From Learning Literature to Online Holistic Education:

An Investigation of an Online Holistic Environment for College Students

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ABSTRACT

This study utilizes the literature education section of an online holistic environment to (1) develop a literature education survey based on Miller's theory of holistic education, (2) explore the effect of students' holistic learning through online literature immersion, and (3) inquire about students' holistic development through literature appreciation. Eight hundred twenty-two college students were involved in the online literature-related activities. With the blending of qualitative and quantitative data collection, the study analyzes online literature and poetry, interactive feedback and reflection, and a survey questionnaire. The study's content analysis (qualitative approach) discovers how students' literature works are distributed into Miller's three principles of holistic education and their extensive subthemes. Confirmatory factor analysis results (quantitative approach) suggest the survey instrument captured e-HO's literature education module's holistic impact. The discussion and limitations for online literature education from a holistic education perspective are also provided to guide future research.

KEYWORDS

College Students, Confirmatory Factor Analysis, Holistic Education, Literature Education, Online Learning

INTRODUCTION

Today's young people are exposed to levels of media content never before seen in human history yet very little research has been done into the effects of the phenomenon (Lutz, Ranzini, & Meckel, 2014; Rodriguez, Gummadi, & Schoelkopf, 2014). From the perspective of the educational professional, this growth in media and media modalities means that teaching and learning need to be redesigned from the bottom-up to be centered around these new information and communication technologies (ICT) in order to be best-suited to exploit the potential for collaboration, interaction, and global communication (Pimmer, Mateescu, & Gröhbiel, 2016). Even though there is no shortage of potential reforms, as there are seemingly as many schools of thought as there are educational researchers (Roth & Lee, 2007), strong barriers preventing wholesale institutional transformations remain (Reid, 2014) . It is

from this reality, with the need for redesigning the curriculum to best suit digital natives in mind, that the online holistic environment—e-Holistic (e-HO) —was developed (Lee, Pan, & Liao, 2011).

This research is designed to improve the limitations of holistic education which a number of studies have suggested. For example, very few empirical studies have focused on students' perceptions and experiences of holistic education in higher education (Ting, Pan, & Yang, 2008). Pan and his colleagues (Pan, Pan, Lee, & Chang, 2010; Pan & Wei, 2006) developed a qualitative method for investigating students' holistic education. However, they point out as one of their research limitations that holistic education needs to be examined through quantitative methods (Pan et al., 2010). Their recommendations resulted in few studies (e.g., Lee, Pan, Liao, Chen, & Walters, 2013) relying on a quantitative approach to investigate holistic learning. Moreover, the integration of holistic education with technology is rarely implemented because of the difficulty developing an environment for students in which to immerse themselves (Lee, Pan, & Liao, 2011).

This particular report, in response to Pan, Pan, Lee, and Chang's (2010) call, is to provide a complement of better qualitative and quantitative data for the promotion of online holistic education. The holistic environment (e-HO) grew out of a desire to have an online university platform which could be controlled entirely by the sponsoring university so that it would be free of commercial pressures, questions of control, and privacy concerns, as well as being in accord with the principles of holistic education (Lee, Pan, & Liao, 2011). E-HO is an integrative learning environment embracing a full spectrum of generation education, including music, art, science, history, and literature.

Because literature is often abstract to seek the meaning of life and philosophy, especially a poem, the literature education module on e-HO under investigation in this study was organized according to Miller's (2007) three principles of holistic education namely, balance, inclusion, and connection, which would serve as the theoretical framework for this study. Additionally, the activities for e-HO's literature module including group-created poetry, interactive feedback, and reflection toward selected texts, were to be analyzed via a qualitative approach to provide a better understanding of online holistic learning. Finally, the quantitative data in this study was to be analyzed according to the theoretical model from Miller (2007) by using structural equation modeling (SEM) (Lei & Wu, 2007).

Research Significance

This research is designed from an online immersive holistic environment. Miller's (2007) three principles of holistic education, namely, balance, inclusion, and connection, guided the design of the online environment and a questionnaire administered after students' e-HO immersion. The survey was piloted with exploratory factor analysis for reliability and validity, and then executed in a large sample for confirmatory factor analysis (CFA) in order to describe how well the observed variables serve as critical measurement (Selim, 2007) and how closely our observed data fit the theoretical model. This research development and findings are to provide a complement for the deficiency of quantitative empirical studies in holistic learning. In addition, other qualitative data (e.g., student-created poetry, interactive feedback, and discussion forum) was collected and analyzed to redress the lack of research about online holistic learning through literature and explore its influence towards holistic development.

Thus, the purposes of this study are threefold:

1. To develop a literature education survey based on Miller's (2007) theory of holistic education;
2. To explore if students' immersion in e-HO's literature module affects their holistic learning; and
3. To inquire if students' holistic development is influenced by online literature appreciation.

