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Rethinking the online environment through collaborative learning

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Abstract

The COVID-19 pandemic brought about a devastating disruption to health, social, economic, and educational systems worldwide. Post-secondary institutions responded expeditiously by extensively converting their classes to a digital format. Teachers' use of collaboration represents a critical instructional approach to enhance student learning and retention in online courses. This investigation examined the perceptions of health education faculty towards incorporating online collaborative learning into their curriculum. Grounded in the northeastern United States, the study's findings suggested that instructor attitude functioned as a powerful, effective, and consistent predictor of their willingness to implement collaboration.

Keywords

online education, distance learning, collaboration, collaborative learning, health education, higher education

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Introduction

The growth of online distance learning

For almost a quarter-century, online distance learning has undergone expansion and continued growth in the variety of course offerings presented at both junior and senior college levels. Before COVID-19, online programs offered by secondary institutions were selected as the preferred mode of attaining a degree by only a limited number of individuals. During the 1997–98 academic year American higher education institutions offered distance learning at relatively low levels (Lewis et al., 1999). In the last 25 years online degrees gradually and then more rapidly extended their course offerings. By 2007, 21.4% or 3.9 million students participated in at least one online course (Daymont & Blau 2011; Jaggars & Bailey 2010). According to National Center for Education Statistics (NCES), in 2018, enrollment rose to 35.3% or approximately 7 million students. Dramatically, during the onset of COVID-19, 98% of institutions quickly pivoted and moved their in-person classes to online platforms (NCES, 2018). As colleges struggled with enrollment following the pandemic, they cannot dispute the value of online education. Today post-secondary education has experienced an explosive demand in the number of degree programs and offerings.

Student and faculty engagement in online courses

Researchers and administrators traditionally advocated that distance learning would represent only an incremental shift in the nature of their pedagogical approach. In other words, it would support face-to-face learning and eventually supplement the in-class experience. This reasoning resulted from several initial Learning Management Systems (LMS) challenges. These included frustrations for learners in the form of long load times, managing live streams, buffering, and other functionality-based issues (Wieland & Kollias, 2020).

Challenges have been widespread among instructors, as well. Ertmer et al. (2012) cited the importance of adequate support in the distance learning environment to offset insufficient development and poor training. Furthermore, even with access to LMS specific in-service training programs, the responsibility to utilize this technology was placed on the teachers themselves. Lack of knowledge and poor self-efficacy often led instructors to teach within the constraints of their traditional belief systems (Hermans et al., 2008). This often postponed implementing new teaching pedagogies until they felt confident and skilled (Ertmer, 1999).

Jacobs (2013) argued that distance learning could be just as effective as in-person learning, but teachers and learners require different implementation strategies. Ustati and Hassan (2013) identified three themes that cultivated a successful online learning experience. These included two-way communication with instructors and peers, online technical and academic support assistance, and the learners' autonomy to reflect on their experiences.

The COVID-19 pandemic necessitated replacing the standard instructional methodologies in favor of e-learning, requiring students to access their coursework online. This demand for seamless instruction mandated instructors to create content for online platforms and utilize streaming platforms and discussion boards. Though the technical side of learning required a deep learning curve, student engagement with the unfamiliar technology remained a critical requirement. During this stressful time, instructors explored

maintaining positive attitudes and interpersonal approaches to keep students engaged and connected in an organized and cooperative manner.

Starkey et al. (2021) suggested a number of significant challenges remained: securing campus broad technological access, instructor training, support, and developing student proficiency to be independent while managing learning with digital tools. Teachers must be aware of these factors by actively participating in class discussions, including commenting on posts, asking pertinent questions, diligently reading the student's written content, and furnishing timely feedback.

The role of collaboration in online learning

Cooperation remains one of the most valuable endeavors for enhanced team functioning, with a substantial literature examining the collaborative process and its positive effects on learning, group synergy, performance, and satisfaction with the experience (Vassigh et al., 2014). Collaboration is considered a more dynamic and inclusive process than mere intergroup cooperation. The collaborative effort may include delineated task assignments and additional cooperation features.

The distinction between collaboration and cooperation is illustrated by Laurillard (2013), who acknowledged that each participant in a group could accomplish the task utilizing the division of labor or resources in a cooperative group. Still, to be a collaborative group, there needs to be a group effort based on mutual engagement toward completing a communal task. Lee & Baek (2012) provided a more direct and lucid distinction between group collaboration and cooperation. The author maintained that experientially, what distinguishes collaboration from cooperation comes down to precisely what is shared. Cooperative actions primarily involve sharing physical resources such as objects, money, or intellectual resources, including time management, knowledge, and expertise. In addition to these shared physical and intellectual resources, collaboration incorporates sharing goals, responsibilities, values, beliefs, and attitudes. While some of these intellectual assets, including cognitive and affective attributes, may become distributed through cooperation, in collaboration, they are fully integrated from the beginning of the undertaking. This collaborative endeavor brings a synergy that adds value by producing something new, unique, and often superior quality (Hernández-Sellés et al., 2019).

