeling (PLS-SEM). So, new insights on the relevance of communication, associated with motivation, satisfaction and perceived learning, in higher education will be presented.

1. Theoretical background

In terms of online learning, there are three different types interactions. Moore (1989) categorizes them as learner-content, learner-instructor and learner-learner interactions. According to Moore (1989), the learner-content interaction describes the interaction of students with the material. Based on these interactions, students are engaged and participate actively in

virtual learning environments (Martin et al., 2018; Seo et al., 2021). Moreover, they experience a learning in online communication as well (Luo et al., 2017). Learner-instructor interaction was identified as the most important interaction type since instructors can motivate students by offering feedback, several communication channels, support and guide them through online discussions (Martin et al., 2018; Martin & Bolliger, 2018; Shackelford, 2012; Zhang et al., 2018). Finally, student satisfaction as well as student performance in online learning environments is significantly impacted (Andersen, 2013; Kang & Im, 2013).

When learners interact with each other, Moore (1989) refers to a communication between two or more learners, i.e., learner-learner interaction. This communication is of great importance in online learning environments since collaboration and rich discussions are fostered (Kurucay & Inan, 2017). Furthermore, the interaction can enhance knowledge sharing, supporting peers (Pan et al., 2024) and reflect that students work on the materials provided by learning and showing how to present a certain point of view and to debate on it (Katsarou & Chatzipanagiotou, 2021). Critical thinking as well as analytical skills are also cultivated (Pan et al., 2024).

In this evolving field, research changed over the past years from analyzing the shift towards online learning, but instead about the ways in which online learning can succeed (Vermeulen & Volman, 2024). Thus Wang et al. (2024) highlight the relevance of interaction between students and content, other students as well as teachers, when achieving student satisfaction. However, a correlation analysis was conducted, which was not analyzed for potential mediating or moderating effects. Due to a well-organized online learning, students experience lower work-study tradeoffs and higher degrees of flexibility (Davidovitch & Eckhaus, 2022). Furthermore, the role of employees of higher education institutions is in the limelight as not only students went through a change process, highlighting that productivity was enhanced while perceived autonomy declined (Staniec et al. 2023). This study focuses on the communication skills of both, learners and instructors and its effects on student motivation, satisfaction, and perceived learnings.

2. Literature review and development of hypotheses

Our literature review is focused on theories and models supporting our conceptual framework.

Social competences with classmates

A study was conducted by Liu (2019) that focused on online learning designs with a readiness scale. A readiness scale means that student's preparation for an online session can be measured as well as the environmental structure. The readiness theory might focus on students' preferences for the form of delivery (in contrast to face-to-face classes), students' confidence in using technical equipment and the ability to take care of own learning progress (Hung et al., 2010). The environmental structure of an online session, because of learners' and instructors' physical distance, is important regarding the quality of learner-learner interactions. When the structure of online sessions increased, interaction decreased. On the one hand, interaction is related to students' willingness and readiness (Liu, 2019) to participate in an online session and on the other hand, interaction can only take place when students bring in their communication skills which are also a part of social competencies.

Demir Kaymak & Horzum (2013) found in their study that students' readiness is positively related with the level of interaction. When readiness increased-due to a good preparation design- interaction increased as well. Additionally, it was found that when readiness decreased, interaction decreased too.

Derived from this we formulate our first hypothesis:

H_1: Social competences (communication skills) with classmates are positively associated with learner-learner interaction.

Learner-learner interaction

Interaction is a complex concept (Kuo, 2010) and consists of both, human engagement and technological equipment. Since technical tools developed of the last couple of years, online learning is an alternative to face-to-face education in classrooms. In the framework (theory) for interaction, according to Moore (1989), learner-learner interaction is defined as a valuable resource of learning when students use their interaction for individual as well as group performance. Our second hypothesis follows this approach and is formulated as follows:

H_2: Learner-learner interactions are positively associated with students' motivation for learning.

Social competences with instructor

In online sessions students and instructors interact differently compared to face-to-face sessions. The ability, confidence and self-esteem of students to ask instructors questions or to initiate discussions with instructors is highly different (Liu, 2019). This might be caused by different emotions as Amadi & Paul (2017) uncovered in their study. Factors like anxiety, expression, interceptions and physical discomfort support a disconnection of the communication process between students and instructors. Students reported in a study of Kuo (2010) that the level of interaction with the instructor increased when students received feedback or comments on their accomplishments. Furthermore, it was found that communication with a variety of technical tools supported the communication process. Importantly, a course structure designed by an instructor seems to have an influence on students' engagement in online sessions. Summarized, our next hypothesis is:

H_3: Students' social competences (communication skills) with instructor are positively associated with learner-instructor interaction.