Withdrawn from the statement of purposes, the research hypothesis would be formed as: Miller's three holistic elements are intercorrelated with one another in the online holistic literature education.

Figure 1. Overlap in how the principles are expressed and achieved in particular settings
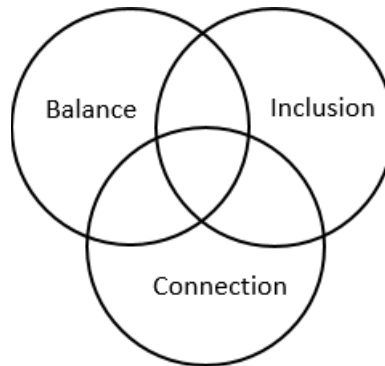
LITERATURE REVIEW

Theoretical Framework

Holistic education is a pedagogical school of thought which seeks to integrate, unify, and connect across domains rather than segregate, contrast, and divide. Perhaps holistic education can best be understood in terms of what changes it would bring to the status quo. Specifically, a holistic educator would disfavor forcing artificially restrictive academic specialization on immature minds, spiritually neutering curriculum out of an ancient fear of sectarianism, and, more concretely, abandon the use of standardized testing as humans are not standardized entities (Gordon, 2008; Miller, 2005; Rudge, 2016; Wilhelm & Novak, 2015). In short, holistic education can be seen as the antithesis of the assembly line and factory model of education which emerged out of the socio-economic needs of industrialized countries in the early 20th century (Kellner, 2003).

Perhaps the most widely-cited approach and clearly defined elucidation of holistic education is given by Miller (2005) who claims holistic education is focused on the "whole person" and is a repudiation of utilitarianism and instrumentalism. According to Miller (2007), holistic education is practiced by designing curricula according to the three principles of balance, inclusion, and connection. Miller believes that for an education program to be holistic, it must be designed with these principles in mind. These principles are not independent and exclusive so it is natural to see overlap in how the principles are expressed and achieved in particular settings (see Figure 1).

Miller (2007) sees holistic education as being practiced by attending to balance, inclusion, and connection. For Miller, "balance" refers to the focus of an educational program. For example, a holistic educational program will help students develop their analytical skills while also allowing them to rely on intuition and this rational/intuitive dichotomy is one of Miller's "balance" subthemes. Likewise, educational programs that are balanced will not only concentrate on student achievement and assessment, but also on what happens inside the classroom in the time between the testing and this subtheme reflects the dichotomy between content and process. Balanced educational programs will contain individual work and discrete skill development, but with equal measures of group work and activities that cut across disciplines, forming the subtheme dichotomy between the individual and the group. Finally, student imagination is often not accounted for under elaborate systems of standardized testing and this forms the subtheme dichotomy of knowledge and imagination.

Miller's (2007) second principle of holistic education is for education programs to be holistic, they must also be "inclusive". Inclusion for Miller refers to the learning students undergo in the program. Learning must not only be the transmission of knowledge and the transaction of understanding, but also the transformation of the student's own self to be socially engaged and purposeful. Educational programs must allow for students' different learning styles and preferences and include meaningful

group work in addition to more standard lecturing and question and answering. Miller (1998) puts forward three orientations, or subthemes, that must be considered to bring about inclusive learning: (1) transmission learning as information flowing one-way from teachers or textbooks to students; (2) transaction learning as teachers and students learn via two-way exchange; and (3) transformational learning as learning occurring through physical, mental, emotional, aesthetic, spiritual, and moral development of the student. Although all three of these orientations should be included in any educational program, the current paradigm tends to neglect transformational learning. In this way, by connecting student transformational learning to subject matter, holistic learning occurs and reflects inclusively natural learning.

Finally, Miller (2007) believes that holistic education programs must foster "connection" between subjects and curricula, between students, teachers, schools, communities, and between students, the earth, and the soul. Connection for Miller means that education is not siloed or stove-piped: holistic education acknowledges the boundaries between disciplines but is not limited by them. Holistic pedagogy helps students see and appreciate just how interrelated subjects are. For example, scientists mapping the universe are witness to some of the greatest natural art ever created. On the other hand, some of the greatest pieces of literature are founded on natural science principles. Holistic educators encourage students to connect subjects so that the subjects themselves are more accurate representations of their true natures. A number of connection relationships Miller (2007) suggests and also which are categorized in our study as subthemes are as follows: in the context of linear thinking and intuition, students are encouraged to apply metaphor and visualization techniques to achieve synthetic learning; in the relationship between mind and body, students are inspired by dance and plays to reach a spiritual level, which is in the human mind; in the relationships among domains of knowledge, school subjects can be connected through multiple disciplines; in the relationship between self and community, a holistic student possesses the skills of interpersonal relation, community service, and social action; in the relationship to the earth, human being is considered as a part of life rather than a separation from the earth; and in the relationship to the soul, holistic learning fosters students' ability to more deeply understand ego, social roles, and inner soul.