The concept of collaboration within the curriculum is one that is familiar throughout American pedagogy. Educational researchers consider collaboration to occur when there has been mutual agreement within the classroom to engage students in a joint effort to master a concept or work toward solving a central problem (Vassigh et al., 2014). Wang et al. (2017) revealed that collaborative learning activities might assist students by expanding their understanding, elaborating their descriptions, and reorganizing their knowledge, thereby improving the comprehension of concepts.

Moseley et al. (2020) raised concerns regarding the ability of teachers, facilitators, and the group to competently initiate and undertake collaborative practices. Teacher-led collaboration is not merely about students relating to an educator; rather, it concerns actively motivating students to engage with each other (Vázquez-Martínez & Alducin-Ochoa, 2014). It is rarely a straightforward process. Hammond (2017) argued that significant obstacles exist regarding improving collaboration, including variables related to context, content, educator, and the learner.

Collaborative learning in health education

Health educators and practitioners have applied collaborative learning techniques within online learning environments for over a decade. This demand for online learning has resulted in mixed results, reviews, and unique challenges for the field. Westbrook (2012) investigated how online discussions foster deeper reflection than in the traditional classroom environment. Their study considered a postgraduate magnetic resonance imaging course, where Westbrook discovered a correlation between engagement and success in the online setting. Further, many task types were compatible with the online collaborative environment. The findings obtained were found to be generalizable to other health-based programs.

Training for health and physical education often needs an active component to be effective and sometimes mandates certification. One of the major concerns in designing distance healthcare classes is to develop practical modalities for integrating natural activities, thereby allowing student participation. The online program aims to determine how the instructor can best involve students with the required material at the desired level and ensure participation (Hampton et al., 2017). Ali et al. (as cited in Barefield & Meyer, 2013) found that it was vital for healthcare teachers to adequately prepare for the demands and stressors of teaching a nursing course online. Those with little online education experience rated their instructional ability at a beginner level, even if they had previously worked in the classroom for an extended time.

Rethinking the faculty role within the online educational environment has emerged as one of the highest priorities in designing and implementing education programs, particularly in the health education field. Confusion about the teacher's role in the online setting is common (Kara et al., 2018). Even experienced and skilled healthcare faculty require help with the online format to implement and attain specific learning milestones.

Health and Physical Education teachers face more significant obstacles than other instructors regarding online education simply because of the nature of the class material (Mercier et al., 2021). However, these challenges can be addressed with more effective instructional design, quality training of teachers, and innovative strategies to implement effective programs. The success of distance learning relies upon the value faculty members impart, along with the ability to use appropriate teaching techniques while nurturing synergy in the classroom environment. Instructors may require additional training along with rethinking their particular educational approach (Mahmood, 2021). The resulting health education-based online learning environment can assist students in better understanding their respective physical health and mental well-being.

Considerations for the present research

Online learning facilitates collaborative activities while expanding its application to a diverse curriculum, management practices, and social activities. Although numerous theorists and researchers have advanced the benefits of collaboration, limited faculty training and the need for collaborative tools for online platforms have often hampered efficient implementation. For example, online programs' perceived quality and efficacy have only sometimes kept pace with the breadth and scope of such a far-reaching expansion (Huss et al., 2015). Bustamante (2021) asserted that the top two concerns indicated by university presidents regarding moving their classes online were maintaining student engagement (81%) and training faculty for online teaching (75%).

Substantial previous research has investigated student perceptions of collaborative learning, although few have focused on teacher characteristics and sentiment. In 2018, Weinberger and Shonfeld examined student teachers' demographics, attitudes, knowledge, and abilities to implement collaboration in their classrooms. From the data obtained these researchers constructed a detailed model (SEM) based upon their Collaborative Learning Experiences Questionnaire (CL) questionnaire constructs. They considered the relationship of faculty perceptions regarding collaboration with their associated willingness to employ these program practices. Teacher experience was revealed only to be directly related to their attitudes and skills. In contrast, perceived benefits, disadvantages, attitude, and skills served primarily as mediating variables impacting the willingness to integrate collaborative learning in teaching.

Weinberger and Shonfeld (2018) acknowledged the limited generalizability of their study and advocated for additional research from other colleges and countries. The current study sought to replicate and extend Shonfeld and Weinberger's model (Shonfield & Weinberger, 2019; Weinberger & Shonfield, 2018) by addressing a sample of United States health educators utilizing a distance-learning format in their programs during the COVID-19 pandemic. Specifically, the research addressed the relationship between health education faculty perceptions regarding collaboration and their willingness to employ these practices in their online coursework.