Learner-instructor interaction

Interaction between students and instructors aims to keep students motivated to follow the learning sessions and to keep themselves on track. Instructors give students feedback and support them with tools which will help them to apply what they have learned (Moore, 1989). Furthermore, the contact between students and instructors can be more intensive when interaction takes frequently place. Importantly, instructors course design can stimulate students' interest in the content of the course or help to motivate students (Kuo, 2010). In that context feedback is very important in online sessions. Feedback should be given by instructors to students as well as by students to instructors. This leads to the next hypothesis:

H_4: Learner-instructor interactions are positively associated with students' motivation for learning.

Motivation for learning

In online sessions students require well-developed self-regulated learning skills (Artino, 2007). According to Artino (2007), self-regulated learning is a constructive process in which students monitor, regulate, motivate themselves and develop their learning goals to perform

best. Support from an instructor is a limited resource in online learning sessions, so students need confidence in their ability to attain defined performance levels. Students' motivation to learn and to regulate their learning is influenced by the instructor's course design or learning session. Regarding Borah's (2021) study, students' motivation is also connected with four dimensions: Competence, control and autonomy, interest and value, and relatedness belonging to a desired social group or to the classroom. According to Hung et al. (2010), students' motivation for learning increased when the task outcome was close to students desired outcome. From that we derive our next hypotheses:

H_5: Motivation for learning is positively associated with student satisfaction.
H_6: Motivation for learning is positively associated with perceived learning.

Student satisfaction

Students' satisfaction is very important for students themselves as well as for educational institutes (Wong & Chapman, 2023). Students' satisfaction increased when the online course material helps them to understand the course content (Alqurashi, 2019) and when they were able to interact frequently with their classmates and instructors in online sessions (Wong & Chapman, 2023). Therefore, the quality and quantity of interaction plays a vital role in online sessions. Although Wong and Chapman (2023) focus on student-faculty and student-student interactions, the interaction with instructors inside and outside the faculty was a significant predictor of students' satisfaction. Moreover, satisfaction increased when in measuring interaction levels, the how of student's interaction with others was a significant predictor and not only with whom they interact (Wong & Chapman, 2023). In a study of Artino (2008), it was found that students who were confident and have a high level of self-efficacy beliefs are motivated and satisfied with the online material. Moreover, those students reported that they were more likely to take other online courses in the future.

Perceived learning

After the COVID-19 pandemic people changed their behavior. They were more reluctant to show up in groups or teams on computer screens. Kaufmann et al. (2022) call it "hiding behavior" in the classroom. Hiding behavior means that students are reluctant to express themselves, participate and to contribute to the e-classroom session. Instructors are asked to help students by giving them communication rules from the very beginning of an online session. Furthermore, a so-called safe place should be offered in which every contribution is valued. According to Kaufmann et al. (2022), to improve interaction of participants, building smaller groups increased the frequency of interaction and has led to students' perception that their desires are met. In addition, if online learning is well designed, it even trust in the career perspective for students (Kołodziej & Kołodziej-Durnaś, 2024).

According to Alqurashi (2019), perceived learning is a core element of learning and how students evaluate courses. Students' feedback on perceived learning helps instructors to improve the course design, delivery and evaluation of the course. Moreover, students enhance their learning experience. It was also found that the quality and quantity of interaction amongst students and with their instructors could have a better impact on their perceived learning and satisfaction (Alqurashi, 2019).

Based on the theories we formulate our next hypotheses:

H_7: Student satisfaction is positively associated with students perceived learning.
H_8: Motivation for learning and perceived learnings is positively mediated by student satisfaction.

Based on our literature review, we summarize our hypotheses and visualize them in figure 1.

