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Research and innovation in teaching and learning are prime topics for the *Journal of Instructional Technology and Distance Learning* (ISSN 1550-6908). The Journal was initiated in January 2004 to facilitate communication and collaboration among researchers, innovators, practitioners, and administrators of education and training involving innovative technologies and/or distance learning.

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Editorial

Learning Architect

Donald G. Perrin

A master-builder or architect visualizes, designs and constructs structures to house human activities now and into the future. The buildings reflect the purpose and functions to be served. An office building is different to a supermarket, apartment house, or a school. Structures may also reflect cultural and geographic influences of the past, present and future.

A learning architect must understand the purposes and functions education needs to serve now an in the future. The ultimate goal is to prepare learners for jobs and for living in a world that is undergoing constant change. Technology is a force for social, political and economic change that outdistances the ability of education to respond. As a result, schools produce an increasing number of graduates who are ill prepared for employment, and an increasing number of dropouts who may become a burden to social services and public safety. Like roads, buildings, and other infrastructure, education is accumulating deferred maintenance and needs major new structures as it grows into the future.

Two decades ago, the *University of the Future* provided the blueprint for changes involving learning management systems and computers. All of the components already existed, so it was possible for schools, colleges and universities to transition, albeit slowly, to the new paradigm. Universities were among the first because of better funding and resources. K-12 education is still in process because of inadequate funding and old-school teacher training. Industrialized countries lead third world countries in adoption of instructional technologies and distance learning.

The new paradigm for K-12 education must be more comprehensive, reflect global needs and standards, promote cultural open-mindedness, and address personal and social issues. It will use information age technologies to expand (not replace) human abilities. It will focus on higher levels of learning to unleash creative and problem solving capabilities. The new paradigm will build on curiosity and intrinsic motivation to produce confident self-directed learners.

> "Learning technology has evolved to the point where it is now both feasible and affordable to create . . . learning solutions that we could only imagine in the past. To stay in front of this revolution, it is critical that fundamental shifts in thinking need to take place. . .learning [can go] beyond the function to become inspirational and meaningful" Bill Bruck (2016)

Better evaluation tools and effective feedback systems are needed; interactive technologies now make this possible. Instead of letter grades, learning should continue until the criterion or standard is reached. This effective use of human capital benefits the student, the learning institution, and society.

To complete the blueprint, a very detailed assessment is needed to determine the status quo and anticipate future needs and changes. For implementation, goals, cost estimates and timeframes must be established. The blueprint may be developed in one year, but funding and implementation will be larger in magnitude than the program to put a man into space. The benefits for the current and future generations is beyond the imagination. The faster we move, the greater the gain!

To summarize, we need the blueprint for a K-12 education paradigm that reflects and supports the rapidly changing world of the 21st century. It must be future based and global. It must go beyond knowledge, skills and aptitudes to developing the whole person, a social being who is energized, honest, ethical, compassionate, and immune from bigotry and unfair discrimination. We need an educated population with higher levels of learning to be able to analyze, innovate and solve problems now and in the future.

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Editor's Note: This carefully crafted study is designed to meet a number of criteria, both academic and logistical, by combining traditional classes with asynchronous and synchronous distance learning and hybrid learning. Data of learner reactions is gathered and analyzed to determine the level of success and areas for future development.

Student perspectives of a blended, distributed-educational Master of Social Work (MSW) program: Equity in Education

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Introduction

The development of technology and the diverse educational needs of our student population are rapidly changing educational delivery modes. Many factors have influenced this change in higher education. The economic downturn in the United States (U.S.) in the early 2000s and the financial crisis of 2007-2008 resulted in increased class size, limited enrollments, rising tuition costs, and decreased funding for student grants and loans (Curtis, 2008; Johnson, 2005; U. S. Department of Education, 2007). This was compounded with students' personal financial challenges due to high unemployment rates and the necessity for full-time employment while attending school.

In 1995, 754,000 U.S. college students were enrolled in one or more "distance" educational courses (Harasim, 2000); this reportedly increased to a total of three million undergraduate and graduate students in 2000-2001 (Waits & Lewis, 2003). The U.S. Department of Education (2014) reported that for fall 2012, 15.2% (2,466,785) of undergraduate students seeking a degree were enrolled in at least one distance education program versus 7.8% (227,467) of graduate students. Interestingly, the report also indicated that the number of undergraduate students who were enrolled "exclusively" in a distance education programs was 11.1% (1,807,860), while graduate students were numbering 22% (639,343). When comparing the numbers from 2000 to 2012, it is evident that not only were students enrolling in one or more courses delivered via technology, an additional two and a one-half million undergraduate and graduate students were enrolled in programs delivered exclusively through distance education.

The Council on Social Work Education (CSWE) (2011; 2016) maintains a list of Master of Social Work (MSW) programs in the United States that offer some form of distributed education. This list is self-reported; the programs contact CSWE regarding their status. As of September 2012, 23 of 209 accredited MSW programs in the United States reported providing variations of distributed education, with four providing entirely on-line programs (CSWE, 2012). By 2014, CSWE reported an increase to 30 accredited MSW programs in distributed educational formats and 15 of these reporting entirely on-line programs (CSWE, 2014).