Methods

Sampling procedure

Forty-four university health education faculty members from six educational institutions were involved in this study. Three of these schools were located in urban New York City. The other three schools were from suburban areas situated on Long Island, New Jersey, and Williamsburg, Kentucky.

A code was generated for each participant with no additional identifying faculty information beyond the CL Questionnaire demographics required for the purposes of this study. This experimental procedure was meant to assist in reassuring the confidentiality of the results. The University of the Cumberland’s Institutional Review Board (IRB) granted full approval for this research on January 12th, 2021.

Data collection

The Collaborative Learning Experiences Questionnaire (CL), presented in Appendix A, was first developed by Weinberger & Shonfield (2018) and employed as the sole vehicle for collecting data throughout this investigation. The authors originally developed this scale based on segments from three prior questionnaires: Collaborative Learning (McNamara & Brown, 2008), The Collaborative Learning, Social Presence, and Satisfaction (Spears, 2012), and Leading a System-wide Pedagogical Change (Weinberger, 2018).

The final questionnaire format consisted of 27 items distributed across six major sections. Section One identified demographic information, including gender, age, educational facility, function, online program being taught, and years of teaching. Section Two uncovered the respondent’s background and knowledge; explicitly, the type of prior training, the mode of online instruction presented, if and how collaborative teaching was previously integrated into the online class, the characteristics, as well as the benefits and disadvantages of collaborative learning. Section Three presented five items, each utilizing

a five-point Likert Scale querying the teacher's attitude toward collaboration. Section Four contained six questions and the same five-point Likert Scale requesting the participant describe previous collaborative learning experiences. The items in Sections Three and Four were summed and then divided by the associated items to obtain the average for each section. Finally, Section Five comprised two Likert Scale items; question 24, indicating the respondent's skill to practice online collaborative learning and question 25, which the CL Questionnaire creators described as their measure of 'willingness' to use collaboration. This question asks: 'How much are you willing to incorporate collaborative learning in your courses?' The additional two open-ended questions in Section 6 were included to allow for faculty observations as well as, to ensure that important aspects of the study were not overlooked. Potential factors included those affecting teacher willingness and concerns for implementation.

Several psychometric analyses were previously conducted for the CL Questionnaire. Weinberger and Shonfeld (2018) reported their reliability results obtained from a sample of student teachers; the Cronbach's alpha $\alpha = .74$ for the advantages section of the questionnaire and for the disadvantages section a $\alpha = .69$. The attitude section reliability was found to be $\alpha = .79$. Similar reliability data was described by Shonfeld and Weinberger (2019) in a later study of employed teaching faculty, with a Cronbach's alpha $\alpha = .82$ for advantages, while the disadvantages of CL displayed a reliability of $\alpha = .79$. The Cronbach's alpha reliability obtained in the present study was revealed to be .63 for advantages, .52 for disadvantages, and .54 or attitude.

Statistical procedures

The online application, SurveyMonkey (https://www.surveymonkey.com), was employed to collect data through a secure web portal and exported into IBM SPSS 2020 Windows Edition for comprehensive analysis. The prospective participants each received an email of introduction, including a link to SurveyMonkey where the CL Questionnaire resided.

The demographics collected and analyzed here were valuable to this study for a number of important reasons. They served to clarify the sample's nature and relationship with the research question. Additionally, they allowed for a direct comparison with the previous research of Shonfeld and Weinberger (Shonfield & Weinberger, 2019; Weinberger & Shonfield, 2018). These authors had questioned the relevancy and possible influence of their sample's demographics for the model they developed. Finally, the data permitted a better understanding of how this sample compares with post-secondary institutions throughout the United States. The generalizability of the present research for future investigation can be more directly considered.

The investigation of all the significant interrelationships among these six measures resulted in five comparisons for each variable. The significance level applied throughout the dissertation employed a two-tailed $p < .05$ level of probability. However, with multiple comparisons performed among the same variables, this alpha would potentially inflate false positives or Type I errors. To correct for this possibility, the $p <. 05$ level criterion was subjected to a Bonferroni Correction ($p = .05$/number of comparisons for each dependent variable in this case 5), resulting in a more stringent $p < .01$ when examining the family of demographic data.

The overall regression analysis and the Structured Equation Modelling (SEM) procedure (Schumacker & Lomax, 2016) were conducted utilizing the exact same procedures

employed by Weinberger and Shonfeld in their 2018 study. Additional follow-up tests were performed to clarify the results obtained in this investigation.

Results

Participants and research setting

Table 1 presents the respondents from the pool of instructors employed. There was an overall 27.0% survey response rate amongst the instructors teaching in the cooperating departments. This rate was at respectable levels for Colleges A, D, E, and F. In contrast, relatively low returns were collected for Colleges B and C.

