A Holistic and Integrative Learning Environment e-HO Complementary to e-Learning for General Education
具全人與整合意義之通識教育網路學習平台「全人發展網」（e-HO）──與 e-Learning 互補的學習環境

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Abstract

How to cope with the issues related to the fragmentation of knowledge and the massification of students has become one of the major challenges to higher education in this Information Age. As the mere curricular reformations in general education since decades ago have been realized to be inadequate for the end, we suggest that a constructivist, holistic and transdisciplinary platform, as exemplified by Web e-HO established in CYCU, connecting the whole spectrum of general education and suitable for mass university students today be constructed and cultivated to meet the need. It is characteristically distinguished from the conventional cyber course platform or e-Learning wherein many courses are packed and delivered individually with various levels of interface that are difficult to crossover. Hence, while e-Learning could be regarded as a bundle of longitudinal fibers separated from one another, e-HO is to serve as providing the horizontal connections in a complementary sense to facilitate an integrative and wholesome knowledge network. The holistic and transdisciplinary impacts of a web like this under the climate of the contemporary Internet subculture influencing mass university students today shall be reported qualitatively and analyzed quantitatively as well through the e-HO survey conducted among 647 university students. The preliminary numerical results turned out quite positive in relating to the purposes of the whole endeavor and deserved careful reflections by concerned educators in higher education today.

Keywords: integration of knowledge, mass higher education, general education, holistic education, web-based learning

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I. Introduction

Two major trends in higher education have been developed and widely noticed since the end of the twentieth century. One of them is related to the issue of the fragmentation and incoherence of knowledge. An awakening has been discerned as well in responding to this. Many have realized that our future relies on the holistic development of human beings characterized by a sense of wholeness and connectedness (Flake, 1993; Forbes, 2003; Miller, 1999; Miller, Cassie, & Drake, 2000; Pan & Wei, 2006; Scott D., 2002). While it used to be the main theme of education in ancient China as exemplified in that advocated by Confucius and his followers, holistic education has been seriously inflicted by those biased entrance examinations of various levels for hundreds of years in modern Chinese history. This new awakening in its modern context does have influenced the higher education in Taiwan since a couple of decades ago notwithstanding. Holistic education is a philosophy of education based on the premise that each person finds identity, meaning, and purpose in life through connections to the community, to the natural world, and to spiritual values such as compassion and peace (Miller, 2001). Its basic assumption is that everything in the universe is fundamentally interconnected instead of being fragmented or unrelated. Therefore, all possible facets of relationships are greatly emphasized and explored--the relationship between linear thinking and intuition, the relationship between mind and body, the relationship among various domains of knowledge, the relationship between the individual and community, and the relationship between self and Self (Miller, 1999; Miller et al. 2000; Miller, 2001; Pan, Pan, Lee, & Chang, 2010). In seeking to nurture the human spirit while improving intellectual ability and performance, holistic learning tries to provide a broader vision of education and human development (Pan et al., 2010).

The other concerns the transformation of essence from the elite to the mass in higher education (Daniel,1993; Mayhew, Deer, & Dua, 2004; Scott P., 2002). In Asia-Pacific Area like Taiwan, the change has been tremendous over the past two

decades (e.g., Wang, 2003). Many problems have emerged as a result of this particular transformation. Especially, as widely perceived, the motivations for and the attitudes toward study differ dramatically between the two.

How to adjust our pedagogical orientations and practices accordingly to meet the needs concerning the integration of knowledge and the characteristics of mass university students has become a great challenge for higher education in the present twenty-first century.

A. Beyond Curricular Efforts Needed

Tremendous efforts and some significant results have been reported since 1980s in coping with the issues related to the fragmentation and incoherence in general education (Bennett, 1984; Cheney, 1989; Johnson & Ratcliff, 2004; Johnson, Ratcliff, & Gaff, 2004). Nonetheless, while educators have supposed that students will integrate automatically what they learned from different courses, lab studies indicated that this is hardly the case though (Barnett & Ceci, 2002; De Corte, 2003). To effectively solve the problem, as suggested by Benander and Lightner (2005), individual courses should be regarded as pieces of a *'larger experience'* for students. While the curricular structure, as the whole skeleton with each individual course as a particular piece of bone, may be perfecting along the way, muscles and sinews are not yet ready developed to facilitate the final move for a lively general education. We would like to call for attention that this '*larger experience'*, wherein to facilitate the due functions of muscles and sinews, could not be expected by nature in the conventional curricular structure as the mere skeleton itself. Some new approach toward this end beyond the curricular efforts mentioned above is evidently both urgent and necessary. The purpose of the present paper is to report on the significance and results of such an endeavor as shall be exposed later.

