



Predictors of Online Learning Satisfaction Among Filipino Pre-service Teachers: A Stepwise Multiple Regression Analysis

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Abstract

This study investigated the predictors of online learning satisfaction among Filipino pre-service teachers in a comprehensive Philippine university, focusing on online authentic learning self-efficacy, social interaction, social presence, and collaborative learning. Anchored in the Community of Inquiry Framework and the Self-determination Theory, this research employed a descriptive-correlational design, using multivariate correlations and multiple regression analysis to assess the relationships among key variables. Quantitative data were collected from 302 pre-service teachers, revealing that social interaction, collaborative learning, and online authentic learning self-efficacy significantly contribute to online learning satisfaction, with age also playing a considerable role. The dimension of self-efficacy related to keeping up with technological advancements had the highest mean rating, while the dimension concerning the relation between real-life environments and online interaction had the lowest mean. Social presence and collaborative learning had moderate mean ratings, whereas social interaction was rated lower. Nonetheless, social interaction and collaborative learning emerged as the strongest predictors of satisfaction, with social presence showing no significant impact. The results highlight the need to improve social interaction and collaborative elements in online learning settings to address the needs of Filipino pre-service teachers more effectively.

Keywords: Online learning, self-efficacy, social interaction, collaborative learning, satisfaction

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Introduction

Technological advancement has significantly altered the educational landscape, with the Fourth Industrial Revolution (FIRe) bringing about major transformations in the delivery and

experience of education (Lase, 2019). Central to this transformation is the development of a more interconnected and intelligent online environment characterized by personalized, anytime-anywhere learning, student choice in learning methods, project-based and hands-on experiences, data-driven reasoning, and a shift in the educator's role from instructor to facilitator (Farrow et al., 2022). In response to these trends and the post-pandemic world, the Philippines' Commission on Higher Education (CHED) endorsed flexible learning approaches through CMO 6, 2022, which supports hybrid educational models that combine traditional face-to-face instruction with online components, adapting to the needs of modern learners and aligning with the principles of Education 4.0. Online learning has become a crucial component of this hybrid approach.

The success of online learning hinges on several factors, one of which is online authentic learning (OAL). OAL has emerged as a promising approach as it promotes higher-order thinking and enhances students' motivation and active engagement in the learning process (Schindler et al., 2017). Self-efficacy, or belief in one's ability to complete a task, is a crucial element of OAL. Scholars have found that self-efficacy positively relates to academic achievement in online learning environments. (Shen et al., 2013). Social presence and interaction are also vital components, as they can create a sense of community among learners and foster collaboration and peer support. (Barreda-Ángeles et al., 2023). Studies have revealed that social presence and interaction are positively associated with student engagement and satisfaction in online learning. (Horzum, 2017); (Richardson et al., 2017). Collaborative learning is also essential as it enhances learning outcomes in online environments by developing students' critical thinking and problem-solving abilities and cultivating their interpersonal and communication skills. (Tang et al., 2020); (Ginting et al., 2022).

Satisfaction is a key predictor of student success; thus, understanding its determinants is crucial for enhancing the online learning experience. (Safitri, 2023). This study examined how online authentic learning self-efficacy (OALS), social presence, social interaction, and collaborative learning influence online learning satisfaction among Filipino pre-service teachers. While e-learning is relatively new in the Philippines and has gained growing attention in the current literature, a significant gap remains in addressing its acceptability and developing predictive models for emerging economies like the Philippines. This study bridges that spatial gap by examining how OALS, social presence, social interaction, collaborative learning, and selected demographic variables predict online learning satisfaction among Filipino pre-service teachers in a comprehensive Philippine university. While numerous studies have explored these factors, research on the interrelationships among these concepts remains limited. With many universities in the Philippines making significant investments in technology and learning management systems (LMS), examining these relationships within the context of a Philippine higher education institution is both timely and beneficial. The results of this study can be used in the design, development, and delivery of online teacher education courses that meet the needs and preferences of pre-service teachers.