Though the barrage of statistics is daunting, the general trend is clear; more students are participating in some form of distance education. This rapidly emerging trend has been termed by some as a "revolution" in higher education (Lei & Gupta, 2010). With the transformation specifically of social work education towards increased opportunities for distributed education, a challenge emerges: how can it be ensured that a quality education is delivered in a "user friendly" format? Thus, this study aimed to assess the experiences and perspectives of students enrolled in a blended, distributed education MSW program to inform future delivery of this format.

Review of the literature

Data compiled by the U. S. Department of Education (2011) indicated that from 2007-2008, the largest percentage of students engaged in programs that utilized distance education were those in

public or private for-profit institutions, with the latter group engaged in a greater number of programs (22%) that were distance based. The data also revealed that age was a variable in the enrollment in distance education courses. Twenty-three percent of students who were enrolled in distance education courses were 30 years of age and older, 17.3% were between the ages of 24 to 29 years, and 59.7% were 23 years or older (U.S. Department of Education, 2011).

The U.S. Department of Education report (2011) also indicated that employment was a factor in undergraduates choosing distance education courses. Seventeen to 25% (full-time to part-time respectively) of all students in the classes were employed, versus 16% who were unemployed. The report also indicated that 33% of post-baccalaureate students who were married with dependents were enrolled in distance education courses; sixteen-percent of those were involved in only distance education classes. This is in contrast to 5% of unmarried post-baccalaureate students who did not have dependents who were enrolled in distance education programs (U.S. Department of Education, 2011).

The literature revealed that there are many reasons for universities, faculty, and students to choose distributed education options. First, students have related that the flexibility and convenience of on-line education allowed for autonomy in personal schedules (Johnson, 2005; Lei & Gupta, 2010). Therefore, students who may be employed and/or experience family responsibilities have the opportunity to receive an education (Diaz & Entonado, 2009; Reardon, 2010).

Second, the delivery of education through the use of technology is seen as a part of the "green revolution" (Lei & Gupta, 2010, p. 618) through the decrease in use of non-renewable resources. Through the use of web-based courses, institutions can address the educational needs of students while making effective use of resources (Gould, 2003). Fiscal costs are decreased by minimizing the cost of paper, printing, and photocopying (Lei & Gupta, 2010), utilizing fewer facility and management personnel who maintain classrooms, and in turn, decreasing energy usage (Gould, 2003; Lei & Gupta, 2010). Additionally, with the decrease in the use of classrooms, the outcome includes less conflict with securing classrooms during peak times and days of demand (Gould, 2003; Lei & Gupta, 2010); this results in more flexibility with the scheduling of classes (Gould, 2003).

Third, several studies noted that through involvement in distributed education, students' time-management skills improved (Johnson, 2005; Lei & Gupta, 2010). Further, the literature indicated that if students are motivated, the learning environment is "friendly," and if the student receives adequate technological training, they will become increasingly computer literate (Johnson, 2005; Lei & Gupta, 2010).

Fourth, Lei and Gupta (2010) indicated that distance education environments allow students with varying learning styles and preferences to flourish. This is because learning is independent and the student can work at his/her own pace (Diaz & Cartnal, 1999). Ellis, Ginns, and Piggott (2009) indicated that a student who experiences self-efficacy and control of his/her learning environment will become more actively engaged in the work than ones who feels disenfranchised. Additionally, through collaboration with classmates, students may increase motivation in learning, gain depth from responses to discussions, and empower other students who may be less interactive due to shyness, learning or physical challenges, or language challenges (Johnson, 2005; Lei & Gupta, 2010). Johnson (2005), related "Shy or reserved students are motivated and even empowered to contribute. When students can read one another's response, there is pressure and competition to respond in a more comprehensive way" (p. 14).

In addition to these strengths, challenges in delivering distributed education are also recorded in the research. Gould (2003) related that as technology develops, institutions do not have the required physical resources to meet the needs of students and faculty. These include providing computers and necessary computer hardware and software (and the space needed for these),

maintenance of the computers, Internet access and appropriate bandwidth, electricity, and disposal of the e-waste of old computers. Experienced technical support is also needed to address incompatible technology such as differences in platforms and software. In addition to the needed technology, funds are needed to compensate faculty for training in use of technology and travel expense. With budget cuts, universities are finding that professional development funds are waning, including funds to support faculty for the time and the expenses of course development (Gould, 2003; Lei & Gupta, 2010; Njenga & Fourie, 2008).

Participation in distributed education may cause a financial challenge for students. Students need to purchase equipment that they may not have prior to pursuing their education. This includes a computer and necessary software, hardware such as headsets, cameras, and thumb-drives, Internet access, and the actual cost of the courses and technology fees (Lei & Gupta, 2010). Many distributed educational programs throughout the U.S. are "self-supporting," with the tuition costs supporting the program. This causes programs to be more expensive than "State supported" programs that utilize State dollars to supplement tuition costs. Student tuition and related fees may then be up to three times the amount of a "State-supported" institution (Zusman, 2004).