Online Holistic Environment

An informal online holistic learning environment entitled "e-HO", created to offer students an alternative way to intake content online, has been implemented and reported on recently (Lee, Pan, & Liao, 2011; Lee, Pan, Liao, Chen, & Walters, 2013). E-HO was designed to offer tertiary students an appealing way access to materials from the full spectrum of general education subjects including music, visual arts, performing arts, science, literature, emotion management, character education, and interpersonal relationships for the purpose of building lateral connections among curricula in the pursuit of personal holistic development. E-HO was also motivated by a desire for a digital "safe space" for students which would be free of the commercial, privacy, copyright, security, and censorship concerns that make using other services such as Facebook or Google disfavored (e.g., Ward, Cole-Miller, Fruhling, & Cooper, 2016). In short, the strategic aim of the institution of higher learning at which e-HO was developed is to help students become "humanized" by integrating the curriculum across all aspects of students' lives. This is achieved for the students by attempting to make the e-HO platform more enjoyable and less intimidating than traditional e-learning platforms. For example, e-HO essentially works through informal autonomous learning and even though some teachers may incorporate e-HO into their syllabi, e-HO itself has no mechanisms for formal assessment. This type of design is intended to reinforce the leisurely climate of e-HO, in the hope of stimulating the students' individual autonomous learning habits (Lee, et al., 2011).

The evaluation of web-based learning systems is an area of research that is rapidly evolving but still without much consensus (e.g., Song & Lee, 2014; Baker & O'Neil, 2013). One approach to

Figure 2. The literature on e-HO is derived from six sources

evaluation is to investigate user attitudes towards the learning system and other self-reported measures of effectiveness. The first study of user attitudes towards e-HO found that students' overall impression was positive, with the most powerful variable being frequency of use: a relatively intermediate frequency of use produced the largest satisfaction among students (Lee, Pan, & Liao, 2011). Another study on e-HO reported findings from its character education module: a survey, while reflecting students overall favorability, revealed significant gender, grade, and discipline differences in e-HO character education effectiveness (Lee et al., 2013).

METHODOLOGY

Literature Education Module

E-HO's literature education module is designed to facilitate extensive and pleasurable reading in accord with Miller's (2007) three principles of holistic education. In this way, e-HO is distinguished from e-learning platforms that serve a purely information-seeking function as has so much of the current reading modalities now commonly relied on through digital media (Curwood, 2013; Gillen 2015). It is hoped that literature on e-HO is enjoyable and interesting to students, motivating them to read more or seek out new articles, stories, and poems, while incidentally exposing them to more thoughtful and enriching forms of written communication; in other words, the literature contained on e-HO should be balanced, inclusive, and connected. Additionally, the literature education module of e-HO is designed not to reinforce the divide between "ordinary" life and "academic" life but to manifest the reality of their unity (Street, 2003). Furthermore, the online literature platform encouraged students to work in groups for poetry creation.

The literature on e-HO is derived from six sources: (1) short stories authored or recommended by university faculty; (2) student-created poetry; (3) literature published by the university as instructional material; (4) a video-on-demand system of lectures relating to literature; (5) an interactive idiom and proverbs game; and (6) poetry created by students as an interactive feature available to e-HO users (see Figure 2). These sources were selected for e-HO's literature education module because they were in fact found to be balanced, inclusive, and connected. Another pragmatic advantage to encouraging literature appreciation on e-HO is that students are able to have free and open access at any time, unencumbered by copyright or other restrictions. Finally, e-HO also contained a messaging system to allow students to post and view comments or reflections regarding a particular work.

According to the methodological workflow (see Figure 3), step 1 and 2 were included above, and followings are the rest of the steps.

Figure 3. Methodological workflow
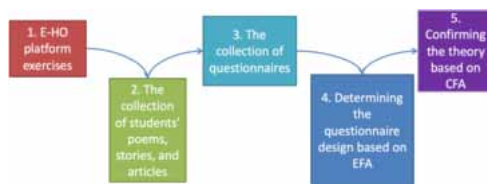
Instrument Design

Applying the theoretical framework of Miller (2007), a 5-point Likert scale questionnaire was designed according to his three holistic principles by a professor who has been teaching literature as general education for years. To fulfill expert validity, the draft of the initial questionnaire was then reviewed by another two professors from the general education field to correct any ambiguous language and content. The questionnaire originally consisted of background information and 24 items relating to literature on e-HO. The pilot factor analysis was analyzed for internal consistency, descriptive statistics, and exploratory factor analysis. The exploratory factor analysis was conducted on 24 questionnaire items in an orthogonal rotation (varimax). The KMO (Kaiser-Meyer-Olkin) of 0.927 is highly suitable for sampling adequacy, described as "superb" according to Field (2009). The correlations between items were relatively large for a factor analysis as Bartlett's test of sphericity was $\chi 2$ (276) = 1542.564 (p <.001). The initial analysis was executed to obtain three components with eigenvalues over Kaiser's criterion of 1. The combined explanation of the variance is 55.412%. By locating three factors with a factor loading more than 0.5 for items (Litzelman, Stratos, Marriott, & Skeff, 1998), the researchers deleted item 1, 6, 10, 11, and 15. In addition, because the meaning of item 7 did not suit the factor attribution and the factor loading was low (0.510), item 7 was deleted.