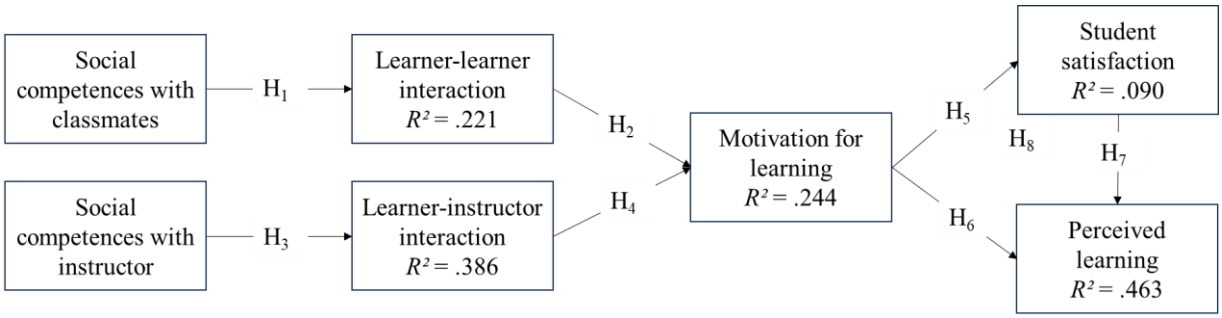

Figure 1. Conceptual framework on communication in online learning
Source: Own depiction

3. Research methodology

For analyzing the data, partial least squares structural equation modeling (PLS-SEM) was applied, as latent variables with complex relationships represented the focus of the analysis (Cheah et al., 2024; Hair et al., 2017). Thus, SmartPLS 4 (Ringle et al., 2022) was used for the statistical analysis since SmartPLS is suggested to be the best one for PLS-SEM (Henseler, 2017).

For measuring the constructs' only validated scales have been used. Within an online questionnaire, participants were asked to rate on a seven-point Likert scale including a cannot answer option. All constructs were translated from English into German via applying Brislin's (1986) back-translation procedure. The following table contains an overview of scales used including a sample item:

Table 1. Overview of constructs and sample items

Abbreviation of construct	**Construct (Source)**	**Sample item**
SCC	Social competences with classmates α = .914 (Liu, 2019)	Apply different social interaction skills depending on situations.
SCI	Social competences with instructor α = .951 (Liu, 2019)	Initiate discussions with the instructor.
LLI	Learner-learner interaction α = .954 (Kuo et al., 2014)	Group activities during class gave me chances to interact with my classmates.
LII	Learner-instructor interaction α = .788 (Kuo et al., 2014)	I received enough feedback from my instructor when I needed it.
MfL	Motivation for learning CR = .843 (Hung et al., 2010)	I improve from my mistakes.
StSat	Student satisfaction α = .940 (Alqurashi, 2019)	Overall, I was satisfied with my online learning experience.
PL	Perceived learning (Artino, 2007)	In your estimation, how well did you learn the material presented in this course?

Source: *Own table*

For generating the data, an online questionnaire was distributed between March and May 2024. Students were contacted via email or online learning platforms. Moreover, students were asked to fulfill the questionnaire during the lectures. Students were also asked to distribute the questionnaire further, so a cluster as well as snowball sampling was applied. Finally, 117 usable data sets were generated, which is above the required minimum sample size of 103, according to G*Power analysis (effect size .15; error probability .05; power .8) (Faul et al., 2009). The 117 respondents were composed of 58 women and 59 men, so there was a balanced gender representation. The average age is 26.65 years. the students have an average of 32% online learning (n = 116). Thus, the sample is understood as being a solid foundation for the analysis.

4. Results and methodological procedure

While analyzing the data, no outliers were identified. Moreover, the data is roughly normally distributed since skewness ranges from -1.236 to .444 and kurtosis ranges from -.627 to 3.611. Missing values were replaced by applying Multivariate Imputations by Chained Equations (MICE) (Azur et al., 2011; Buuren van & Groothuis-Oudshoorn, 2011). Due to its five imputed and finally pooled data, MICE is superior to single imputation techniques (Döring & Bortz, 2016; IBM Corp., 2021; Jekauc et al., 2012).

4.1. Measurement model analysis

Referring to Hair et al. (2019), internal consistency, convergent validity and discriminant validity have to be assessed for measurement model analysis. The results of the measurement analysis are summarized in table 2.