B. Inadequacy of e-Learning

Meanwhile, we have seen new opportunities and possibilities emerging as well in this Information Age. Especially, the Internet has been widely exploited for teaching and learning since 1980s (Cheung & Huang, 2005; Desai, Hart, & Richards, 2008; Fraser, 1999). The role of web-based learning has become more and more dominating today for learning overall. A recent research has even found that much more students viewed web-based learning as pursuing real understanding and seeing in a new way than those

for learning in general (Tsai, 2009). However, while it has been very significant and efficient in some respects concerning distance learning, the state of the art has derived little help to our particular end for an integrative mass higher education though. Two major reasons are pondered and explained in the following:

(A) Not initiated for the present need – integration ignored

Though the perception and methodology of higher education have been influenced tremendously by Information and Communications Technology (ICT), especially the Internet, the main stream of this influence upon teaching and learning centered basically upon a grand cyber platform or 'e-Learning' wherein hundreds of courses are packed and cultivated in their own individual territories separated usually by various levels of interface that are difficult to crossover. Hence, when the attempt for reducing the fragmentation and incoherence of knowledge is concerned, the platform as such derives no essential difference from the traditional class delivery environment. Indeed, e-Learning has not been constructed for this particular purpose, instead, but for the convenience in communicating the teaching materials and all that related in a given individual course. Besides, after those years' experience, e-Learning has also been speculated for not being able to achieve what had originally expected (Hedberg, 2006). As has been rightfully suggested by Fraser (1999), e-Learning need to move beyond the mere provision of information and become more interactive. Though various proposals have been suggested or investigated recently for the remedy and further improvements of e-Learning (DiRamio & Wolverton, 2006; Keller, 2008; McPherson & Nunes, 2008; Sims, 2008; Wahlstedt, Pekkola, & Niemelä, 2008), nonetheless, the need to connect and integrate among different discipline fields has remained unresolved neither properly focused upon even.

(B) The still elite format for the already mass context – massification neglected

Besides, instructors tend to be so preoccupied most time with the materials or information that they are trying to communicate or deliver as to neglecting students' internet perceptions and preferences which actually do play very important roles for online studies among mass young generations today (Tsai, 2007; Tsai, 2008). As a result, the great potential of the Internet has not been fully appreciated and realized in general in

the pedagogy. For example, while enjoyment or entertainment has become one of the major favored elements for university students and young people overall when they are surfing in the Internet (Peng, Tsai, & Wu, 2006; Tsai, 2006), most courses in the conventional e-Learning environment tend to neglect it though. The significant roles of play and pleasure in the teaching and learning processes have also been reported (Moyles, 2005; Weinstein, 2006) and deserve careful reflection by concerned educators and teachers. Further studies have also indicated that students perceiving the Internet as a leisure tool show more positive attitudes than those regarding it as a mere functional means (Peng et al., 2006). It has been rightfully suggested that teachers be aware of this and take it into account to enhance their teaching result. Earlier studies also demonstrated that this 'info-tainment' factor, if carefully conducted, is important and helpful to learning process (Brooke & Solomon, 1998; Lucas, 1991). In addition, though the blog subculture and other sharing mechanisms like User Generated Contents (UGC) as illustrated by YouTube and Wikipedia etc. have influenced the majority in this generation (Cha, Kwak, Rodriguez, Ahn, & Moon, 2007; Liao, 2008; Tolksdorf & Simperl, 2006), e-Learning has not embraced them in general. Very often the teaching materials are prepared by faculty members who by and large have been brought up academically in the former elite mentality. Furthermore, they are usually delivered in the still elite format with little attraction to the mass university students who, being bred up intensively by the Internet subculture characterized by speed, freedom and entertainment, could very well be called 'digital natives' instead (Prensky, 2001; Williams, 2007), even foreigners to their parents and instructors. That is one of the reasons why we have met so many frustrated professors and even more multitudes of casual or ill-motivated students on campus in recent years. For a practical resolution, therefore, the orientation and pedagogy of the university need, wittingly or not, undergo a dramatic change that may not be totally appreciated by the faculty in general.

We can summarize at this point that one of the major problems concerning the development of any platform for teaching and learning in the university stems from our being left behind or falling out considerably of the contemporary Internet subculture overall.

C. Constructivist Learning Environment – Fitting for the Mass University Students Today

The trends in the Internet subculture dominating mass university students today as mentioned above do reflect the significance of the constructivist theory (Bonk & Cunningham, 1998 ; Duffy & Cunningham, 1996; Fosnot, 1996; Terwel, 1999) and the traditional teaching practice wherein knowledge is delivered from the instructor to the students is being replaced by learning (Scott P., 2002) or learner-centered constructivist activities in which the guiding, supporting and interacting are emphasized to help students construct their own worldview or perceptions through the inspirations or enlightenings sprung up in their mind while lingering in or relating to the particular environment prepared. These processes cherish to have students grow as inner-illuminated human beings instead of outer-stuffed animals. The rationale is fully supported by some significant anthropological point of view concerning human learning behaviors that stresses the meaning of their intertwinement and practical engagement in their surroundings (Ingold, 2000; Plumb, 2008).