Table 1. Response rate by institution

Institution	Department	Instructors employed	Sample number	Response rate
College A	Health Education	27 (12 full time,15 adjuncts)	13	48.1%
College B	Health and Physical Education	23 (17 full time, 6 adjuncts)	2	8.7%
College C	Health and Human Performance	25 (10 full time, 15 adjuncts)	1	4%
College D	Family, Nutrition and Exercise Science	18 full time	7	38.9%
College E	Health and Physical Education	22 (10 full time, 12 adjuncts)	8	36.4%
College F	Health, Exercise and Sports Science	48 (8 full time, 40 adjuncts)	13	27.1%
Total for institutions	All departments	163 (75 full time, 88 adjuncts)	44	27.0%

No noteworthy effects were uncovered for the relation of faculty location with the participants' attendant demographics. That is, cross tabulations with faculty location were found to be independent of instructor years of teaching, their gender, age, and primary function.

The 44 participants identified in Table 2 indicate that 27 or 61.4% were female, and 17 or 38.6%, male. The faculty was predominately distributed across three age groups ranging from 35 to 64 years old, comprising almost 80% of all respondents. Nine of the 17 males

(52.9%) were between 35 to 44 years old. Females were generally older, reporting that 17 or almost 63% of all females were age 45 to 64 years. A significant chi-square relationship was revealed for the distribution of gender by age, $x2(4, N = 44) = 10.43$, $p = .03$ with Cramer's $V = .49$. However, this finding did not meet the more conservative Bonferroni Correction $p < .01$ and hence was considered marginal for the purposes of this study. Still, this relationship is of value since it provides insight into the sample composition and allows further examination regarding the Weinberger and Shonfeld (2018) model and the nature of their research participants.

Table 2. Gender by age of respondent

			What is your gender?		
			Male	Female	Total
What is your age?	25 to 34	Count	2	3	5
		% within age	40.0%	60.0%	100.0%
		% of Total	4.5%	6.8%	11.4%
	35 to 44	Count	9	5	14
		% within age	64.3%	35.7%	100.0%
		% of Total	20.5%	11.4%	31.8%
	45 to 54	Count	4	7	11
		% within age	36.4%	63.6%	100.0%
		% of Total	9.1%	15.9%	25.0%
	55 to 64	Count	0	10	10
		% within age	0.0%	100.0%	100.0%
		% of Total	0.0%	22.7%	22.7%
	65 to 74	Count	2	2	4
		% within age	50.0%	50.0%	100.0%
		% of Total	4.5%	4.5%	9.1%
Total		Count	17	27	44
		% of Total	38.6%	61.4%	100.0%

Teachers primarily served in an educational capacity and were relatively evenly split between instructor or adjunct staff (50%) and career line professors (45.5%). Adjuncts are part-time or contingent instructors, often called 'visiting professors' in other countries. Two additional subjects listed themselves as lecturers. The faculty's primary function was

not significantly associated with the level of student taught nor with years of teaching experience.

Expectedly, a significant relationship was identified between the participant's age and years of teaching. The majority of faculty (30 or 68.2%) had been teaching between 4 and 20 years. Only 14 respondents instructed for fewer than four years (5 or 11.4%) or over 20 years (9 or 20.5%). No other significant relationships were uncovered between the respondent's age and the type of students taught or the educator's primary function. Also, the level of teaching was not found to be significantly related to the respondent's years of teaching.

The educators predominately taught undergraduate students, with 31 constituting over 70% of all respondents reporting no graduate assignments. Only three teachers, a mere 6.8%, exclusively taught graduate students. The remaining 10, which represented 22.7%, instructed both undergraduate and graduate classes.

Analysis of research question

The present research explored the relationship of health education faculty perceptions regarding collaboration with their willingness to employ these online programs' practices. Explicitly, would the same pattern of structural network associations be displayed as found by Weinberger & Shonfield (2018)? Experience is expected to be directly associated with both attitudes and skills, while benefits, disadvantages, attitude, and skills serve as mediating variables impacting the willingness to integrate collaborative learning in teaching.

The research question investigated in the present study sought to replicate these causal paths with a new sample of health educators in the United States utilizing an online paradigm. The previous analysis found no significant direct causal relationship between the initial system variable experience with that of willingness, the criterion. In similar fashion, the present sample uncovered no direct bivariate correlation between the measures of experience and willingness, $r\,(42) = .01$, $p = .951$.

Subsequently, according to the model, the mediating variables' linkages between experience, willingness, and each other should be displayed as delineated in Figure 1. The present analysis employed a univariate regression with the measure of experience, designed as the initial predictor variable, followed by the mediators serving as covariates: benefits, disadvantages, attitude, and skills. Willingness to integrate was assigned as the dependent variable. The overall corrected model was found to be significant $F\,(11, 43) = 5.89$, $p < .001$. However, as Table 3 presents, experience, along with the covariates of benefits, disadvantages, and perceived skilled, did not achieve significance. The only effect noted was for attitude demonstrating a statistical relationship $F\,(1, 43) = 40.27$, $p < .001$. A strong partial Eta Squared for this single variable accounted for almost 56% of the total explained variance in the measure of willingness. Additional analysis conducted on this regression revealed a high level of Power = .91.