Theoretical Framing and Research Hypotheses

This study is grounded in the Community of Inquiry (CoI) framework (Garrison, Anderson & Archer, 2000) and the Self-Determination Theory (SDT). The CoI posits that effective online learning is facilitated by the interplay of cognitive, social, and teaching presences. In this context, social presence and collaborative learning are critical components that influence online learning satisfaction. Social presence, which pertains to the learners' ability to make their presence felt and understood in an online environment, and collaborative learning, which emphasizes interaction and teamwork among students are integral to creating a supportive and engaging online learning community. Complementing the CoI Framework, SDT provides a psychological perspective on how individual needs impact learning satisfaction, focusing on three basic psychological needs: autonomy, competence, and relatedness. Online authentic learning self-efficacy reflects learners' perceived ability to engage effectively with online tasks. Thus addressing the need for competence. Social interaction and presence fulfill the need for relatedness by promoting meaningful connections between learners and instructors.

Based on the theoretical frameworks and objective of this study, the following hypotheses are proposed to explore the predictors of online learning satisfaction among Filipino pre-service teachers:

H1: Online authentic learning self-efficacy has a significant direct positive impact on students' online learning satisfaction.

H2: Social presence has a significant direct positive effect on students' online learning satisfaction.

H3: Social interaction has a significant direct positive influence on students' online learning satisfaction.

H4: Collaborative learning has a significant direct positive effect on students' online learning satisfaction.

H5: Demographic characteristics such as age, gender, and Internet subscription significantly influence students' online learning satisfaction.

Method

Study site and Sample

The respondents included 302 undergraduate students from a comprehensive university in the Philippine capital. These were pre-service teachers (PSTs) from a teacher training college offering Elementary and Secondary Education programs. Respondents were selected using purposive sampling. Only Filipino PSTs above 18 years old who were officially enrolled during the conduct of this study were recruited. At that time, undergraduate courses were delivered online through synchronous and asynchronous modes. Table 1 displays the demographic profile of the respondents. Their ages range from 18-25 years. There is a preponderance of female pre-service teachers (226, 74.8%), 266 (88.1%) are Catholic, and 177 (60%) reside in the National Capital Region. Of the total respondents, 161 (53.3%) are Elementary Education students, with 100 (33.1%) specializing in Special Needs Education. Over 200 (68.5%) have postpaid Internet subscriptions, and a majority are using laptops (269, 89.1%) and smartphones (255, 84.4%) for online learning. The majority of the students have accounts in social networks (Facebook, Twitter, LinkedIn, etc.) (298, 98.7%) and media sharing networks (Instagram, YouTube, Pinterest, etc.) (286, 94.7%).

Table 1. Demographic Characteristics of Pre-service Teacher Respondents (n = 302)

	n	%		n	%
<i>Gender</i>			<i>Field of Study</i>		
Male	76	25.2	Elementary Education (EEd)	161	53.3
Female	226	74.8	Secondary Education (SEd)	141	46.7
<i>Age</i>			<i>Major/Specialization</i>		
18-19	81	26.8	Early Childhood Education	48	15.9
20-21	176	58.3	Elementary Education	13	4.3
22-23	43	14.3	English	40	13.2
24-25	2	0.6	Filipino	12	4.0
			Mathematics	25	8.3
<i>Religion</i>			Religious & Values Ed	12	4.0
Catholic	266	88.1	Science	18	6.0
Non-Catholic	36	11.9	Social Studies	34	11.3
			Special Needs Education	100	33.1
<i>Year Level</i>			<i>Technological Devices Used*</i>		
Freshmen	58	19.2	Desktop	76	25.2
Sophomore	86	28.5	Laptop	269	89.1
Junior	104	34.4	Tablet	68	22.5
Senior	54	17.9	Smartphone	255	84.4

<i>Region of Residence</i>				Smart TV	38	12.6
National	Capital	177	58.6			
Region 1		6	2.0	<i>Social Media Accounts*</i>		
Region 2		5	1.7	Media sharing networks	286	94.7
Region 3		42	13.9	Social networks	298	98.7
Region 4A and 4B		62	20.5	Discussion networks	191	63.2
Other regions		10	3.3	Social blogging networks	32	10.6
				Review networks	11	3.6
<i>Internet Subscription</i>						
Postpaid		207	68.5			
Prepaid		95	31.5			

*Multiple responses

Research design

This study utilized a descriptive-correlational design. It employed multivariate correlations to identify significant relationships between the various variables measured. A multiple regression analysis was employed to examine how predictor variables impact students' online learning satisfaction. The predictor variables entered into the analysis included Online Authentic Learning Self-Efficacy (OALS), Social Presence (SP), Social Interaction (SI), Collaborative Learning (CL), as well as demographic factors such as age, gender, and internet subscription.