D. An Innovative Move for the Need – Constructivist Holistic Web e-HO

Therefore, in order to take some steps toward a more integrative mass higher education in this Internet era, we have been inspired to experiment on a new approach, beyond the conventional one as modeled by e-Learning, to incorporate various facets and contents of general education in a holistic and transdisciplinary web constructed and cultivated for this end by providing a common constructivist environment connecting most individual courses in general curriculum. In this paper we shall report on the significance as well as the results of such an endeavor. We depict first qualitatively in the following section on the characteristics and impacts of a platform like this as exemplified by Web e-HO constructed in CYCU recently for the very purpose. After that, we shall present the results of our numerical study concerning a particular survey conducted among the students in CYCU toward the meaning of e-HO.

II. Comparisons between e-HO and e-Learning

As mentioned earlier, e-Learning has been very significant and convenient in the communication of teaching materials and information in a given course. It has been such a paradigm shift in education and brought tremendous impacts upon teaching and

learning overall (Desai, Hart, & Richards, 2008). It could be improved and made perfect further if only the purpose for the deliveries of individual courses is concerned as was mentioned in the Introduction. Nonetheless, as far as the end for an integrative mass higher education is considered, e-Learning has been inadequate as was also discussed earlier. That's why a constructivist holistic learning environment like e-HO emerged for this purpose to connect in a horizontal way the individual courses of diverse disciplines as vertical, parallel and ill-related fibers to weave an integrated and holistic knowledge network. To explain clearly on the necessity for such a construction we shall report in the following on the characteristics and impacts of e-HO in contrast with the nature and practices of e-Learning.

A. Holistic and Horizontal vs. Fragmented and Longitudinal

We started to set up e-HO since 2005 with various works, articles, VODs (Videos on Demand) and worldwide links in full spectrum of general education including music, fine arts, science, literature, emotion management, character building and personal relationship etc. for the purpose of its *holistic* significance as well as its *horizontal* connections among different disciplines, in contrast to e-Learning wherein many parallel courses developed in their own longitudinal way, ill-related and fragmented to one another, are packed and delivered individually with various levels of interface that are difficult to crossover.

B. Student Generated Contents vs. Instructor Delivered Materials

One of the characteristics of the Internet subculture today is that young people do like to share or contribute something they think interesting or meaningful to the learning environment they have involved in. Therefore, in e-HO sharing mechanisms of various sorts have been set up as wide open as possible for this particular purpose. While the moderator does have provided resources of many kinds in all possible facets of general education, students could share their own short stories, poems, humorous pieces, art works, photos, composed music and comments etc. in various sharing sections in e-HO. In addition, they could share as well many excellent or interesting links in YouTube and other sites and, as a result, many worldwide resources of User Generated Contents (UGC) good for encouragement, emotion management, arts appreciation and science education etc. have become available and are easy for excess as well to students. Sharing

mechanisms like these have been very significant and helpful in collecting excellent and meaningful learning resources for general education though some systematic expositions with Instructor Delivered Materials (IDM) are still necessary and indispensible in the general curricula. However, this is in agreement with and a realization of the emerging trend that the traditional teaching practice wherein knowledge is delivered from the instructor to the students is being replaced by learning or learner-centered constructivist activities as mentioned earlier. As a result, some paradigm shift for the faculty could be anticipated in this ever maturing Information Age. The role of an instructor is being shifted to a moderator and a co-learner among students.

C. Muscles, Sinews and Nerves vs. Bones, Skeleton and Structure

As a constructivist learning environment, e-HO is to serve as a platform for this '*larger experience*' mentioned earlier (Benander & Lightner, 2005) wherein students could stay and connect in some organic way the contents from different courses in general education. It is to provide the due functions of muscles, sinews and nerves for e-Learning as the whole skeleton and structure itself with each individual course as a particular piece of bone to facilitate the final move for a lively general education. Though the general curriculum in e-Learning as the whole skeleton and structure is both vital and crucial, the role of e-HO as providing muscles, sinews and nerves to connect each individual course as a piece of bone is also indispensable for an integrative and wholesome body of education system. Therefore, we see in e-HO this important complementary significance to e-Learning. It is significant to add here that the functions of muscles, sinews and nerves are facilitated not only by many multidimensional contributions, sharings and uploaded external links as described above concerning Student Generated Contents, but also by those systematic transdisciplinary activities and inspirational atmosphere designated by the moderator. The former serves as countless intertwined tiny connections or neurons, whereas the later plays in some sense the role as various major stems. It will be further illustrated in the following.