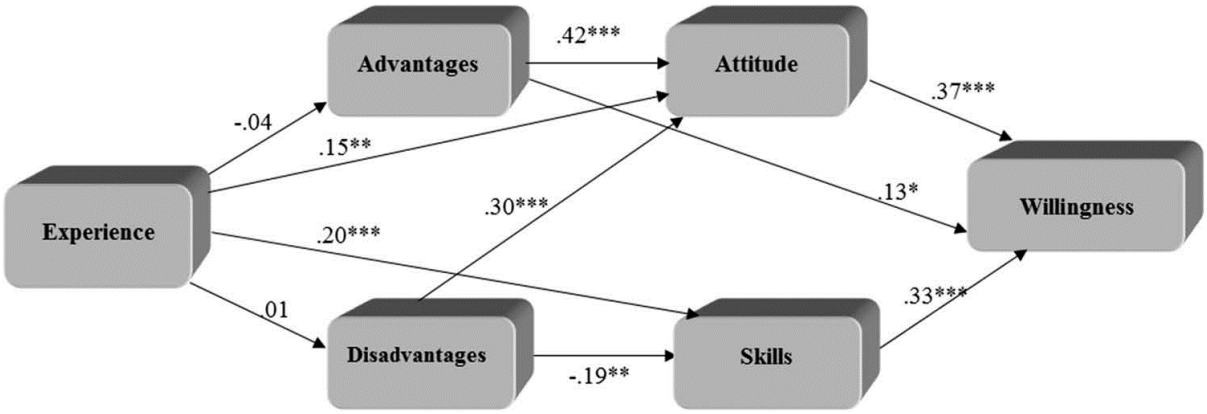

Figure 1. Structural Education Model of willingness to integrate collaborative learning in teaching

Table 3. Linear regression with willingness, Question 25

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	29.266[a]	11	2.661	5.887	.000	.669
Intercept	.200	1	.200	.442	.511	.014
Q11_CountBenefits	.009	1	.009	.019	.892	.001
Q12_CountDisadvantages	1.559	1	1.559	3.449	.073	.097
Section3-Average	18.197	1	18.197	40.265	.000	.557
Q24-skilled	.640	1	.640	1.415	.243	.042
Section4Average	5.092	7	.727	1.610	.168	.260
Error	14.461	32	.452			
Total	670.000	44				
Corrected Total	43.727	43				

a. R Squared = .669 (Adjusted R Squared = .556)

The role of faculty demographics was also examined to determine if they were related in any way to willingness to incorporate online collaborative learning. Gender identification for the 27 females and 17 males and was not found to be a significant variable, t (1, 42) = 1.28, p = .21 nor was age F (4, 39) = .81, p = .53 or years teaching F (4, 39) = 1.0, p = .42. Finally, primary function, when comparing professor career line with instructors, adjuncts and lecturers combined was not associated with willingness F (1 ,42) = 2.9, p = .09.

A subsequent regression was designed to further investigate the relationship pattern in this model and the mediating variables' contribution. These indicators operated as predictors and experience as the criterion. The results here revealed no significant

associations with the experience. The effect sizes produced were extremely small and negligible even when all the variables were combined. A follow-up linear regression was therefore constructed without the influence of experience considered. The mediating variables were entered as predictors of willingness; the dependent variable is exhibited in Table 4.

Table 4. Willingness predictors: skilled, benefits, disadvantages, and attitude

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	29.266[a]	11	2.661	5.887	.000	.669
Intercept	.200	1	.200	.442	.511	.014
Q11_CountBenefits	.009	1	.009	.019	.892	.001
Q12_CountDisadvantages	1.559	1	1.559	3.449	.073	.097
Section3-Average	18.197	1	18.197	40.265	.000	.557
Q24-skilled	.640	1	.640	1.415	.243	.042
Section4Average	5.092	7	.727	1.610	.168	.260
Error	14.461	32	.452			
Total	670.000	44				
Corrected Total	43.727	43				

[a]R Squared = .669 (Adjusted R Squared = .556)

The overall regression proved significant $F(4, 39) = 12.05$, $p < .001$ along with two predictors, attitude $t(43) = 5.66$, $p < .001$ and disadvantages $t(43) = -2.10$, $p = .04$. Attitude produced a robust, standardized beta of .67, while again, in this analysis, disadvantages added a relatively weak beta of -.24. The other two constructs, advantages and skills, displayed no significant betas; -.02 and .13, respectively.