Table 2. Assessing the measurement model

Construct	No. items	IL min	IL max	CR	α	AVE	DV
SCC	5	.250	.884	.857	.779	.555	Yes
SCI	5	.496	.888	.874	.816	.578	Yes
LLI	8	.628	.831	.888	.867	.518	Yes
LII	4	.671	.797	.744	.735	.557	Yes
MfL	4	.676	.775	.726	.721	.544	Yes
StSat	2	.930	.931	.846	.846	.866	Yes
PL	1	1	1	n/a	n/a	1	Yes

Note: IL min = item loading minimum; IL max = item loading maximum; CR = composite reliability, i.e., $\rho\Lambda$; α = Cronbach's alpha; AVE = average variance extracted; DV = Discriminant validity.
Source: *Own table*

According to Hair et al. (Hair et al., 2017, 2019, 2022), cronbachs alpha (α) and composite reliability (CR) refer to the internal consistency. The threshold of .7 was exceeded by all constructs. Moreover, the AVE was above .5, so construct validity was established. Finally, the heterotrait-monotrait (HTMT) criterion was assessed for controlling for convergent validity. The threshold of .85 was not exceeded by the HTMT. In addition, the bootstrapping procedure highlighted that all HTMT values are significant. Thus, discriminant validity has been established.

4.2. Structural model analysis – testing of hypotheses

In order to analyze the structural model, multicollinearity has to be examined by using the variance inflation factor (VIF) which must be below the threshold of 5 (Hair et al., 2017). As the VIFs vary from 1.000 to 1.666, this criterion was achieved. Moreover, the R^2 values are assessed. The R^2 for perceived learning (.463) and learner instructor interaction (.386) are substantial, the R^2 values for motivation for learning (.244) as well as learner learner interaction (.221) are moderate and the R^2 value for student satisfaction (.090) is considered to be weak, according to Cohen (1988).

Finally, path coefficients including the effect sizes – indicating if a construct substantively impacts an endogenous construct – are reviewed in order to test the hypotheses. Referring to Cohen (1992), .02 refers to small, .15 to medium and .35 to large effect sizes. Table 3 includes all relationships including its path-coefficients (β), p- as well as f^2-values.

Table 3. Assessing the structural model

Hypotheses	Path	β	p	f^2	Remarks
H_1	Social competences with classmates → Learner-learner interaction	.470	.000	.283	Supported
H_2	Learner-learner interaction → Motivation for learning	.412	.000	.135	Supported
H_3	Social competences with instructor → Learner-instructor interaction	.621	.000	.628	Supported
H_4	Learner-instructor interaction → Motivation for learning	.115	.293	.011	Not supported
H_5	Motivation for learning → Student satisfaction	.300	.001	.099	Supported
H_6	Motivation for learning → Perceived learning	.010	.892	.000	Not supported
H_7	Student satisfaction → Perceived learning	.678	.000	.779	Supported

Source: *Own table*

In addition, figure 2 visualizes the final model including the path coefficients.

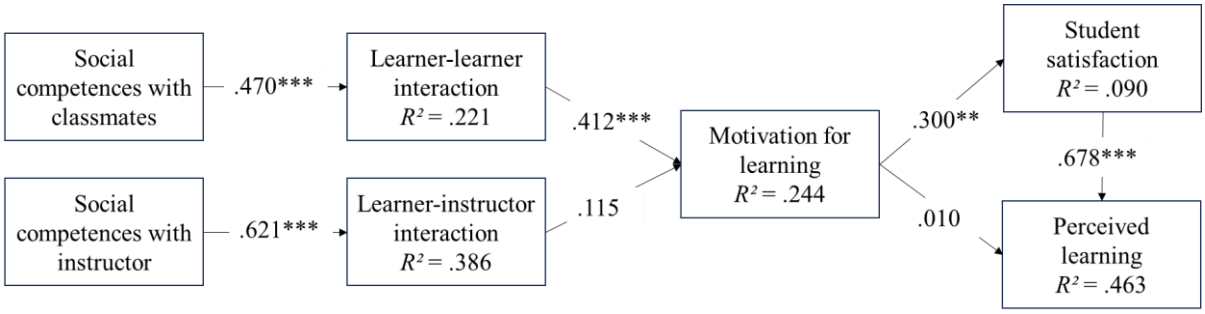

Figure 2. Results of the structural model
Note: (*** p < .001; ** p < .05; * p < .1)
Source: Own depiction

4.3. Mediation analysis

As recommended by Hair et al. (2019), H_8 was analyzed separately by determining the level of significance via the bootstrapping procedure. The results show that the nexus between motivation for learning and perceived learnings is positively and statistically significantly mediated by student satisfaction (β = .203, p = .002).