D. Transdisciplinary vs. Specialized

Students shall receive transdisciplinary and holistic inspirations of their own when they continue to navigate in this constructivist learning environment. While its overall significance will be reflected in quite a concrete way in the numerical study to be

presented later, we shall describe here qualitatively some of the significant results from various types of directed transdisciplinary explorations and campus-wide web activities held and cultivated in e-HO:

(A) Intriguing scientific expositions to students of humanities

For example, many students majored in liberal arts used to be scared by science as such. However, when they were encouraged to watch through the handy links in e-HO some intriguing series of movies about science, or to play with some interesting interactive 'applets' of physics , they were so thrilled and marveled as well at how science could be so interesting, even so real and close to us. They could also share in e-HO with all on campus how interesting those particular experiences had been and what they had meant to them. They had much fun and learnt a lot through these interactive explorations. All these could not be achieved easily in a traditional physics class. Even some competitive classes in general science, delivered in e-Learning or not, could reach only a few hundreds each academic year among thousands of students in colleges of humanities, whereas intriguing scientific cultivations in e-HO like these could reach them all in an open and convenient way. We see in e-HO this tremendous potential and great impacts upon the transdisciplinary explorations and horizontal connections in general education envisaged in modern ICT. One then might begin to appreciate the anthropological perspective on human learning as related to our entwinement in the dwelling and arising within the current of our involved activity as quoted earlier. Evidently, this is quite true in a constructivist holistic learning environment like e-HO.

(B) Cosmology and poetry infused in Aesthetics and Arts

How will it turn out when Astronomy meet with Visual Art? We have an ongoing sharing activity in which students are encouraged to upload the links of some gorgeous or spectacular photos of the cosmos that they have favored among thousands of those made available in "Astronomy Picture of the Day Archive" of NASA and share with all the students on campus also what they have felt with all kinds of imaginations for those particular photos. From this activity students started to see many great and gigantic artworks lying silently deep in the sky for ages in the scale of from millions of miles to billions of light years. They have been often touched tremendously by the beautiful scenes revealed only through great telescopes like the Hubble. They can also respond and

interact with others concerning how they have felt with any specific picture to stimulate further discussions. In other words, they have not only been awakened to the aesthetical perception inherent in the universe, but also that with great impacts upon their mind. A step further, therefore, a contest was directed for students to upload their artworks based upon some of the spectacular pictures of the cosmos cited from NASA. Many of them were so surprised to see what they had accomplished with echoes and reflections abounding from other students on campus. This is another example that any creative and intriguing experience comes many times through the crossover of any transdisciplinary engagement. It should be emphasized as well that a holistic environment like e-HO full of transdisciplinary atmosphere not only foster, on the one hand, sound holistic development in a student but also enlarge, on the other, his or her dimension of creativity as part of the package in holism as shall be reported later.

In a similar way, many students have also attempted to incorporate their poems with visual arts in various forms and experienced some integrative and higher levels of inner inspiration that could not be readily achieved by each individual engagement alone.

(C) Music compositions for students of all disciplines

As another example, besides the musical collections available from campus, we have also introduced some musical resources available worldwide to students. For instance, we found for students some interesting software, free downloadable for composition. Significant part came from the contests on e-HO where students uploaded many pieces of music composed by themselves to their own surprises for the first time in their life, though most of them knew nothing about the theory of composition as such. A simple melody composed first time by an apprentice has often inspired others beyond he or she could imagine. Many times the impacts came about in a nonlinear way or beyond rational linkages conceivable. A web activity like this has also triggered many enlightening reflections and discussions and brought about inner awakenings of various degrees to a fulfilled and holistic life for students. A campus-wide online musical activity like this could only be made possible through a common and *horizontal* platform like e-HO, whereas any individual music course in e-Learning could not have achieved this for all the students on campus. Again, we see this *holistic* and *horizontal* significance of e-HO that could not be brought about naturally by e-Learning.

(D) Visual arts expand as well the scope for those with science and engineering background

We have held in e-HO various contests in visual arts as well. For instance, in a digit-art competition wherein students were asked to upload their works composed of straight lines only, many creative and intriguing artworks flooded in from students all over the campus, including those from different fields of disciplines like science, engineering, business, humanities and education etc., besides a few from the college of design. When the time came for students to comment upon one another's work, many interesting dialogues and interactions took place and they learnt a lot through this constructivist learning environment. Nonlinear responses emerged in students' heart as well when they reflected freely upon the masterpieces of famous artists like Monet, van Gogh, Cezanne and Gauguin etc. and shared on the web what they had felt. Needless to say, hundreds of photos in all varieties by students from all discipline fields are being shared and reflected as well at any time of the academic year. As a result, many students from colleges of science and engineering have enjoyed and cherished the environment that e-HO had handily provided in helping transcend the narrow scope that they had used to in their own disciplines. Indeed, creative and intriguing experiences come through the crossovers of various transdisciplinary engagements.