It is important to note that in order to participate actively in web-based courses, students need training in use of the computer, programs, and related technologies (Lei & Gupta, 2010). Time is required to train students and therefore they may not be able to immediately begin coursework that requires technology. Students may experience anxiety about the new technology and in turn, feel challenged with course requirements such as electronic submission of assignments (Heaton-Shresta, Gipps, Edirisingha, & Linsey, 2007; Lei & Gupta, 2010).

Student learning styles and preferences vary and this may result in challenges for students. It is interesting to note that regardless of the learning styles and preferences, understanding the students' emotions and the way they are expressed in regard to distributed education (positive and/or negative), is an important factor in the learning environment (MacFadden, 2007). Liang and Wu's (2010) study of nursing students highlighted that the greater the Internet self-efficacy, the greater the confidence and motivation to engage in Internet activities. Zacharis' (2010) research supported that "variation in the way students approach their learning is related to how they perceive their context, what they think they are learning, and the quality of their learning outcomes" (Ellis, Ginns, & Piggott, 2009, p. 304).

Independence in learning is a strength. However, this can also be challenge for some students due to the demand for greater motivation, time management, and self-discipline in regulating work in a distributed education course. Students who prefer close, group interaction in a face-to-face environment, may find that the on-line component is arduous (Lei & Gupta, 2010; Reardon, 2010). Further, Johnson (2005) noted that the less structured a distributed education course, the greater anxiety a student may experience due to lack of face-to-face and verbal contact with faculty and peers.

Overall, the review of literature indicated a primary benefit of web-based courses; they be accessed by students throughout the world. Students may participate with their peers in groups and actively in course projects even though they may be at a geographical distance from a university campus in a remote region, state, or country. Web-based courses allow students who are unable to attend a classroom setting due to a disability or other factors, to receive an education (Lei & Gupta, 2010).

Overview of the study

The use of distributed education model (DEM) in this study was seen as a way to grow our own professionally trained social workers to meet the health, social and human services needs of this region. This DEM provided needed education and training opportunities to its mostly-rural

residents. Access, affordability, and minimizing family and life disruptions were central themes in developing this approach. This study captured the key experiences and perspectives of students enrolled in a DE-MSW program. The program was offered in the alternative format as compared to a traditional entirely face-to-face educational delivery model. Further, an assessment of the four learning environments provided within this program was performed. The learning environments were: 1) primarily asynchronous, on-line/web-based; 2) synchronous on-line/web-based (Collaborate Class); 3) hybrid; and 4) face-to-face.

Twenty-eight (76%) of the 37 students enrolled in a three-year, blended, DE-Master of Social Work (MSW) program participated in the study. The program, situated in rural, northwest university in the United States, was 75 miles from the main university campus and served a region the size of the state of Ohio. This area incorporated 15 counties. The MSW program in this study provided the same curriculum as the two-year, traditional, face-to-face, campus based MSW program. Additionally, the tuition was also "State support" versus "self-support" tuition.

The School of Social Work faculty for this MSW program made a conscious decision for the three-year distributed education program to be "State-supported" as a matter of equity. It seemed contrary to the values of social work and the mission of the university to require a higher tuition for the same education simply because a student needed an alternative form of course delivery due to employment, geographic location, and/or personal reasons.

The total length of this program was three years with eight semesters, including two summer sessions. Students in this DE-MSW program were required to take 25 graduate level social work courses. Of the 25 courses, 11 were developed for entirely face-to-face environments, while 14 were delivered via technology. Of these 14 courses, six were synchronous on-line/web-based (Collaborate Class) delivery, three were of a hybrid format, and five were delivered entirely on-line. Blackboard Learn was the platform used to deliver course content.

At the time of this study, the students had completed four of 11 semesters and had completed nine courses: five were face-to-face; one synchronous on-line/web-based (Collaborate Class); one hybrid; and two primarily asynchronous, on-line/web-based. The timing of the study was chosen to allow for modification of delivery format in the program if this seemed warranted due to the results (see discussion).

A survey was created for the purposes of this study by following an extensive review of the literature. It consisted of five parts: computer skills; personal learning style and preferences (communication & feedback); previous experience with on-line/web-based courses and university services; means used for class participation among DE-MSW students (communication means; use of different modalities such as chat function and Blackboard Collaborate Class; and demographic information. The survey was then reviewed by colleagues in the field of social work to enhance its face validity. The on-line tool, Survey Monkey, was used to create the survey format and collect data. The 50-question survey took approximately 15 minutes to complete.

Students were invited to participate in the survey through an email invitation that provided a link to the survey. Participation in the study was voluntary, however, to increase participation, respondents were entered in a drawing for four $25 Amazon gift cards. Thus, this was a limited, non-random sample consisting of all students who were currently participating in the DE three-year MSW program. Seventy-six percent (n = 28) of the students in this program participated in the survey.

The responses were analyzed without any identifying information except for age, partnership status, employment status (full time-part-time), distance from educational sites, and previous and current experience with on-line education. Descriptive statistics were generated through the Survey Monkey Analyze function. Additionally, both the researchers individually performed open

coding on the qualitative responses to perform content analysis to gather greater depth (Rubin & Babbie, 2010).