The exploratory factor analysis of the pilot study's data resulted in three clustered factors. Based on Miller's theory of holistic learning, the first factor—inclusion, includes 6 items ($\alpha = 0.843$, AVE = 0.76), the second factor—connection, includes 8 items ($\alpha = 0.888$, AVE = 0.79), and the third factor—balance, includes 4 items ($\alpha = 0.778$, AVE = 0.78). The overall Cronbach's alpha of the three factors for the questionnaire is 0.935. According to Nunnally and Bernstein (1994), reliability for the overall questionnaire and for each factor of 0.7 or greater is appropriate for using the instrument. Moreover, Fornell and Larcker (1981) suggest that a discriminant validity of 0.5 or greater is considered valid. The results of the pilot study show that the questionnaire meets the standards for reliability and validity (see Table 1).

Participants

A hundred and twenty participants were randomly recruited from a university in northern Taiwan for a pilot study of the reliability and validity of the newly developed questionnaire (Ware, Kosinski, & Keller, 1996). Eight hundred and twenty-two participants from the same university were recruited for the full-scale sampling. Participants (N=822) were divided into 257 groups of two to four each to create text-only poems and multimedia poems. The survey was placed on e-HO after their immersion in four-week long online literature-related activities. The participants represented a majority of undergraduate students (96%) and a minority of graduate students (4%). Their majors were from various disciplinary fields, including the College of Business (30%), Electrical Engineering and Computer Science (21%), Design (19%), Science (17%), Engineering (13%), Humanities and Education (12%), and Law (4%). On average, participants spent at least 30 minutes a day for four weeks on reading short stories created by university faculty, viewing

Table 1. Result of exploratory factor analysis, reliability and average variance extracted (AVE)

Item	Inclusion	Connection	Balance	Cronbach's α	AVE
Q13 E-HO's content and activities expand my understanding of the range of literature.	0.758			0.843	0.76
Q12 E-HO's activities or contests expand my personal imagination.	0.732				
Q14 E-HO's content and activities expand my perception of life.	0.616				
Q2 E-HO makes me more willing to enjoy literature in the future.	0.586				
Q5 E-HO's content and activities help me achieve the goal of becoming a whole person.	0.583				
Q9 E-HO's content and activities increased my interest in literature.	0.582				
Q20 E-HO's content and activities caused me to realize that everyone is special in his or her unique way.		0.726		0.888	0.79
Q8 E-HO has allowed me to easily access many different works of literature available on campus.		0.714			
Q24 E-HO's content and activities cut across disciplines.		0.659			
Q4 E-HO's content and activities helped me to better understand how others think and feel differently from me.		0.639			
Q23 I like to read literature on a multidisciplinary platform like e-HO.		0.630			
Q21 E-HO's content and activities make me more willing to accept others.		0.616			
Q3 E-HO's content and activities aroused my interest to browse the selections.		0.562			
Q19 E-HO's content and activities help me understand others' feelings.		0.540			
Q22 E-HO is helpful for literature education.			0.794	0.778	0.78
Q18 Through e-HO, I believe literature can be a vital way to experience holistic education.			0.680		
Q16 E-HO, embracing multiple areas like music, art, science, and literature, is more attractive to me than a website which focuses solely on literature.			0.577		
Q17 E-HO's content and activities cause me to be more willing to express my feelings in words.			0.518		

Overall Cronbach's α= 0.931, N=822

videos related to literature, creating short stories or poems for campus-wide competition, and playing an interactive idiom and proverbs game.

Data Collection

There are qualitative and quantitative data collections in this study. Qualitative data includes: group-created poetry, interactive feedback on poetry, and reflective discussion on e-HO literature; the quantitative data is the online questionnaire. Both text-only (n=194) and multimedia (n=64) poems were created by student groups of two to four people. Text-only poems were usually a bit longer and described the writers' deeper thoughts about life, the environment, philosophy, earth, soul, body, and mind. As for multimedia poems, they were pictures with a short poem, a word-and-image animation in the form of a poem, or a video with animated text and photos.