Data measures

A robot photo was fielded using Google Forms to gather demographic data such as age, gender, program, and specialization. The Online Authentic Learning Self-Efficacy Scale was developed by Tezer and associates (2018) for prospective teachers. Consisting of 66 indicators using a 5-point Likert scale (5 = agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = disagree), the tool developers utilized Exploratory Factor Analysis, which generated nine dimensions. Cronbach alpha was calculated at 0.97. The Social Interaction, Social Presence, Collaborative Learning, and Satisfaction. Originally developed to measure students' experiences in computer-mediated communication, The context of the SP Scale of (Andel et al., 2020), appropriately assess students' perceptions of social presence in online courses. This scale consisted of 9 items, with a reliability index of 0.76. (Günak et al., 2020), likewise contextualized the Interaction Scale used. This scale contained six indicators, and the reliability coefficient stood at 0.84. The CL and Satisfaction primarily intended to measure students' perceptions of online collaborative work and their overall satisfaction with their instructor and the online curriculum. The SI and Satisfaction Scales contained 7 and 11 items, respectively. The Cronbach alpha coefficient of the SI scale was 0.88 and 0.93 for the Satisfaction Scale. All four scales consisted of 5-point Likert-type items with response options ranging from 1, strongly disagree, to 5, strongly agree.

Data gathering procedure

The data collection procedure involved administering a survey through Google Forms to gather participants' responses efficiently. After collecting the survey data, the responses were imported into SPSS (Statistical Package for the Social Sciences) for analysis. SPSS was used to perform various statistical procedures, including descriptive statistics, stepwise multiple regression analysis, and other relevant tests to identify predictors of online learning satisfaction. This software facilitated the systematic organization, analysis, and interpretation of the data, ensuring accurate and comprehensive results.

Data analysis and ethical consideration

A stepwise multiple regression analysis was employed to determine the predictors of online learning satisfaction. This method was selected for its effectiveness in determining which variables significantly contribute to explaining the variance in online learning satisfaction while controlling for the influence of other variables. The analysis involved adding predictor variables systematically that show a strong correlation to the response variable and removing those that lose significance in each step. This approach ensures a robust model by retaining only those predictors that have a meaningful impact on online learning satisfaction, thereby providing insights into which aspects are most influential in shaping students' satisfaction levels. Ethical concerns were thoughtfully addressed throughout the survey process. The researchers secured the participant's informed consent, ensuring they were fully informed about the study's objectives and their involvement. Permission to conduct the survey was also sought from the heads of the academic departments, ensuring compliance with institutional guidelines. The PST respondents were given assurances that their responses would be treated confidentially and that their personal information would be protected. This approach was designed to uphold the research's integrity while respecting the respondents' privacy and voluntary participation.

Results and Discussion

Table 2. Descriptive measures of respondents' online authentic learning self-efficacy (n = 302)

Dimensions	Mean	SD
Problem- solving skills and bonding	3.97	0.57
Metacognitive skills and permanence in learning	4.10	0.55
Relation with real-life environments and interaction in an online environment	3.88	0.60
Interaction with real-life and learning experiences	4.11	0.57
Creating Social bond in an online collaborative learning environment	4.10	0.66
Structured support in effective learning and internalizing information	4.01	0.64
Keeping up with technological advancement	4.29	0.73
Multiple evaluations and feedback	4.07	0.61
Collaborative working skills and product development	3.94	0.68