(E) Transdisciplinary engagements enlarge students' capacity of creativity

It should be emphasized as well that a holistic environment like e-HO full of transdisciplinary atmosphere not only foster, on the one hand, sound holistic development in a student but also enlarge, on the other, his or her dimension of creativity as part of the package in holism. Transdisciplinary linkages of information many times trigger explosive and creative energy in the mind as reported by Csikszentmihalyi (1997) who, after having studied 91 influential people of the twentieth century including a few Nobel Prize Laureates, concluded that most of the creative breakthroughs came from the linkages of information that were regarded in general as unrelated. They receive more inspirations from other domains than their colleagues, especially very often from those of the perceptual. The crossovers of different domains are one of the most important characteristics of these outstanding people (Csikszentmihalyi, 1997). This conclusion is also fully supported by the research in modern neuroscience. Various studies have shown that students who had been exposed to and engaged in more activities in music and arts excelled in average with significant differences from those otherwise even in those

so-called mainstream curricula (e.g., Jensen, 1998). It should be emphasized here that such kind of transdisciplinary activities or linkages of information usually do not occur in most individual courses in e-Learning.

E. Holistic Personality vs. Imbalanced Specialty

It is interesting to notice that the integrative impacts and capacities of a web like e-HO might break forth beyond imagination. For example, students in a class of 'Stress Management' were asked to browse through all the components of e-HO to find out which part of it would be helpful to individuals' stress management. The result is very significant and positive. Most of the components were reported to be helpful, relaxing or animating to them. This in some sense reflects the fact that many times the stress or pressure comes as a result of some sort of imbalance from the integrative being or holism of a person. Therefore, a holistic and wholesome Internet environment like e-HO, which is easy for access in this particular era, is so urgent and needed to general education of the present day.

Just to mention here another example in this respect concerning the significance of this autonomous learning environment. One girl was attending a web activity like treasure hunt. After searching through many parts of the web and, as a result, she read and interacted along in the context as to dawn on her right in the middle of the activity that she decided to be reconciled to her family. How encouraging to see such kind of transformation happening in a student's heart while she was surfing and indwelling in such a learning environment, whereas she might not have been convinced of otherwise for doing so.

F. Life Paradigms from Diverse Disciplines vs. Trapped Souls in a Single Dimension

Within the e-HO platform, a VOD system has been incorporated with more than one hundred videos in documentary or interview concerning many distinguished people in diverse disciplines including scientists, artists, entrepreneurs, architects, medical doctors, writers and philanthropists etc. so that students could reflect and meditate freely at any time upon their characters and lives to learn about how they had found their purpose of life and how they had coped with the trials and difficulties encountered along the way. They could also share with others about what they have learned or thought concerning

each individual life paradigm and induce further discussions in the environment. Particularly, every student could step out of his or her own narrow discipline background and behold a wide range of multidimensional endeavors inherent in the lives of those respectable people for the benefit of the whole human race. Here we see the significance of e-HO as a constructivist learning environment in connecting the diverse discipline fields in general education even in a lively way. Therefore, the holistic impacts and inspirations inherited in e-HO have not only derived through the various facets of transdisciplinary explorations or campus-wide activities as depicted earlier but also through those vivid and impressed life encounters with many outstanding life models from diverse disciplines worldwide. This usually does not happen in those individual courses in e-Learning with each one limited to certain amount of students enrolled and concentrated in some particular part of human knowledge or engagements developed longitudinally with little connection to other branches or activities. Whereas e-HO is open to all the students on campus and helps them in handy and convenient ways to leap out of the traps inherited naturally in their individual disciplines and be connected both by words and by lives in their favored Internet subculture to a whole spectrum of knowledge system in general education overall.

G. Summary: To Close Up the Knowledge Network in General Education

It is difficult to lay out here all the details and examples concerning the significance and impacts of a learning environment like e-HO. We shall summarize at the end in Table 1 the complementary roles and significances of e-HO to e-Learning and conclude that a *horizontal* and *holistic* platform like e-HO is important and indispensable to the *longitudinal* and *specialty-oriented* e-Learning to form an integrative and complete knowledge network and learning system for mass higher education today. For simplicity, all the positive and unique characteristics of e-Learning have not been listed as they are of little relevance to our particular concerns here in relating to the issues concerning integration and massification. It should also be added here that the contrasts between the two are merely relative but not absolute in the sense. For example, while most e-Learning courses are specialized or devoted exclusively to certain specific fields, there indeed do exist some which are interdisciplinary though their scopes might not be wide enough in comparison.

Table 1. The complementary roles and significances of e-HO to e-Learning.

Characteristics	e-HO	e-Learning
Integration aimed		
Knowledge provision	horizontal	longitudinal
Knowledge atmosphere	holistic	fragmented
Holism promotion	oriented	unmotivated
Integrative intention	initiated	relaxed
Running focus	transdisciplinary	specialized
Functional role	muscles and sinews	skeleton and structure
Massification reflected		
Available to	all	few
Platform type	open	closed
Feeling preferences	cared	neglected
Leisure climate	intended	ignored
Inspirational atmosphere	cultivated	casual
Interactive mechanism	intensified	little
Activity occurrence	frequent	rare
Info-tanment flavor	prepared	omitted
Moving impetus	dynamic	static
Learning flow	active	passive

Note: All the positive and unique characteristics of e-Learning have not been listed as they are of little relevance to our particular concerns here.