The online questionnaire was placed on e-HO for students to complete after giving their consent to be involved in the study. After deleting invalid data, 822 surveys were collected for the investigation study.

Data Analysis

The qualitative data was analyzed with content analysis as the researchers read the feedback and discussion to allocate the interaction (Downe-Wamboldt, 1992). The text of students' interactive feedback and discussion were selected if they contained similar aspects, which were considered as meaning units (Graneheim & Lundman, 2004). By modifying the approach of content analysis in Graneheim and Lundman's (2004) study, meaning units were derived into themes and subthemes. Themes were later categorized into Miller's (2007) holistic concepts to demonstrate and support literature reflections in e-HO.

Student-created poems were read by two researchers with experience in qualitative coding. The two researchers conducted content analysis on text-only and multimedia poems, and discussed the disagreement over certain coding results; a compromise was reached for coding agreement. Both forms of poems, text-only and multimedia, were categorized into Miller's (2007) three themes and their extended subthemes—inclusion (transmission, transaction, and transformation), connection (linear thinking and intuition, relationship between body and mind, relationship between self and community, relationship to the earth, and relationship to the soul), and balance (content/process, individual/group, knowledge/imagination, rational/intuitive). Because students' poems did not display the full spectrum of subthemes identified by Miller, certain aspects of his theory like the relationship among domains of knowledge, quantitative/qualitative, technique/vision, and assessment/learning, were not coded and did not display in our qualitative findings.

For the confirmatory factor analysis, all parameters were measured using the maximum likelihood (ML) estimation with Amos 16.0. A CFA is to specify "the relations of the observed factors to their posited underlying constructs" (Selim, 2007, p. 403). Numerous goodness-of-fit indicators, such as Normed Fit Index (NFI), Incremental Fit Index (IFI), Non-Normed Fit Index (NNFI), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and other fit indexes, were estimated to assess the model.

RESULTS

The Coding of Student Group-Created Poetry

For the content analysis, whole poems were categorized according to the subthemes based on Miller's theory. In text-only poems, the most common expression of "inclusion" was through "transformations" (18.6%); for "connection" in text-only poems, the relationship between body and mind (30.9%), the relationship to the earth (29.9%), and the relationship to the soul (28.9%) were the most common ways in which the principle was expressed; for "balance" in text-only poems, the dichotomy between content and process was most common (60.3%).

The multimedia poems showed similar results to the text-only poems after the content analysis as the most common expression of "inclusion" was through transformation (50.8%) and the most common expression of "balance" came from the content/process dichotomy (52.4%). However, as for the principle of connection, the multimedia poems fell nearly evenly into the five subthemes—linear thinking and intuition (36.5%), relationship between body and mind (31.7%), relationship between self and community (36.5%), relationship to the earth (34.9%), and relationship to the soul (38.1) (see Table 2 and 3).

The Interactive Feedback on Poetry

Interacting between peers, there is an average of five responses for each poem. The majority of responses echo poem authors' emotions, mindset, and reflections of respondents' life experiences. In Miller's holistic learning, students' interactions were mostly considered as transformation in the perspective of inclusion, relationship to mind and soul in the principle of connection, and the balance principle of the rational and the intuitive. However, some of the students' imaginations on poetry

Table 2. Text-only poetry (N=194)

Theme	Subtheme	Article coding (frequency, percentage)	Example poem (article number, title)
Inclusion	Transmission	13 (6.6%)	#10, Wonderful life
	Transaction	4 (2.0%)	#12, Brewing sport competition
	Transformation	36 (18.6%)	#14, Staying up late
Connection	Linear thinking and intuition	46 (23.7%)	#21, The meaning of life
	Body and mind	60(30.9%)	#32, Love
	Self and community	33(17%)	#22, Sharing
	Relationship to the earth	58 (29.9%)	#47, A journey
	Relationship to the soul	56 (28.9%)	#148, A dark night
Balance	Individual/group	22 (11.3%)	#113, Ambiguous relationship
	Content/process	117 (60.3%)	#114, Miscellaneous emotions
	Knowledge/imagination	28 (14.4%)	#63, Breakthrough
	Rational/intuitive	43 (22.2%)	#101, Rain

Table 3. Multimedia poetry (N=63)

Theme	Subtheme	Article coding (frequency, percentage)	Example poem (article number, title)
Inclusion	Transmission	8 (12.7%)	#4, Shimen's charm
	Transaction	10 (15.9%)	#10. Good life
	Transformation	32 (50.8%)	#5, A city corner
Connection	Linear thinking and intuition	23 (36.5%)	#15, Be yourself happily
	Body and mind	20 (31.7%)	#12, All for heart
	Self and community	23 (36.5%)	#14, A rabbit couple
	Relationship to the earth	22 (34.9%)	#24, A peninsula verse
	Relationship to the soul	24 (38.1%)	#23, Window
Balance	Individual/group	21 (33.3%)	#30, Blood youth
	Content/process	33 (52.4%)	#34, Tunnel
	Knowledge/imagination	24 (38.1%)	#42, Time
	Rational/intuitive	16 (25.3%)	#8, Coastal areas

creation reflect the conflicts between respondents and poem authors. Even so, those responses were positive and developed into more profound peer introspections. An example reflecting on text-only poem #8, "Secret Love," is:

Your words really hit the feeling of secret love.
With the emotional text, you described the struggle when not seeing the one you love.
However, because of his or her careless neglect, your emotional adoration is gradually revealed.