Student profiles

This MSW program consisted of a greater number of female (90%) than male students. This is consistent of the average of 15% males in graduate level, part-time social work programs in the United States (CSWE, 2007). The age range of students in this DE-MSW program was 25 to 58 years, with 38.75 as the average age. However, the national average age of students in part-time MSW programs is 24.3 years (CSWE, 2011), which is much younger than the students who participated in this study (CSWE, 2011). Seventy-nine percent of the students had children, and an average of 44% had other caring duties (older adult, disabled family member, and/or personal health challenges).

Seventy-five percent of the students were employed 30 or more hours per week. Eighty-six percent of the students' primary source of income was from employment, followed by additional income from student loans (68%), income of spouse/partner (46%), and grants (29%).

Out of 28 students, 11% (n=3) live 11-25 miles from the main university campus, 43% (n=12) lived 51-100 miles away, and 23% (n=6) lived 101-200 miles from the main campus. The miles from the distributed education site was less for the students participating in the program. For example, 4% (n=1) resided 11-25 miles from the site, 21% (n=6) lived 51-100 miles away, and 21% (n=6) 101-200 miles from the distance education delivery site. The residential distance from the main campus, for populations in our rural and remote regions, was a factor in the program choosing the specific location for the off-campus site.

Factors for choosing a blended, distributed educational (DE) MSW program

The students related multiple factors that influenced their decision to participate in a DE - MSW program. Eighty-nine percent of the students indicated that they chose this program to gain an advanced degree, which would in turn further their job opportunities. Students also related that employment made it necessary for them to have an alternative form of education. Thus, approximately 80% indicated that this educational model fit their daily schedule better than a traditional face-to-face, weekly campus-based program. It was also reported that the DE -MSW program provided students with flexibility and in turn, they were able to pursue a MSW when otherwise not possible.

Weather conditions and residing in a remote and rural region were also factors in choosing this program. Fifty-seven percent (n=16) of the students chose the MSW program due to their remote geographical location. Four of the 16 students expressed that the weather conditions during winter months prevented them to travel and made it absolutely necessary for them to enroll in a distributed learning program. For example, one student related, "I live in a very remote and rural area and to think that I am able to live where I want to live and attend a program that is within a relatively close area (1 hour each way), I am thankful."

Students noted that the geographical convenience of the program and delivery mode allowed individuals in remote regions "to continue education without having to sacrifice much time, money and family." The alternative educational delivery model enabled students to maintain employment and attend to their educational and personal needs. One student summed this up by relating, "I like not having to travel (and put myself at risk) in the winter months. Yet I still have interaction with my classmates and instructors [through Collaborate Class], and on a more limited basis on-line." However, another student did note that the distance from the university campus made it difficult to take advantage of student services such as the health center, counseling services, and the bookstore.

Use of technology

All six of the students who were 32 years or younger rated that their computer skills were "high," whereas half (50%) of the students who were 33-58 years of age (n=10), rated their computer skills as "moderate." Further, eighty-five percent (n=24) of the students reported that they had received some training in using a computer prior to starting the DE-MSW program. Of these, 16 students rated themselves "high" in computer skills in regard to competence with email, web browsing, word-processing, video/voice chat, and downloading/ installing program. After receiving training during the DE program from various sources (i.e. faculty, university computer technology help-line or staff, on-line tutorials, personal sources, and/or a class member), this increased to 25 students rating themselves "high" on computer skills.

Fifty-four percent of students in this study perceived challenges to their own on-line learning and further elaborated on those challenges in regard to needing training with Blackboard Learn and Collaborate class delivery. Slow Internet access was also a challenge experienced by 75% (n=21) of the students. Additionally, two students mentioned that they lived in remote areas and had very limited Internet connectivity through satellite.

Learning styles and classroom environments

The survey included questions to capture the students' experiences and perspective regarding engagement and interactivity in the four learning environments (face-to-face, hybrid, Collaborate Class, entirely on-line). In terms of preferred class environment, 89.3% students reported face-to face as their first choice *only if* this was feasible geographically and schedule-wise. They ranked Collaborate Class their second choice of course delivery, followed respectively by a hybrid model and completely on-line. Twenty-five percent of the students related that they learned as much content through on-line-web-based or hybrid classes as in a face-to-face class. Further, 43% related that they learned as much content through Collaborate Class delivery as in an entirely face-to-face classroom environment.

Classroom environments

Face-to-face class environment: advantages and disadvantages

Advantages of face-to-face classroom environment: The students related the advantages of face-to-face educational environment in the following order: Developing a relationship with peers and gaining a sense of community (39.3%); immediate response from professors in regard to questions (28.6%), and the social interaction that helped with learning & skill building (25%). Twenty-one percent of the students related advantages of the face-to-face environment including "free flowing" and high quality discussion, and visualizing non-verbal cues.

The qualitative data regarding advantages of face-to-face learning environments included, "[face-to-face settings are] more conducive for practical skill building… [I] can interact socially and see verbal and non-verbal cues… [I feel a] sense of cohesion…feels like I learn from my fellow students…deeper discussion… [I can] ask for clarification… [I like the] human contact…."

Disadvantages of face-to-face classroom environment. The disadvantages of face-to-face educational environment included the time away from family and work. Additionally, 14% of students noted the time required to drive to the campus as a barrier. Eleven percent of students noted financial concerns (costs of babysitter, gas, meals, and overnight accommodations) as a challenge.