Table 2 shows the mean and standard deviation measures of pre-service teachers' online authentic learning self-efficacy. Results reveal that among the dimensions, "Keeping up with technological advancements" had the highest average rating ($\bar{x}=4.29$, $s=0.73$). Respondents indicated they could keep up with technological advancements through social media and online communication tools. In this study, the PSTs have at least one social media account, mostly on social networking sites, media sharing, and discussion networks. This is not surprising, considering that the PST respondents belong to Generation Z, a generation characterized by being digital natives, highly adept at social media, and deeply digitally connected. This is followed by "Interaction with real-life and learning experiences" ($\bar{x}=4.11$, $s=0.57$), which reflects the presence of authentic learning. In contrast, "Relation with real-life environments and interaction in an online environment" had the lowest mean rating ($\bar{x}=3.88$, $s=0.60$), suggesting that while students may understand and apply knowledge in real life, they may struggle to effectively communicate and interact within online environments, limiting the integration of their learning with broader real-life contexts. Table 3 displays the Social Presence (SP), Social Interaction (SI), Collaborative Learning (CL), and Satisfaction indicators.

The number of respondents who agreed and strongly agreed are indicated. Regarding SP, item 7, which is related to the teacher's facilitation of the discussion in the online mode, garnered the highest percentage. This may be attributed to the instructors' exposure and training in maneuvering the learning management system site, which allowed them to adapt and employ discussion strategies

in the virtual environment. Meanwhile, items 2 and 3 related to introduction and interaction with other participants received the lowest percentage. This difference may reflect cultural factors, as Filipino students often exhibit a reluctance to actively participate in discussions, possibly due to a sense of 'hiya' or diffidence, which can make them less inclined to engage openly in online social interactions.

Table 3. Social Presence, Social Interaction, Collaborative Learning, and Satisfaction Indicators

<i>Variables</i>	<i>f</i>	<i>%</i>
<i>Social presence (SP)</i>		
1. Communication in the courses was impersonal.	145	48.0
2. I felt comfortable conversing in the courses.	136	45.0
3. I felt comfortable introducing myself in the courses.	143	47.4
4. The course introductions enabled me to form a sense of the community.	169	56.0
5. I felt comfortable participating in course discussions.	142	47.0
6. The instructor created a feeling of community.	196	64.9
7. The instructor facilitated discussion in the course.	241	79.8
8. I felt that my point of view was acknowledged by other students in the courses.	171	56.6
9. I was able to form distinct impressions of some students in the courses.	178	58.9
<i>Social Interaction (SI)</i>		
10. Courses are an excellent means for social interaction.	77	25.5
11. I felt comfortable interacting with other students in the courses.	125	41.4
12. The amount of interaction with other students in the courses was appropriate.	104	34.4
13. The quality of interaction with other students in the courses was appropriate.	108	35.8
14. The amount of interaction with instructors in the courses was appropriate.	146	48.3
15. The quality of interaction with instructors in the courses was appropriate.	146	48.3
<i>Collaborative Learning (CL)</i>		
16. I felt part of a learning community in my courses.	153	50.7
17. I actively exchanged ideas in my courses.	138	45.7
18. I was able to develop new skills and knowledge from other members in my courses.	203	67.2
19. I was able to develop problem-solving skills through peer collaboration.	212	70.2
20. Collaborative learning in my courses was effective.	171	56.6
21. Collaborative learning in my courses was time-consuming.	177	58.6
22. Overall, I am satisfied with my collaborative learning experience in the courses.	148	49.0
<i>Satisfaction (S)</i>		
23. I was able to learn in the courses.	158	52.3
24. I was able to learn from course discussions.	168	55.6
25. I was stimulated to do additional reading or research on topics discussed in the courses.	152	50.3
26. Discussions assisted me in understanding other points of view.	235	77.8
27. As a result of my experience in the course, I have made acquaintances from other parts of the world.	128	42.4
28. The courses were a useful learning experience.	171	56.6
29. The diversity of topics in the courses prompted me to participate in the discussions.	169	56.0
30. My level of learning that took place in the courses was of the highest quality.	98	32.5
31. Overall, the learning activities and assignments of the courses met my learning expectations.	128	42.4
32. Overall, the instructor for the courses met my learning expectations.	180	59.6
33. Overall, the courses met my learning expectations.	136	45.0

Given SI, a little under half of the respondents agree on the appropriateness of the amount and quality of interaction with instructors received. These low percentages are supported by the PSTs' response to item 10, that courses delivered in the online mode do not provide an excellent means for social interaction. Filipino PSTs in this study may perceive social interaction in in-person classes as more effective due to cultural preferences for face-to-face engagement, where the classroom dynamics are seen as more personal and meaningful. This perception may lead them to compare it unfavorably with the quality of interaction experienced in online courses. Such perception exists because physical presence is absent or lacking. The results parallel a three-year study by (Cole et al., 2014) Among undergraduate and graduate business students in an American university. Dissatisfaction with online learning stemmed from a lack of interaction. While online learning was convenient, students regarded it easier and more efficient to communicate and engage with their instructors and peers face-to-face.