The researchers considered these interactions as examples of holistic learning among peers.

The Discussion Forum

The discussion forum on e-HO was provided for students to offer their reflections towards selected literature. The prose written by faculty or famous writers modeled for student's critical thinking and experiential reflection at a high level. The results reveal that students' old experiences affect their holistic thinking and learning in slightly different ways. The majority of their learning focuses on transformation under the inclusion principle, the connection principle between linear thinking and intuition, and the balance principle between knowledge and imagination. An example of linear thinking intuition reflecting to the article "After Wearing the Headset" is:

This article recalls much about my high-school experience when putting on headphones through the sleeves of my jacket.
The feeling was like being isolated from the outside world. In a noisy public place, this is a good way to isolate oneself for temporary relaxation from the outside world.

Another example on the balance between knowledge and imagination reflecting on the same article:

Listening to music is like making a girlfriend: you can choose to keep her private or introduce her to your friends.
When you don't want to be disturbed, just put on your headset.

These two examples of reflection were responding to the same article "After Wearing the Headset." Two students applied different holistic approaches of retrospection and imagination after their reading of the article written by a university professor.

Survey Questionnaire Results

The standardized path coefficient (see Figure 4) was analyzed through confirmatory factor analysis (CFA). A reasonable fit to the formal study of 822 participants was exhibited through the fit indices $\chi^2_{(df=132, N=822)} = 574.234$ ($p < 0.001$); RMSEA = 0.064, CFI = 0.951, SRMR = 0.0321). Schumacker and Lomax (1996) indicated that a good model fit and model's quality cannot be judged by a single index. According to Hoyle and Panter's (1995) summary of recommended fit indices, the results of CFA for fit measurement (see Table 4) is displayed as follows.

Because chi-square is affected by the large size (Lei & Lomax, 2005), its *p* value is significant. Other than chi-square, all indices meet the recommended standards for the fit. The CFA results show that no modifications are necessary because all indices but chi-square demonstrate a good fit.

The mixed-method research results are showed as Figure 5. It shows three results:

1. Miller's holistic themes were equally covered in the online exercise according to the content analysis approach.
2. Exploratory Factor Analysis (EFA) approach determined initially developed questionnaire.
3. Confirmatory factor analysis (CFA) approach confirmed Miller's holistic theory.

DISCUSSION

By relying on Miller's (2007) theoretical framework for holistic education, a questionnaire for online literature immersion in a holistic environment was developed. Students' collaborative works of group-created poetry, as well as peer-to-peer and student-to-literature interactions demonstrate just how