Two (7%) students expressed weather conditions and work/family schedule as a challenge to attend the demanding class schedule, which included eight-hours on Saturdays twice a month. Another student expressed a concern as having to attend a set time and place. Further, One student

qualitative response related: "The long days in class can be difficult sometimes, especially if I am with an instructor that is not my favorite, but that is a small price to pay for the advantages, and I still feel as though I learn more." Another student stated, "We cannot always be there due to weather and schedules."

On-line: Advantages and Disadvantages

At the time of the survey, the students had completed two entirely on-line courses. The majority of the courses were asynchronous, with synchronous times that were used for office hours and optional group project meetings.

Advantages of on-line classroom environment. Although the on-line educational environment was rated as the least desired by the students, 57% related an advantage that the schedule was flexible and the student could work at his or her "own pace." Additionally, slightly less than a quarter of the students (21.4%) related the advantage that they could work from "anywhere . . . you don't need to travel." Four related that this made it easier to coordinate work and family. Two students stated it was cost-effective and that they learned from others through posts and varied readings. Further, twenty-five percent of the students agreed that on-line activities in the hybrid format mirrored face-to-face class activities.

Overall, students affirmed that the on-line format provided the opportunity to secure an education in a situation where this might not have occurred. One student's comment seemed to exemplify several stating, "It [on-line format] allows me to work and care for my family in tandem with attaining my goals. Although I prefer a face-to-face learning environment, I appreciate the ability to attain my goals on-line while working and caring for my family. The on-line experience offers independence and opportunity." Another student related, "Although I may not be the biggest fan of strictly on-line classes, I am very appreciative of the opportunity it provides to not travel in the winter and still receive my education."

In regard to other advantages of the on-line format, 71.4% of students agreed, and 21.4% of students strongly agreed, that they were able to work at their own pace in the on-line component of a class. Twenty-five percent of the students related that in the on-line environment they had more frequent access to their peers and felt, in this format, a sense of community with their peers. Furthermore, 25% of the students felt that they commented/discussed more in the on-line format than in a face-to- face class. It is interesting to note that almost 18% of the students thought that the quality of their discussion was higher in an on-line class than if they had been in a face-to-face class. Importantly, 32.1% of the students felt that they could ask questions without "feeling stupid" in the on-line component.

Disadvantages of on-line classroom environment. Approximately, 54% of the students disagreed that student and faculty contact increased in on-line format more than in a face-to-face class. Further, 53.5% disagreed that on-line activities in the hybrid format mirrored face-to-face class activities.

The qualitative data was rich regarding the on-line learning environments. Thirty-six percent (n=10) of the students noted that they viewed this environment as "less personal…detached from peer group. "Of these, three related not "getting to know the professor." Twenty-five percent (n=7) of the students related missing the instant feedback from peers and instructors that occurs in face-to-face classroom discussions and that they experienced "procrastination since [I] work at my own pace…." Eighteen percent (n=5) of the students stated that some meaning was lost through discussion board postings on-line. Technology challenges by 7% of the students were also noted as a disadvantage.

Collaborate class: advantages and disadvantages

Students in this program participated in Collaborate Class during the spring semesters as weather conditions in the remote regions impacted accessibility to the face-to-face classroom. Thus, for every class that was offered in the spring semester, six sessions were delivered in the synchronous environment via computer using Collaborate Class, and the last two sessions of the semester, met face-to-face in the classroom. At the time of survey, the students had participated in two Collaborate Class delivered courses.

Advantages of Collaborate Class environment. Fifty-percent of the students reported preferring the Collaborate Class format due to convenience as they resided in a remote region. Additionally, 78.4% found the ability to access the Collaborate Class archives of course sessions at a later date as an important factor of this delivery mode.

Within the primarily Collaborate Class course, students met face-to-face at the university distance location for last two class sessions. Seventy-five percent of the students felt strongly that these two sessions were important for their learning process. Eighteen percent (n=5) of the students related enjoying attending the face-to-face portion of the class because "see[ing] the professor and live instruction, adds [to] enthusiasm."

Student comments regarding Collaborate Class included: "[I like the] live chat component to talk with peers or instructors via [Collaborate] during class … [there is] an additional layer of learning added with the components of discussion postings if the instructor so desired…I feel like I'm in an interactive classroom." Students additionally noted, "I like it… "… [the] advantage of live chat and discussion postings gives everyone what they need… [I am] able to feel a part of the class/cohort even when not physically present… [it is] more affordable, [I have] time for family…[and receive] amazing technical support…." Additionally, another student related, "I like not having to travel (and put myself at risk) in the winter months. Yet I still have interaction with my classmates and instructor through [Collaborate] and on a more limited basis on-line. Although I still prefer the face-to-face setting, I do like the [Collaborate] format as an alternative."