An additional regression analysis was designed to examine any direct predictive association between attitude and the remaining mediators. The single significant coefficient associated with attitude was the relationship with advantages/benefits, $t(43) = 2.70$, $p = .01$, whereby the number of advantages supported by the participants was associated with a higher composite Likert score on the average attitude items. A moderate bivariate correlation was uncovered between the benefits and attitude, $r(42) = .39$, $p = .01$. A more detailed analysis for each of the benefit choices was not individually predictive of attitude.

A confirmatory SEM analysis as depicted in Figure 1 was conducted for the present sample and assessed employing the identical framework of Weinberger and Shonfeld's (2018) model. According to these authors, their sample yielded a high level of overall model compatibility (NFI = .99, CFI = .99, RMSEA = .05, x2 = 3.7, p > .05). By comparison, the present sample resulted in a less-than-adequate model configuration (NFI = .79, CFI = .56, RMSEA = .42, x2 = 83.89, p < .001), which cannot be considered an accurate portrayal of the relationships among these constructs. Table 5 presents a direct comparison of the two samples provided for each path: the standardized regression weights, the strength of the effect, and the associated significance level.

Weinberger and Shonfeld's (2018) model presented ten distinct paths. Two show no significance and do not formally operate as mediating variables from experience, namely the linkages displayed between experience and advantages and also with disadvantages. Further, the literature considers standardized regression weights of .20 or less are generally weak and not of important predictive value. Therefore, four paths in the Weinberger and Shonfeld model, although attaining significance due to sample size, should be regarded as marginal or unsubstantiated; these are experience and attitude, experience with skills, advantages to willingness, and between disadvantages and skills. The four remaining significant regressions were, at least, mildly predictive and gave some support to the model; advantages with attitude, disadvantages and attitude, attitude to willingness, and for skills with willingness. The current evaluation, by comparison, revealed five weak regressions that did not obtain statistical significance for this sample size. Only a single significant path b =.77 indicated a strong correspondence between respondent attitude and willingness to incorporate online collaborative learning.

Table 5. Comparison of model data

Model Path	Weinberger and Shonfeld 2018 Sample			Present Sample		
	Standardized regression	Relative strength	Significance level	Standardized regression	Relative strength	Significance level
Experience to advantages	-.04	None	NS	-.13	Weak	.39
Experience to disadvantages	.01	None	NS	.00	None	.98
Experience to attitude	.15	Weak	< .05	-.01	None	.96
Experience to skills	.20	Weak	< .01	.00	None	.99
Advantages to attitude	.42	Mild	< .01	.14	Weak	.35

Advantages to willingness	.13	Weak	< .10	.04	None	.72
Disadvantages to attitude	.30	Mild	< .01	-.12	Weak	.42
Disadvantages to skills	-.19	Weak	< .05	-.13	Weak	.41
Attitude to willingness	.37	Mild	< .01	.77	Strong	< .01
Skills to willingness	.33	Mild	< .01	.11	Weak	.27

NS = Not Significant

These findings were generally consistent with the analyses described earlier. The relationship measured by the standardized regression estimates between benefits and attitude was more diluted than the direct correlations and did not attain significance in the SEM. No direct causal path between skills and willingness was found substantiated by any of the analyses conducted. Additional alternative paths among these variables did not appear supported in the present study. The disparity between the two SEM models was not merely a function of sample size but also must consider the strength of the regression estimates identified (Sideridis, et. al., 2014; Wolf, et. al., 2013).

In summary, no relation was revealed between the predictor, experience, and mediating variables: advantages, disadvantages, attitude, and skills. Furthermore, the only mediating variable strongly and consistently predictive of instructor willingness was attitude. In addition, there is evidence that the advantages/benefits of online learning were significantly related to attitude.

Discussion

The results of this investigation revealed an intricate affiliation among several important constructs of online collaborative learning. The present study, which emulated Weinberger and Shonfeld's (2018) research, was examined and analyzed, employing a sample of instructors from six educational facilities in the United States. The findings display these sample health instructors' perceptions toward online collaborative learning. More specifically, instructors with positive attitudes were most likely to support the willingness to consider employing collaboration in their online teaching pedagogies.

The original Weinberger and Shonfeld (2018) data displayed a significant SEM model and several weak but marginally significant paths. In contrast, the SEM examined from this sample did not satisfactorily represent the prior model paths, primarily due to the lack of mediating effects. No consistent relationships were established between the predictor, experience, and the proposed advantages, disadvantages, attitude, and skills mediators. The one significant path uncovered between attitude and willingness was substantially more substantial than any of those identified in the previous model, b = .77. The linear regression among these variables reported that attitude accounted for almost 56% of the

explained variance in willingness. There was also a notable lack of demographic influences in the earlier, as well as the present research.