As for CL, around 70% of Filipino PSTs agree that peer collaboration in the online mode contributes to developing their problem-solving skills. This may be primarily due to the collaborative activities and tasks inherent in Teacher Education courses. The availability of breakout rooms in videoconferencing applications and collaborative digital tools makes it possible for students to engage in problem-solving activities with their peers. (Tasnim Wan Hussin et al., 2019), In their review of over 90 articles, uncovered that the collaboration features of social media and learning management systems (LMS) were featured, which can effectively promote communication, teamwork in problem-solving, and peer evaluation. Despite higher percentages in other CL indicators, only 49% of the

respondents are satisfied with the CL experiences online. This may be due to the significant challenges present in CL. For instance, in a study with online learners in Information and Communication Technology and Education in Spain, several sources of frustration were revealed, such as difficulties with group organization, lack of shared goals, uneven commitment and contribution levels, excessive time spent on online collaborative tasks, and issues with communication and grading (Capdeferro & Romero, 2012). Additionally, students taking more online courses are less likely to engage in collaborative learning (Mumford & Miller, 2018). Regarding Online Learning Satisfaction, 77.8% of the respondents agree that online discussions assisted them in understanding other people's points of view. This reflects the nature of online discussions where PSTs can share their insights on the subject matter. However, this may not be tantamount to raising the quality of learning in the online mode. Only 32.5% of the PSTs agree that online classes raise the quality of their learning.

Table 4. Descriptive measures of respondents' social presence, interaction, collaborative learning, and satisfaction (n = 302)

Variables	Mean	SD
Social presence (SP)	3.56	0.65
Social interaction (SI)	3.15	0.90
Collaborative learning (CL)	3.56	0.69
Satisfaction (S)	3.44	0.74

As displayed in Table 4, Social Presence ($\bar{x}$ =3.56, s =0.65), and Collaborative Learning (s =0.69) had the highest mean rating, while social interaction had the lowest ($\bar{x}$ =3.15, s =0.90).

Table 5. Relationships among online authentic learning self-efficacy, social presence, interaction, collaborative learning, and satisfaction

Variables	OILS	SP	SI	CL	S
Online authentic learning self-efficacy (OALS)	1.000	0.586**	0.411**	0.596**	0.557**
Social Presence (SP)		1.000	0.709**	0.720**	0.694**
Social Interaction (SI)			1.000	0.698**	0.763**
Collaborative Learning (CL)				1.000	0.752**
Satisfaction (S)					1.000

** $p < 0.01$

As shown in Table 5, the variables selected for the study showed significant positive correlations. OALS is moderately associated with SP, SI, CL, and online learning satisfaction. SP also has moderate correlations with online satisfaction but relatively strong relationships with SI and CL. SI and CL are highly associated with online satisfaction.

Table 6. Online learning satisfaction regression coefficients

Variables	B	SE	β	t
<i>Model 4</i>				
(Constant)	0.80	0.430		1.86
Social Interaction (SI)	0.38	0.037	0.46	10.38***
Collaborative Learning (CL)	0.34	0.054	0.32	6.25***
Online Authentic Learning Self-efficacy (OALS)	0.26	0.056	0.18	4.55***
Age	-0.04	0.019	-0.06	-2.03*