Disadvantages of Collaborate Class environment. Twenty-one percent (n=6) of the 28 students related experiencing technology challenges, followed by fourteen percent (n-4) who found it difficult to interact with peers. Eleven-percent (n=3) of the students simply stated "I didn't like it," and 7% (n=2) found they could be easily distracted, and had to be trained to use equipment, as it was "difficult to learn." One student reported feeling detached from peer group, experienced challenges in "following" course information, experienced frustration as feedback from peers and instructors was not instant, having a "course discussion were not as 'dynamic and emotional' as face-to-face, and that presentations were difficult." Additionally, 7% (n=2) of the students related challenges with the course due to the instructor not liking or understanding the use of Collaborate Class.

Student comments related challenges with learning the unfamiliar technology, power outages that hampered attendance, and logging onto the learning platform. Other comments focused equipment issues such as difficulty using the voice tools to communicate from the home environment that resulted being able to only send chat messages to participate. This form of communication in the class was seen as hampering conversations due to the time wait for the professor and other students to read the chat box and respond. One student summed up the views of many of the students, "the technical support we had this semester was amazing, [but] though using the camera and microphone we are at the mercy of the technology fairies."

Hybrid: advantages and disadvantages

The hybrid-learning environment included face-to-face class sessions, synchronous class interactions via computer (live case presentations with immediate feedback via voice or on-line chat) and asynchronous web-based class activities such as discussions.

Advantages of hybrid classroom environment. Thirty-seven percent of the students related that a combination of posting discussions via the web and face-to-face interactions was "effective," and the combination helped them "feel part of a community." Other areas related by the students included appreciating face-to-face to "see the instructor's enthusiasm" while having the flexibility of the web-component to "work at my own pace…from anywhere." Further, 35.71% of the students (n=10) found hybrid class environments to be effective in helping them develop skills, examine and shape attitudes and beliefs, and learn to think critically. One student summed up the advantages related by others in this quote: "The mix of the two settings made it helpful to structure the class around my schedule in addition to, meeting my learning style needs. I could go on-line when I was available to complete discussion posts or assignments. Later, when the class met face-to-face, I could clarify questions and re-connect with my peers."

Disadvantages of hybrid classroom environment. The disadvantages of the hybrid-learning environment included technology challenges especially with the voice aspect of the web-interactions. One student related feeling "disconnect[ed]" and desired more interaction with the instructor. Another student commented "the feedback from peers and instructors was not instant when the class was utilizing the web-based component". Web-based challenges also included local power outages and equipment failures. A student related: "you feel that you can lose on your learning [due to technical problems]."

Students' overall view of the distributed educational environment

Positive components of distributed educational environment

The DE-MSW program was designed to meet the needs of students who would be unable to attend a traditional, face-to-face, campus based program. This goal seemed to have been met as one student's response was mirrored by many in the program: "I have enjoyed the learning experience regardless of the delivery method, although some methods of delivery are better than others. In-class experiences are most beneficial for many reasons such as, relationships, richer/fuller discussions, clarity, and so forth. However, the ability to access classes on-line is vital when you are working full-time and have a family." Another student related, "The program is set up in such a manner that learning takes place well in all environments presented," while another stated, "I like the fluctuation between on-line, hybrid, and face-to-face classes... the [Collaborate Class] and hybrid classes are a good alternative."

Negative components of distributed educational environment

There were several challenges articulated by students with the DE-MSW program. More than 60% of the students reported feeling isolated from their peers in the on-line component of classes. The students indicated that the discussions in the distance-learning (on-line, Collaborate Class, and Hybrid) environment did not seem as rich or "deep" in comparison to the face-to-face classes. Fifty percent of the students related a desire for face-to-face campus program if there had been no other compounding factors impacting a student's ability to attend such a program. Further, one student's comment related that, "Challenges were encountered when attempting to complete group work and/or projects with those out of the area. It is much easier to meet in the library and work on an assignment versus Skype…." In spite of these challenges, a DE-MSW program was beneficial and necessary for this specific group of students to earn a MSW degree.

Satisfaction with program

To capture overall student satisfaction with this program, students were asked if they would participate in a DE-MSW Program based on their current experiences. Ninety-six percent of the students (n=27) responded affirmatively. Further, 54% (n=15) of the qualitative comments contained the general theme of accessibility and flexibility. Common statements included, "I live in a very remote and rural area" and "I would have never done it without this program." Thirty-two percent (n=9) of the students used the word "thankful" or "grateful" in discussing the opportunity to earn their education via a DE program.

Limitations

The purpose of this research was to complete a process evaluation to allow for modifications of the delivery format in the program. This study was conducted in a small rural region of Northern California with a small sample. Thus, the results of this study cannot be generalized. The survey was created specifically for the purposes of this study. Hence, the survey only had face validity. Additionally, the other variables such as faculty skills with technology, course design, and variations in teaching methods were not evaluated. External factors that may impact students, such as an acute crisis, were not assessed. Therefore, these additional variables and factors may have impacted responses at the specific time of survey completion.

Discussion

The data from this study indicated that gender had an impact on using new technology like smart phones, KINDLEs, and iPods. All of the male students (n=3) related looking forward to learning new skills, whereas only 48% (n=12) of female students related this. Fifty-two percent of the female students related that they were "nervous" regarding the use of technology, but were willing to "try it anyway."