In the Weinberger and Shonfeld (2018) model, willingness to incorporate online collaborative learning was strongly related to teacher attitude, and robustly associated with other mediating constructs assessed. There was a direct and pronounced causal link between being skilled enough to practice online collaborative learning and willingness. Two inquiries from this study were telling regarding teachers' attitudes. Firstly, CL question 25: ‘I am willing to incorporate online collaborative learning in my classroom’, and question 13: ‘I like to incorporate collaborative working in my courses’, were found to be strongly related ($r = .76$, $p < .001$). The two items are almost identically worded except for internal perceptions of ‘willingness’ or ‘like’. It would appear that liking and a sense of willingness are part of the same underlying construct but may not differ significantly in the sense of behavior. It is possible that these two questions address an opinion or sentiment held by the subject of this study rather than an anticipated conscious act. In that case, their inter-relationship but lack of a significant association with skill may be more understandable.

Several notable distinctions were apparent between the methodology of Weinberger and Shonfeld (2018) and the present research. The original CL Questionnaire was based on three earlier student-based surveys. The resulting 2018 instrument presented no constraints on the definition of collaboration in the study; the resulting model addressed collaborative learning in general terms and not specific to the online collaboration format. This examination, by comparison, had instructions that explicitly and consistently directed the respondent to consider online collaborative learning exclusively.

The data here were obtained solely from health education faculty teaching online courses. Health education as a subject matter is distinct from other disciplines because it challenges students to personalize the material taught and create ways to implement it to improve their own and others' well-being. For these reasons, teaching health topics requires a strong need for collaborative discussion and exploration (Merete Nordentoft and Wistoft, 2012). The correlation between attitude and willingness to incorporate collaborative pedagogy found in this study could be connected to the themes surrounding health education. Some concepts (i.e., cardiopulmonary resuscitation (CPR) training) also require a practicum or hands-on hybrid approach to master the concepts. Teaching wellness concepts creatively and engagingly became timely and more evident during the COVID-19 pandemic. The Centers for Disease Control and Prevention (2023) acknowledged that people with obesity, type 2 diabetes, hypertension, tobacco, and substance abuse are at higher risk of severe illness or death following the contraction of coronavirus.

Interestingly, some researchers have suggested a gamified approach for teaching health concepts online and increasing such active participation. Taylor et al. (2020) indicate that much of the content in health-related classes could be taught in a virtual setting. Using this scenario, they advocate a virtual contextual environment such as Second Life (https://secondlife.com/). Because so many people have an affinity for video games, this type of setting may prove beneficial. Virtual platforms are continuing to develop, and the future looks promising for games that focus on specific goals such as education and training (Damaševičius et al., 2023).

Finally, training remains a crucial issue that must be considered in facilitating faculty development (Bustamante, 2021; Starkey et al., 2021). The results of this investigation point to the strong relationship between an instructor's attitude and their corresponding willingness to implement collaboration. In addition, being aware of the multilayered benefits of collaboration can bring a more positive attitude. Institutions of higher education must provide formalized training designed to sensitize instructors, inform and emphasize benefits, as well as introducing teaching pedagogies and methods that will enhance effective collaborative online techniques. Through a blending between the needs of students and the curriculum design, collaborative learning can cultivate successful connections among peers in the distance learning environment.

Higher education continues to be the foundation of achievement for individuals seeking advanced knowledge and participating in careers that demand specialized skills (O'Banion, 2019). In the wake of the pandemic, renewed opportunities have arisen for college students to earn degrees outside of traditional physical institutions, allowing for more flexible arrangements. These opportunities present challenges for some educational facilities moving into new and uncharted online environments.

Exploring new innovative approaches to bring communal experiences to students must be considered (Whalley et al., 2021). For example, collaborative learning curriculums allow teachers to employ softer skills. In one study, students have asked that soft skills be taught first (not last) in their coursework so they could engage more successfully. Soft skills help people manage conflict and create inclusive relationships that improve team performance, idea creation, negotiation of solutions, and revamping of work processes (Muir, 2004). Collaborative learning helps appreciate the critical feedback and divergent views from peers and instructors, further promoting communication and interpersonal skills (Boyce et al., 2001). Educators willing to incorporate online collaborative learning can be more attuned to their students' needs to feel included and valued. In turn, such efforts would assist institutions in retaining and graduating students.

Future studies should advance knowledge around collaborative learning within the online community in several crucial ways. Explorations of the best collaborative learning techniques comparing nontraditional versus traditional college students should be examined. Since decision-making and funding for faculty training come from top down, investigations into decision-makers' attitudes regarding collaborative learning are needed. Lastly, encouraging and cultivating collaborative learning practices for senior and junior faculty may present different challenges. Additional research is necessary to develop ways to appeal to faculty less prone to employ online courses or who could benefit from adjustments to their outreach and presentations.

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Appendix

Collaborative learning experiences questionnaire (Teacher)

The main objective of this instrument is to learn about your collaborative instructional experiences provided through a distance online program format.