$R=0.84$ and $R^2=0.70$ for Model 4, $F(4, 297)=172.74***$

* $p < 0.05$

** $p < 0.001$

Regression analysis results revealed (Table 6) that social interaction, collaborative learning, OALS, and age significantly explained the variance for online learning satisfaction, accounting for about 70% of the variance. PSTs with greater social interaction ($\beta = 0.46$) and collaborative learning engagement ($\beta = 0.32$), high SE ($\beta = 0.18$), and lower age ($\beta = -0.06$) tended to have greater satisfaction with online learning. Among the three predictors, SI has the greatest weight. The results reinforce the hypotheses H1, H3, and H4 proposed in this study and align with the conclusions drawn by other scholars. Social presence, gender, and internet subscription types did not account for any significant variance. The first hypothesis is supported, indicating that higher levels of Online Academic Learning Self-efficacy (OALS) lead to increased online learning satisfaction, although relatively weak. Various dimensions of self-efficacy, the belief in one's ability to complete an online course successfully a key predictors of online learning satisfaction. However, they also observed that other aspects of self-efficacy, such as those related to interactions with instructors and peers, contribute less significantly to overall satisfaction. This finding implies that while OALS is an essential factor, its effect on satisfaction might be moderated by other variables or contextual factors not fully captured in the study. Conversely, (De La Salle – College of Saint Benilde in Manila, Philippines et al., 2022), found that although online learning self-efficacy significantly impacted perceived learning and academic performance, it did not necessarily lead to higher student satisfaction. This discrepancy may be due to factors like increased stress and anxiety, which can diminish the positive effects of self-efficacy on satisfaction.

Social interaction is also identified as a crucial predictor of online learning satisfaction. That increased student satisfaction is associated with high levels of interactivity, mainly through participation in discussions. In this study, social interaction (SI) indicators specifically examined the quality and extent of interactions between students and their instructors and peers. Notably, (Moore, 1989); (A. Jaradat & O. Ajlouni, 2020), highlighted that online learning involves interactions not only between students and instructors or among students themselves but also between students and content. While this broader interactional framework was not a focus of this study, it underscores the multifaceted nature of social interaction in online learning environments and its importance in shaping overall student satisfaction. Regression results also count collaborative learning as a significant predictor of online learning satisfaction. By fostering student interaction and cooperation to achieve learning goals, CL enhances engagement, deepens understanding, and boosts overall satisfaction with the online learning experience. However, cultural factors can influence how students perceive and benefit from these collaborative elements, affecting their engagement and satisfaction levels differently.

Although social presence is often considered crucial for online learning satisfaction due to its role in fostering a sense of connection and engagement (Park & Kim, 2020), it did not show a significant impact in this study. One possible reason for this discrepancy is that many students turn off their video during synchronous sessions, often to conserve bandwidth, especially given that 31.5% of the respondents use prepaid internet subscriptions, which can be data-restricted. This reduction in visual engagement may limit the opportunities for meaningful social interaction and non-verbal communication, leading Filipino pre-service teachers to place greater importance on other factors, such as social interaction and collaborative learning, which were identified to be more strongly related to their overall satisfaction with online learning. The relationship between the predictor variables and online learning satisfaction was highly significant ($F = 172.74$, $p < 0.001$), indicative of its predictive capability.

Conclusion

This study provides important insights into the factors influencing online learning satisfaction among Filipino pre-service teachers. About OALS, results indicate that while students are confident in keeping up with technological advancements, they face challenges integrating real-life contexts into online learning environments. The respondents showed a considerable level of agreement on the effectiveness of teacher facilitation in discussions (Social Presence), the contribution of peer collaboration to problem-solving skills (Collaborative Learning), and the ability of online discussions to aid in understanding others' viewpoints (Satisfaction). However, their responses suggested reservations about the quality and amount of social interaction. The results revealed that social interaction and collaborative learning are critical for enhancing online satisfaction. In contrast, social presence's impact was not significant, likely due to reduced visual engagement during online sessions. These results suggest that future online course designs should prioritize interactive and collaborative elements to meet students' needs better and improve their learning experiences. Building on these results, this study contributes to the research on online learning satisfaction and offers guidance for Filipino educators in designing and developing online or hybrid courses. The data, drawn from a single Philippine university with a well-developed e-learning policy, may limit generalizability; hence, expanding research to include a broader range of institutions and academic programs is recommended. Additionally, exploring factors such as course design, teacher-related elements, and content quality will provide a more comprehensive understanding of online learning satisfaction. Comparing data from other private and state universities can further enrich the insights gained.

Conflicts of Interest

The author declares no conflict of interest.

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