Figure 4. The standardized path coefficient
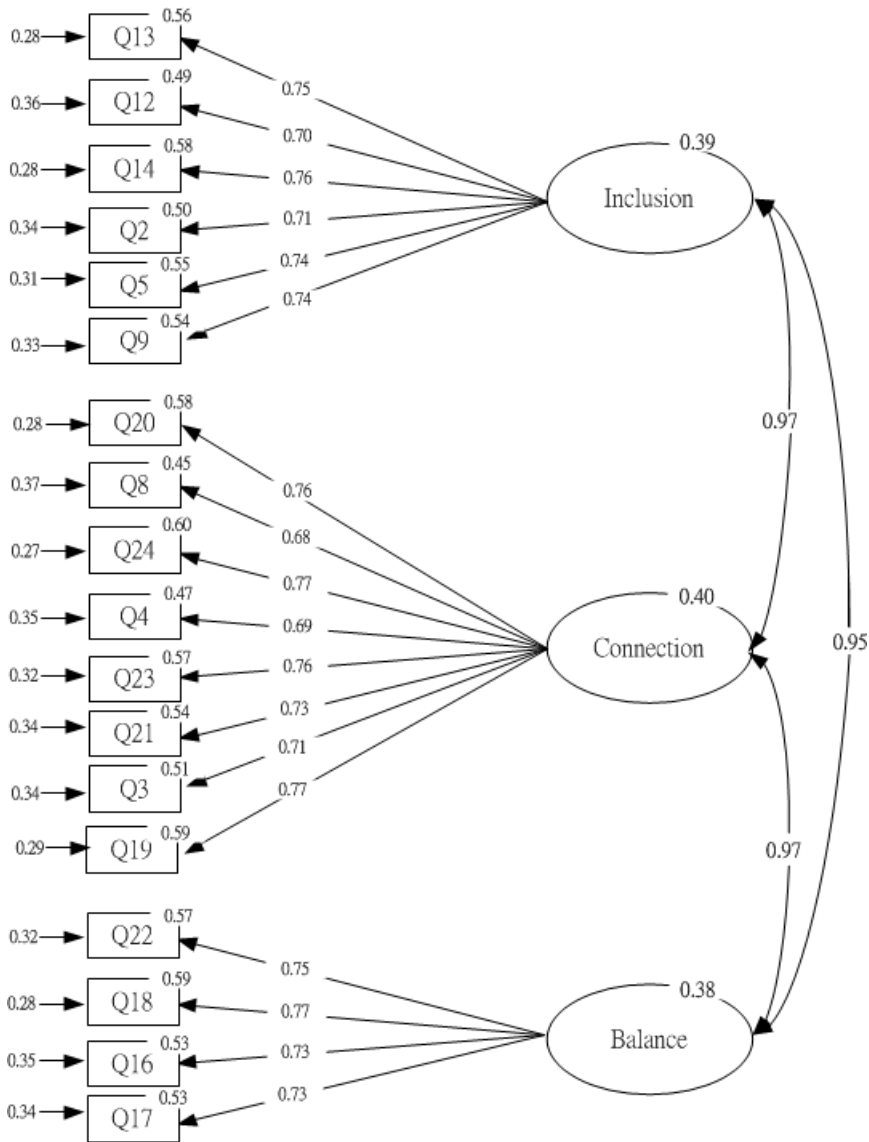
Miller's theory of holistic education is manifested in students who have participated in an informal online holistic learning platform. The following is the discussion of the qualitative and quantitative results this study generates, as well as how online literature immersion and appreciation affects students' holistic learning and development.

The Discussion of Students' Writings and Interaction

In the qualitative coding of student group-created poetry, all poems contained one or more subthemes of Miller's (2007) three principles of holistic education, namely, inclusion, connection, and balance. As repetition coding was applied to enhance the robustness of content analysis (Pesquet-Popescu, Dumgroup-createditras, & Macq, 2006), a certain number of student group-created poems were

Table 4. Statistics of model fit measures

Fit index	General rule for acceptable fit	Estimated value
Absolute Fit Indices		
Chi-Square	$p>0.05$(insignificant)	574.234(p=.00)
Normed	<3 good <5 acceptable	4.35
GFI	>0.90	0.922
RMR	<0.05	0.022
RMSEA	<0.08	0.064
Comparative Fit Indices		
AGFI	>0.80	0.900
NFI	>0.90	0.938
RFI	>0.90	0.928
IFI	>0.90	0.951
TLI (NNFI)	>0.90	0.944
CFI	>0.90	0.951
Parsimonious Fit Indices		
PGFI	>0.50	0.712
PNFI	>0.50	0.809
PCFI	>0.50	0.821
CN	>200	247

Figure 5. Mixed-method research results
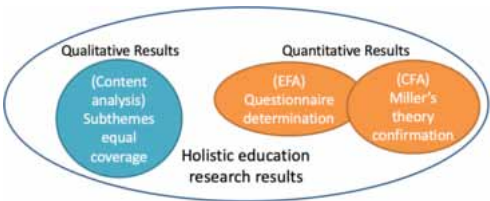
categorized into all of Miller's (2007) three principles. An example of multimedia poems created with an animation exemplified the holistic concept students developed:

Sharing is like spreading joy to others.
Similar to planting a seed, when you are watching the seed sprouts, and grow up little by little, your happiness is growing little by little.
Unselfish sharing is spreading happiness.
It is more blessing to give than to receive.

This poem is categorized into the transformation subtheme of the inclusion principle, the relationship between self and community in the connection principle, and content/process subtheme of the balance principle. Another example of a text-only poem is as follows:

Nobody can live alone.
If you can, then you are letting go of everything around you.
If you can't, think about how much this world has given you.
Meanwhile, try to figure out how to be yourself and also help those in need.

This poem is categorized into the transformation subtheme of the inclusion principle, the subtheme of linear thinking and intuition in connection principle, and individual/group subtheme of balance principle.

The above two examples of students' group-created poetry demonstrate undergraduate students' concern for the connection among self, community, and the world. Students' contemplations result in their personal reflection to the deepest level of the soul and mind. Slattery (2012) proclaims that when students are empowered by a holistic environment, their self-discovery and self-demands transcend subject grades. In reference to Slattery's comments on holistic life experience, Kincheloe (2013) concludes that students are turning a holistic journey into a subject of personal consciousness in order to construct his or her life path.