Distance education allows for those who are employed to still secure an education. The data from this study is consistent with the 2011 21st Century Campus Report that indicated that 62% of students view "virtual learning" as a primary way for workers to attend classes. In this current study of the DE-MSW program, 95% of the students who were employed 32-40 hours a week indicated that they would participate in this program again. Further, this study also found that students viewed the advantages of the DE-MSW program as providing a community for learning, the opportunity to have time and flexibility, and the ability to complete schoolwork at his/her own pace.

This current study also revealed disadvantages of distributed education that included challenges with technology and a desire for greater peer/faculty interaction. Thus, attention was given to the student feedback following analysis of this data. The students were offered additional individual and group training by the campus institutional technology services on technology uses and ways to problem-solve challenges. The faculty modified the on-line and Collaborate Class courses to allow greater opportunities for synchronous interaction with the professor and student groups.

One student summed up a common theme regarding DE-MSW program: "Although I feel like I am missing out on a big piece of the learning process by being on-line, I would participate in the program again because it is better than the education we had before. There is not a lot in rural areas in the way of higher education. My preferred mode of education is still face-to-face though." Thus, even with the challenges described, the goal was met to provide an equal education for those residing in remote regions, and/or those who experienced employment and personal commitments.

Summary

The assessment of the results of this study led to several recommendations for future research. The majority of students in social work programs are female; the question of the impact of gender in other DE-MSW programs needs further evaluation. Additionally, it is important to note that the research has indicated that the greater an individual views competency with the Internet (Internet self-efficacy), the more likely s/he will be successful with web-based learning tasks (Liang & Wu, 2010; Tsai, 2003). The students' related challenges with technology in this DE-MSW Program and thus, it would be beneficial to evaluate the impact of an initial, in-depth training on technology, on students' Internet self-efficacy.

The on-line course modality was rated the lowest of all four educational modalities. One might wonder if the ratings would change if the on-line courses provided greater student-student and student-faculty interaction via video chat or other new technology that allows for the opportunity for "face-time" interactions and activities such as in Collaborate Class. Additionally, a time assessment of students/faculty in on-line versus traditional course would provide further data for course design and program development.

The DE-MSW program assessed in this study was specifically designed to provide equity in education. The tuition was comparable to that of the campus-based program, the curriculum mirrored the traditional program, and the faculty focused on providing the same support regardless of the delivery mode. Moreover, data from this study indicated the need for MSW programs to provide continued access to affordable education for students who reside in remote regions and/or are unable to attend the traditional face-to-face campus classes due to employment, family commitments, or physical and/or health challenges. In line with the values of social work, providing this access to rural and remote students is an issue of equity in education and critical to providing highly educated social workers for rural and remote populations.

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Dr. Schuldberg's research interests include gerontology, behavioral health, genocide and reconciliation, immigrants and refugees, curriculum development, cultural competency in social work education, distributed education, and transnational social work. Her publications and service are related to her interests.

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Editor's Note: In traditional education, most communication is one-to-many (lecture) with a few minutes at the end of the session for questions or discussion. Highly individualized explorations and learnings occur as homework or self-study where the instructor is less accessible. Televised lectures enable the listening and viewing part of learning to take place outside the classroom so that class time can be dedicated to group activities, explorations and discussions. This is the inverted classroom model.

Heterogeneity of students: the inverted classroom model is a solution

Andrea Breitenbach
Germany

Abstract

How can activating teaching concepts be implemented on large-scale courses that usually need teacher-centred instruction? This question was in the focus of a project aiming to improve statistics courses in social sciences by introducing new teaching methods. The new teaching concept, the "inverted classroom", should substitute for one compulsory course and thereby improve the teaching. After having introduced the concept it was evaluated by qualitative interviews.

The results are varied and interesting. The respondents prefer the concept to didactic teaching and they estimate the learning outcome as greater. There are hardly any disadvantages and also self-study was not a problem. Students with less knowledge of mathematics even work on more exercises than those with greater knowledge.

Keywords: Didactics of Statistics, flipped classroom, inverted classroom model, innovative teaching methods, improvement of teaching, teaching statistic, heterogeneity of students, knowledge requirements, different living circumstances

Introduction and research question

Over some decades the heterogeneity of students has increased. This can be seen in different levels of knowledge and different living circumstances. Though these challenges exist, adequate measures to face these problems are often lacking in current teaching. Usually, preparation courses and additional tutorials are offered in order to reduce the heterogeneity but their effect is limited; for example special programmes and teaching concepts for commuters, students in work or students with children are very rare (Hanft, 2015, p. 13 ff.; Middendorff, 2015; Reinmann, Ebener, & Schön, 2013, p. 2).

Nevertheless, students of social sciences have to attend compulsory courses in statistics, even if most of them are afraid of it and often do not have good grades in mathematics (Windolf, 1992, p. 82 f.). Not surprisingly, the failure rate is especially high in these courses. This effect is reinforced by the disadvantages of traditional teaching methods that are very teacher-centred and often over-crowded (cf. Gudjons(2006, p. 14 ff.) und Meyer (2007, p. 182 ff.)). These disadvantages especially harm these groups of students mentioned above. In order to improve the teaching of statistics, an alternative teaching concept was developed aiming at better meeting the students' heterogeneous needs.