5. Discussion

Our study started with two aims. First, we wanted to analyze the effects of communication skills on student motivation and satisfaction in online sessions and second, we wanted to uncover how students perceived their progress in learning and consequently their performance. Our results indicate that communication skills (interaction) are a strong predictor for interaction between learners but also between learners and instructors as the relationships are highly significant. Moreover, learner-learner interaction is highly significantly related to motivation for learning, which – from our point of view – reflects via the collaboration and discussion with peers a motivation for learning. This is in line with existing research (Katsarou & Chatzipanagiotou, 2021; Kurucay & Inan, 2017; Moore, 1989). Moreover, it also reflects that students are not hiding but actively participating which also positively affects motivation (Kaufmann et al., 2022). Learner-instructor interaction is also positively related to motivation for learning, although not significant. Therefore, this findings are contradicting existing literature stating that learner-instructor interaction is the most important one (Martin & Bolliger, 2018). Moreover, motivation for learning is statistically significantly related to student satisfaction, but not to perceived learning. The relationship to student satisfaction is in line with existing research (Artino, 2008). It is, however, surprising that student motivation is not statistically significantly associated with perceived learning. The explanation the mediation; the relationship between motivation for learning and perceived learnings is positively and statistically significantly mediated by student satisfaction. Thus, there is an indirect effect. Finally, satisfied students are statistically significantly related to perceived learning which is in line with Alqurashi (2019).

5.1. Theoretical contributions

Our study reveals that in online sessions, students' and instructors' interactions play an important role. Theory on interactions in online sessions has been expanded. Especially, we highlight the paramount importance of learner-learner interaction which is even more important than learner-instructor interaction. This enhances on the one hand the theory while it forces instructors, on the other hand, to focus more on learner-learner interactions when designing online courses due to its positive and statistically significant effects. Thus, the effect of communication with peers constitutes a significant theoretical finding as it related to motivation. So, students motivate each other even better than instructors.

5.2. Managerial contributions

The results indicate the relevance of social skills as they are the foundation for high quality interaction. Thus, social competences have to be trained, i.e., higher education institutions have to develop their instructors and implement social competences and communication skills in their study programs for learners as well.

Study programs should focus on the interaction between learners since this is statistically and significantly related to motivation for learning. Thus, group works, for instance, should be enhanced instead of lectures by the instructors only.

Furthermore, online learning enables students but also instructors to work outside of the premises of the higher education institution. Thus, online learning can lead to flexible work arrangements for instructors as well which comes along with beneficial aspects for companies, i.e., higher education institutions, and instructors as well (Kamp et al., 2024; Tirrel et al., 2021).

5.3. Limitations and avenues for further research

This study has some limitations, which might also lead to further research. First, this is a cross-sectional study which does not claim to present causal effects due to several methodological issues like endogeneity which were not controlled in this study (Wilms et al., 2021). Therefore, future research should focus on establishing causal effects by conducting longitudinal or experimental studies.

Second, this study is regionally bound to Germany. Thus, the results cannot be generalized to other countries or cultures. Therefore, further studies have to evaluate online studies in various countries and cultures. The results should be compared in order to identify cross-national or -cultural differences.

Third, as indicated in the managerial implications, future research should analyze the positive and negative effects of flexible work in higher education institutions, as it is common practices in other industries (Tirrel, 2023; Tirrel & Winnen, 2018).

Conclusion

Our overall conclusion is that online sessions need a very good structure and design for fostering student motivation, satisfaction and perceived learning. Prior research emphasized the relevance of learner-instructor interaction, while our findings highlight that learner-learner interactions are even more relevant. Thus, students perceive learning when student motivation and satisfaction are present, based on peer collaboration. Thus, instructors need to enhance interactions between learners in online learning environments. Student satisfaction was identified as being a critical mediating variable on the nexus between motivation and perceived learning.

The implications of this study are twofold. First, course design should prioritize structured opportunities for peer interaction, such as group work, discussions with peers, or breakout sessions. These collaborative interactions strengthen student motivation and promote deeper engagement with the subject matter. Second, institutions have to systematically integrate communication and social skills training for online learning into their curricula. As a consequence, both learners and teachers are equipped with stronger interaction skills, so higher education institutions can ensure that online learning environments promote both academic success and career preparation.

Finally, online collaboration and communication skills are not only relevant in academia, but also in the industry. Thus, strong online communication and collaboration skills might also enhance the employability of students.

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