III. The Numerical Study Concerning e-HO as a Holistic and Integrative Learning Environment

While it is impossible to present here all the impacts and feedbacks by words concerning e-HO, the statistics itself, we trust, suffices to reflect in a major degree the significance of this particular endeavor. Thus, to the numerical study now we turn. In this particular section the preliminary numerical results of the e-HO survey conducted among the students in CYCU shall be presented in detail.

A. Method

The study involved 647 university students from diverse college backgrounds in CYCU, including science, engineering, business, design, humanities and education etc., with 309 males (48%) and 338 females (52%). The majority of them are undergraduate students (94%) and only a few are graduate students (6%). As far as discipline background is concerned, a little bit more than half the participants (57%) came from colleges of science and engineering, while the rest of them (43%) majored in business, design, education, humanities and related fields. The survey was presented with bipolar agree/disagree statements in a 5-point Liker mode for totally 14 items concerning web e-HO as a holistic learning environment for general education overall. A score of 5 was assigned to the response of "strongly agree", whereas 1 to that of "strongly disagree". In order to find out the efficacy concerning its first role as a holistic learning environment in this characteristic Internet era, the questionnaire has been designated to include those items measuring its capacities in incorporating various holistic resources both worldwide and on campus as well as those indicating its modern significances in knowledge communication for general education and beyond. Secondly, to envisage the characteristics of mass university students today highly influenced by the contemporary Internet subculture, further embraced are the items measuring students' feeling preferences toward e-HO and all that like activity enjoyment, leisure climate, inspirational atmosphere and overall satisfaction etc. which have often been neglected in traditional e-Learning. We received comments on the content validity for the items from two experts in the field of holistic education.

B. Results

(A)Factor analysis

After factor analysis, five orthogonal factors (scales) were extracted through principle component analysis with varimax rotation. Their significance and related numerical results are presented in the following:

(1) *Holistic resources scale*: measuring perceptions of the extent students regard e-HO as adequate for the provision of content and resources related and helpful to the holistic development of a person, e.g., through e-HO I can reach easily many excellent worldwide resources in fine art, music and science etc. besides those available on campus and reserved in it. This factor accounts for 25.3% of variance with reliability coefficient Cronbach-α = 0.91.

(2) *Feeling preferences scale*: measuring perceptions of the extent students feel positively toward the learning environment in e-HO, e.g., I enjoy attending the activities in e-HO. This factor accounts for 17.9% of variance with reliability coefficient Cronbach-α = 0.88.

(3) *Leisure climate scale*: measuring perceptions of the extent students consider e-HO a good environment to visit in their leisure times, e.g., e-HO is one of the websites or places I would like to visit after class. This factor accounts for 13.4% of variance with reliability coefficient Cronbach-α = 0.78.

(4) *Holistic inspiration scale*: measuring perceptions of the extent students consider e-HO as inspirational and helpful for holistic education, e.g., the contents and activities in e-HO often bring me illuminations. This factor accounts for 12.5%of variance with reliability coefficient Cronbach-α = 0.78.

(5) *User friendliness scale*: measuring perceptions of the extent students feel e-HO as a learning environment easy for access, e.g., the interfaces of e-HO are friendly. While this particular scale was not really relevant and attempted within the original scope of this study, it turned out quite significant as well when its loading was concerned. It came out as high as 0.871 for the single item mentioned. So we have not dropped it. This factor accounts for10.7% of variance with reliability coefficient Cronbach-α = 1 accordingly.

The five factors account for 79.8% of total variance explained with overall Cronbach-α = 0.95, reflecting that the above factors extracted are quite reliable in assessing the significance and impacts of e-HO as an Internet platform suitable for and favored by mass university students in the promotion for an integrative and holistic higher education. The result is schematically shown in Table 2.

Table 2. Factor analysis of the e-HO survey

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1: Holistic resources (HR, α = 0.91)					
HR1- university resources	.782				
HR2- worldwide resources	.743				
HR3- modern significance	.731				
HR4- lifelong learning	.725				
HR5- abundant content	.504				
Factor 2: Feeling preferences (FP, α = 0.88)					
FP1- activity enjoyment		.730			
FP2- delightful learning		.662			
FP3- overall satisfaction		.617			
FP4- recommending zeal		.585			
Factor 3: Leisure climate (LC, α = 0.78)					
LC1- creative playground			.869		
LC2- leisure environment			.707		
Factor 4: Holistic Inspiration (HI, α = 0.78)					
HI1- holism promotion				.721	
HI2- inspirational atmosphere				.706	
Factor 5: User friendliness (UF, α = 1.0)					
UF1- friendly interfaces					.871

Note: Overall α = 0.95, total variance explained is 79.8%.