This questionnaire consists of 27 items divided into 6 Sections and your response will take between 10 and 15 minutes. The survey will ask you for demographic information, experience and knowledge regarding collaborative learning and attitude, as well as, your perceptions concerning your online collaborative learning experiences.

Please answer honestly as this enables the results to be correct. All of your responses will be kept confidential when reporting the research results.

Thank you for your time answering this survey.

Section 1: Demographic information

1. What is your gender?

❍ Male

❍ Female

2. What is your age?

❍ 20-29

❍ 30-39

❍ 40-49

❍ 50-59

❍ 60 or above

3. In which Educational Facility and Program are you teaching?

_____

4. Do you teach:

❍ undergraduates

❍ graduate students

❍ a combination of both

❍ Other: _____

5. What is your primary function?

❍ Instructor or Adjunct

❍ Professor: Assistant, Associate, Full

❍ Researcher

❍ Administrator

❍ Other: _____

6. How many years are you teaching?

❍ 1-3

❍ 4-10

❍ 10-20

❍ 20-30

❍ More than 30

Section 2: Your prior experience and knowledge

7. Did you integrate collaborative teaching in your online classes?

❍ Yes

❍ No

7a. If you answered 'yes', please mention in which of your online courses and in what context (please write the name of the course):

1. _____

2. _____

3. _____

8. Were you specifically trained in:

❍ online collaboration

❍ collaboration, but not online collaboration

❍ No

9. What is your mode of online instruction? Please see the definitions below:

❍ Asynchronous - There are no planned virtual class meetings, students work independently throughout the course.

❍ Synchronous - Virtual meetings are planned throughout or at some points during the semester where students can engage directly with the teacher.

❍ Both Asynchronous and Synchronous online instruction.

❍ Neither – please explain _____

10. In your opinion, what are the characteristics of online collaborative learning?

❍ Mark the appropriate sentence/s (You may choose more than one answer):

❍ Working together with other students on the same assignment or project

❍ Cooperating with peers during the lessons

❍ Being actively involved in the learning process

❍ Sharing work between learners

❍ Learning content from each other

❍ Learning together online

❍ Other:

_____

_____

11. In your opinion, what are the benefits of online collaborative learning?

Mark the appropriate sentence/s (You may choose more than one answer):

❍ Better comprehension of the topics

❍ Fostered exchange of knowledge & experience

❍ Developing higher order thinking skills and abilities

❍ More relaxed atmosphere

❍ Enhanced communication skills

❍ Making new friends

12. In your opinion, what are the disadvantages of online collaborative learning?

Mark the appropriate sentence/s (You may choose more than one answer):

❍ Waste of time

❍ Difficulty getting members to actively participate in tasks

❍ Unfair evaluation of each student's investment in the process

❍ Communication difficulties

Section 3: Your attitude

Please, indicate your agreement with each of the statement below for online collaborative learning (SD = Strongly disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly agree):

	1 SD	2 D	3 U	4 A	5 SA
13. I like to incorporate collaborative working in my courses.	❍	❍	❍	❍	❍
14. My students prefer to do all their learning activities alone.	❍	❍	❍	❍	❍
15. The activities carried out in a group collaboratively, are important to my students' learning experience as students.	❍	❍	❍	❍	❍
16. My students learn more working in a group than alone.	❍	❍	❍	❍	❍
17. The activities carried out in a group collaboratively are important to my students' learning experience.	❍	❍	❍	❍	❍

Section 4: Your previous online collaborative learning experience

Please, indicate your agreement with each statement below (SD = Strongly disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly agree):

	1 SD	2 D	3 U	4 A	5 SA
18. It's easy to organize and distribute tasks and responsibilities among group members.	❍	❍	❍	❍	❍
19. There are members who provide limited contribution to teamwork and benefit from the efforts of other members.	❍	❍	❍	❍	❍
20. Working in groups requires more time than working alone.	❍	❍	❍	❍	❍
21. It is hard to maintain a smooth and continuous contact with all members of the group.	❍	❍	❍	❍	❍
22. It is easy to reach consensus in a group.	❍	❍	❍	❍	❍
23. It is unfair that members, who provided limited contribution to the work, receive the same rating as the rest	❍	❍	❍	❍	❍

Section 5: Your skill and willingness to implement online collaboration

Please, indicate your agreement with each statement below (SD = Strongly disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly agree):

	1 SD	**2** D	**3** U	**4** A	**5** SA
24. I feel that I'm skilled enough to practice online collaborative learning with my pupils. Please elaborate: _____	❍	❍	❍	❍	❍
25. I am willing to incorporate online collaborative learning in my classroom. Please elaborate: _____	❍	❍	❍	❍	❍

Section 6: Open ended questions

26. Tell us about your teaching experiences with online collaborative learning.

_____

_____

_____

27. Do you have any other comments regarding online collaboration activities in your programs?

_____

_____

_____