The Development of the Survey Questionnaire

In the survey questionnaire, six items fall under Miller's (2007) inclusion principle, eight under connection, and four under balance. The exploratory factor analysis result does not fit with how the researchers originally designed the survey to contain 24 items. However, from the data collection for the formal experiment, the confirmatory factor analysis shows that the exploratory factor analysis result identifies appropriate items, with a number of questions deleted because of low factor loading.

The items under the principle of balance were reduced the most. That only left four items to reveal just how e-HO's content and activities are balanced from a holistic perspective. The balance subtheme of the dichotomy between technology-driven curriculum and programmatic vision shows that the item is plausible. However, the balance of rational and intuitive as well as individual and group, were excluded and the result displays better CFA results with no further modification needed.

Six items fell under the inclusion principle as the questions concern more about how e-HO uses online literature to affect learners' holistic inclusiveness. Items that discuss students' perceptions of life and personal imagination represent transformational learning. E-HO's literature content fosters students becoming whole persons, which reflects holistic education through literature appreciation. Learners also expressed their favorability towards the literature content because of the nature of the e-HO environment.

Eight items fell under the connection principle as the questions concern more on how e-HO presents online literature to affect learners' interpersonal connection. When learners connect themselves to the world, their empathy towards others and the community becomes obvious, such as being more willing to accept others, understand other's feeling, and perceiving that everyone is unique. The interdisciplinary connections in the literature help to develop students' thinking and intuition. By reading the literature connecting to the campus, they connect themselves to the soul, and further expand to the community and the global society. This outcome is also aligned with our results from the content analysis showing student-created poetry tended to be more evenly distributed across the connection principle, perhaps because connection is the principle concerned with subject matter and the other two principles are more reflective of the intrinsic attributes of the teacher and program.

Three principles represented in the questionnaire significantly and highly correlate to one another—inclusion to connection ($r = 0.97$, $p < 0.001$), connection to balance ($r = 0.97$, $p < 0.001$), and balance to inclusion ($r = 0.95$, $p < 0.001$). The model thus verifies Hutchison and Bosacki's (2000) idea that a holistic and transformative program must encompass personal integration, sociocultural awareness, cognitive change, and affective consciousness. All of these can be seen in our quantitative data when it is organized according to Miller's (2007) holistic education framework. Thus, on the

basis of this results, the research hypothesis "Miller's three holistic elements are intercorrelated with one another in the online holistic literature education" was accepted.

Limitations

This research initiates a mixed study attempting to represent the full spectrum of Miller's (2007) theory of three holistic principles. However, there are a few limitations that need to be considered for future related research:

1. Although the survey questionnaire is designed based on Miller's theory of three holistic principles, the online literature on e-HO is only a part of holistic learning development. The full spectrum of holistic perspectives might not be entirely presented and affected in students' independent online learning. Thus, some contexts in Miller's theory are not presented in the questionnaire, such as rational/intuitive and individual/group for the balance principle, but this resulted in a better structural model.
2. The content analysis is only conducted for student group-created poetry but not for the interactive feedback on the poetry and discussion forum because the feedback and discussion do not completely present a full context for Miller's three holistic principles. The reason for this might be due to the lack of open-ended questions relating to the curricula and activities because e-HO is an informal and independent learning environment where teachers did not play the role of content leader. However, this aspect might have resulted in some qualitative data being omitted for a more in-depth discussion about e-HO's effectiveness.

CONCLUSION

Both qualitative and quantitative analyses suggested that students must learn not only the knowledge, but also the passion about life and love. From the content analysis of holistic poetries, students went beyond the conventional learning of knowledge to the transformational learning of spiritual exploration. From the development of holistic questionnaire, EFA explored the model of survey questions, and CFA confirmed Miller's pattern is suitable for holistic exploration. The following is three conclusions drawn from the research results:

1. When designing a holistic curriculum, a teacher must consider the dichotomy between content and process seriously. In this way, students can link their learning into Miller's "balance" subtheme.
2. Learning is not happening through one-way teaching—teachers to students or textbooks to students. It truly happens when students can link the learning into physical, emotional, spiritual, and moral development. This kind of learning is what Miller referred to "inclusion" subtheme.
3. Learning is not just about self, but also connecting to interpersonal and intrapersonal relationship. Most importantly, holistic pedagogies are a human-world connection. When a person knows his or her purposes of coming to the world, he or she comprehends the meaning of existence, which connects inner soul, human mind, community development, and world sustainability. In this way, the student is self-motivated to take social action to impact the community and the world.
4. In the future, the machine learning on text analyses can be included for finding patterns and trends on syntax and semantics. In this way, the text can be compared on the bases of different genders, grades, colleges, and other background differences. As long as the volume of data is big enough, the association rule learning can be applied for discovering interesting relation and phenomenon in literature holistic education.

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