(B)Scores on the five scales

In Table 3 we lay out the average scores and standard deviations for the five scales of the e-HO survey. From the score of the first scale on holistic resources (4.07 in average) we see the role of e-HO as a resource center for holistic education is highly commended by the majority of students. It is significant in the promotion for transdisciplinary engagements in a constructivist Internet environment favored by mass university

students, as a platform for this 'larger experience' mentioned earlier, to help connect different facets of general education and realize the vision for an integrative mass higher education. This constitutes one of the characteristic distinctions between e-HO and conventional e-Learning wherein many courses of diverse disciplines are delivered in their own territories with various levels of interface that are difficult to crossover in general. From the score of the fourth scale on holistic inspiration (4.05 in average) we see that e-HO not only provides full spectrum of good resources for the holistic purpose, in contrast to the specialized materials in most individual e-Learning courses, but also brings about significant results, as perceived by most students, in the promotion and realization of holism in an inspirational and interesting way. On the other hand, while most e-Learning courses have neglected students' internet perceptions and preferences (Tsai, 2007; Tsai, 2008), from the score of the second scale on feeling preferences (4.01 in average), we see most students found the contents and activities in e-HO interesting, enjoyable and entertaining many times, whereas it is hardly the case for most individual e-Learning courses. Indeed, the so-called 'info-tainment' has become one of the major elements in the Internet favored by students today (Brooke & Solomon, 1998; Lucas, 1991; Scott P., 2002) and has been recognized and emphasized as important for modern teaching practices (Peng et al., 2006; Tsai, 2006). From the score of the third scale on Leisure climate (3.60 in average), we see though it is not as highly recommended as the previous scales discussed above, however, in contrast to the traditional teaching platform like e-Learning, e-HO has in some good extent made a significant progress as an educational web in incorporating play and leisure elements into the learning environment to make it a favored one for students. As already mentioned in the Introduction, the significant roles of play and leisure climate in the teaching and learning processes have recently been reported and emphasized also by various researchers (Moyles, 2005; Peng et al., 2006; Weinstein, 2006). They rightfully suggested that teachers be aware of this and take it into account to enhance their teaching result. The final scale, on user friendliness (3.83 in average), with only one item appeared, was indeed not within our original concerns of this particular study, but only served as a byproduct. However, loaded as high as 0.871 with 10.7% of variance explained, it does show that e-HO as a learning environment for holistic general education is quite easy for access and suitable as well as helpful for the particular end regarding an integrative mass higher education. For completeness, the mean scores of all the items in the e-HO survey are provided instead in Appendix 1.

Table 3. Average scores on the scales of the e-HO survey

Scale	Mean	SD
1. Holistic resources	4.07	0.71
2. Feeling preferences	4.01	0.73
3. Leisure climate	3.60	0.84
4. Holistic Inspiration	4.05	0.70
5. User friendliness	3.83	0.77

IV. Discussion

From both our qualitative presentations and quantitative studies we found Web e-HO, served as a platform helping students to reach for abundant holistic resources and to provide the due functions of muscles and sinews in the holistic sense for the general curriculum as the whole skeleton, does play its role in bringing about with inspiration horizontal connections and integrations in general education. It is achieved through the cultivation of an interactive and transdisciplinary constructivist environment filled with the info-tanment atmosphere that suits mass university students today. The leisure climate inherent in this particular learning environment is crucial, in contrast to the traditional e-Learning, for the development of the emerging trend that teaching is being replaced by learning as the mainstream activity of education as mentioned earlier. Our preliminary study concerning the e-HO survey does show that the construction and continual cultivation of a platform like e-HO is very significant and suitable for the promotion and practices of holistic general education in this characteristic Internet era. To effectively cope with the challenging problems related to the fragmentation of knowledge and the massification of students in higher education, therefore, a holistic and integrative learning environment like e-HO complementary to e-Learning for general education is suggested for individual universities. As such, the whole new endeavor as depicted in this research deserves careful reflections by concerned educators in higher education today.

It is certainly true that the ICT sector of modern education, however efficient it might have proved itself for the mere purpose of rapid or instant communications in teaching materials, is not at all meant to exhaust all that could be termed under the title of education *per se*. Educational settings based upon realistic interactions, whether

through eye contacts or other personal contacts, are indispensable and vital still for human education overall, especially in holistic education and general education. However, in facing the ever fast-changing world of Information Age like this with great opportunities for education emerging continuously, how to embrace or utilize them wisely and prospectively in modern pedagogy is also very important for higher education today. Therefore, the impacts of ICT should be seriously taken into account and fully appreciated in higher education beyond the mere construction of an Internet platform, commonly realized as e-Learning, for the deliveries of many individual courses without much connection to one another in general. Web e-HO cultivated as much as possible in the climate of the contemporary Internet subculture as illustrated above could serve as an example in this expansion to help realize the vision for an integrative higher education. Of course, to fully support this particular endeavor, a paradigm shift for the faculty, at least some, could be anticipated. They should be allowed and encouraged to actively engage in the construction and facilitation as well as the organization of this constructivist, transdisciplinary and holistic environment as some researchers have already pointed out for learning-weighted pedagogy (Tigelaar, Dolmans, Wolfhagen, & van der Vleuten, 2004; Williams, 2007). All the instructors should also be encouraged to step out of their own individual courses to enjoy in this common learning environment the integrative and holistic benefits which could not be easily achieved by their personal efforts alone.

Moreover, with the ongoing expansion of the resources and activities of the web like e-HO, it could be realized as an extended lifelong learning environment as well to result in a continual and coherent education system, in contrast to those started many times outside the infrastructure of the university and hence are as fragmented as used to be. This is in agreement with and served as an example of the observation by Williams (2007) that the convergence of higher and further education might become part of the tertiary education landscape.

The impacts of ICT, good or bad, are far beyond the imaginations of the administrations in general in higher education. The Academy has been clashed involuntarily by The Economy in this Knowledge Economy era, especially when commercial providers of e-Learning and related resources are cherry-picking the most lucrative subject areas, as Williams (2007) vividly depicted. While this is becoming more conspicuous in the so-called professional education sector, would the general education as the possible final ground for the university, we are eager to ask, be immune from the assault overall? If we do not make the most out of every opportunity, this final ground

may disappear even faster than we could imagine. We started to see the differences, in response to the ICT impacts, between universities potentially in the various stages, with crises or with promise, as quoted by Williams (2007) and categorized by Waks (2004). Casualness costs, even beyond imagination, in this voyage to the unknown for higher education in the present twenty-first century.

Therefore, as the society has changed in this Internet era, has our perspective also shifted and managed to educate this new generation in just where they are? Challenges are great, yet opportunities have been ripe as well. Needless to say, if the university administration could envisage seriously this new trend and re-evaluate their education policy and pedagogy accordingly to fully facilitate and support the faculty for this paradigm shift would be one of the most crucial factors for the success of the whole endeavor toward an integrative and holistic knowledge network for mass higher education today.

V. Acknowledgement

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Appendix 1. The mean scores of all the items in the e-HO survey

Item	Mean	SD	Percentage/Frequency				
			1	2	3	4	5
Factor 1: Holistic resources							
HR1- university resources	4.06	.719	1% 9	1% 8	11% 70	63% 407	24% 153
HR2- worldwide resources	4.06	.714	1% 7	2% 12	11% 69	63% 408	23% 151
HR3- modern significance	4.06	.691	1% 7	2% 12	9% 58	66% 428	22% 142
HR4- lifelong learning	4.03	.752	1% 4	3% 17	15% 99	56% 364	25% 163
HR5- abundant content	4.14	.734	1% 7	2% 12	9% 56	58% 378	30% 194
Factor 2: Feeling preferences							
FP1- activity enjoyment	3.91	.771	1% 8	2% 10	23% 146	54% 352	20% 131
FP2- delightful learning	4.04	.741	1% 9	1% 6	15% 94	59% 381	24% 157
FP3- overall satisfaction	4.03	.709	1% 6	3% 17	10% 66	65% 421	21% 137
FP4- recommending zeal	4.06	.721	1% 5	2% 13	12% 80	60% 388	25% 161
Factor 3: Leisure climate							
LC1- creative playground	3.62	.844	1% 7	6% 42	36% 232	43% 275	14% 91
LC2- leisure environment	3.59	.843	2% 14	6% 39	34% 217	47% 307	11% 70
Factor 4: Holistic inspiration							
HI1- holism promotion	4.12	.699	1% 4	2% 11	10% 67	60% 387	27% 178
HI2- inspirational atmosphere	3.99	.707	1% 5	3% 17	13% 84	64% 415	19% 126
Factor 5: User friendliness							
UF1- friendly interfaces	3.83	.779	1% 7	6% 40	15% 97	64% 413	14% 90

Note: The total number of the participants, N = 647.

摘要

　　在這資訊快速發展的世代中，如何解決知識體系的支離破碎和學生大眾化所延生的各種相關問題，已經構成當今高等教育所面對的重大挑戰。由於過去幾十年來純粹著眼於傳統通識課程之改革所做的諸般努力已顯示不足以順利達成目的，我們提議設立並持續經營一個符合現今學生特質的建構式全人化網路平台——以中原大學的全人發展網（e-HO）為例——來連結通識教育中的不同領域以解決現在的需求。它與傳統充塞許多互相難以跨越之課程的教學平台 e-Learning 存在有本質上的差異，後者可視為許多彼此獨立之縱向課程纖維叢，而前者則將做為它們之間的水平橫向聯繫，以互補的角色來共同完成一個整合且流通的知識網絡。我們將從質性敘述與量化分析兩方面，分別呈現這種在當今大學生網路次文化氛圍中經營的網路平台對於全人教育和跨領域學習所帶來的重要意義和影響。透過針對 647 位大學生所做的全人發展網問卷調查（the e-HO survey），結果顯示其對於解決上述需求具有相當正面與實質的果效，值得當今高等教育工作者進一步的參考與研究。

關鍵字：知識整合、大眾化高等教育、通識教育、全人教育、網路學習