Inverted Classroom and didactic context

Having analysed several teaching methods, *the Inverted Classroom Model* (ICM) was chosen to substitute for the lecture in the initial phase of learning. Within this concept, students learn on their own by, e.g. watching videos provided by the course instructor. In the following session at university, these topics are worked on further and practiced. Questions can be discussed and exercises are done.

According to users of ICM, the concept has a lot of advantages: Students can regulate the learning pace by the use of videos; these enable them to repeat difficult parts until they are understood. This leads to an individualization of learning pace and path. Videos are very popular, especially with the young generation that has been raised with the Internet. Notebooks, mobile and smartphones play an important role not only in private life, but also at school and university. The greatest advantage of ICM is that this teaching concept enhances the cognitive process, self-regulated studying and autonomy within the learning process. The sessions at university require students to make collective decisions, interact socially and study collaboratively and cooperatively so that important soft skills can be developed (Bergmann & Sams, 2012, p. 20 ff., 89; Handke, 2015; Schäfer, 2012, p. 9 f.).

Despite all these advantages of ICM, there are, as with any other teaching method, some disadvantages. However, they are relatively few. Apart from the need for a fast internet connection, it is absolutely necessary for students to have the discipline to watch the videos. This should be encouraged by tests or question sheets guiding and structuring the self-study process. In order to give the students even more initiative and motivation for self-study, Apostolopoulos, Hoffmann, Mansmann und Schwill (2009, p. 107) propose concluding learning agreements with the students. Another disadvantage is that students cannot immediately ask questions at the self-study stage, so questions cannot be immediately answered by the instructor (Bergmann & Sams, 2012, p. 20 f.; Handke, 2012, p. 39 f.; Handke & Schäfer, 2012, p. 13ff., 26 ff.; Sams, 2012, p. 19 f.).

In the winter semester of 2014/2015, ICM was introduced and replaced the regular lecture pattern. For the self-study phase, videos that had been produced by the course instructor were mainly used, along with four relevant You Tube videos.

The videos last approximately 40 minutes and compress the content of four semester-hours. The videos can be found on a learning platform and need to be watched before the weekly sessions at university. Any other necessary information about the course can be found on this platform as well. For example students find there a timetable with information on how to use the videos, exercises for the videos, self-tests and additional exercises with solutions ordered according to topics etc. All exercises are voluntary and are not discussed in the sessions at university; however it is possible to ask questions about the videos and exercises. Additional exercises are done in small groups and then discussed in the whole group.

The *active plenum* is another method used in large-scale seminars. This means that the whole group solves exercises together in the plenum. The focus of this work is not only the application of new teaching-methods, but also the analysis of their potential to be substitute for the didactic teaching which is commonly used in large-scale seminars. Furthermore, their advantages and disadvantages and their relative value to classical lectures should be brought out. These aspects show the central research question of this work.

Analysis and results

In order to analyse the research question, qualitative interviews have been conducted. In contrast to standardized interviews and quantitative methods, they can give insights into students' attitudes and background to their response behaviour. In total, 11 seminar participants have been interviewed who have either attended the course in the winter semester of 2014/2015 or summer 2015. The selection of respondents was conducted according to the criteria as sex and knowledge about mathematics: This could be assessed by taking the active participation during the seminar and the work on exercises into account. Afterwards, this was compared to the question in the guideline interview about the students` performance in mathematics at school. The instructor's assessment was equal to the students' statements in every case. The respondents were interviewed

according to an approximately 40 guideline-questions and the interviews were transcribed afterwards. The analysis took place according to qualitative content analyses according to Mayring, especially the technique of summarizing. In order to find out if the students could also solve complex exercises because of watching the videos, they were observed solving a transfer exercise.

The analysis of the interviews and the observations provided more results than had been expected.

In the following text, the results relevant to the research question are presented at first. Then, other interesting aspects of ICM are described: the respondents for the self-study phase find that ICM is suitable for large-scale lectures. It is not important how many people study by using the videos. The functioning of large-scale lectures also depends on the number of students during the sessions at university. Some of the respondents wish to limit the number of participants during the sessions at university, a hundred participants is too many; the field of statistics especially requires intensive tuition (Qualitative Interviews about ICM, 2015). This is not caused by the design or structure of ICM, but the number of participants. This is a problem that every large-scale lecture has to face. In comparison to all other learning formats, ICM plays a particular role. While in traditional lectures, issues are taught during sessions, in ICM, issues have been prepared in self-study individually at home and in the sessions, issues are discussed and practiced. In lectures with a very large number of participants in the sessions, other methods can be applied, like lecture-hall-plays (see also Spannagel und Spannagel(2013, p. 116 f.)). It can be said that ICM is an appropriate substitute for teacher-centred instruction, and the learning output is probably even higher. The majority of respondents especially appreciate the various functions of the videos, but also the intensive work at university sessions (Qualitative Interviews about ICM, 2015).

There is another interesting finding. Very few respondents see any disadvantages. Some respondents assume that not all students had watched the videos regularly and just learned passively without properly having understood the content. However, all respondents had watched the videos and worked intensively with them.

The main advantages regarding the work with the videos, but also the sessions at university have been evaluated positively: asking questions about the videos and working on exercises in groups is appreciated by most respondents.

Only the *active plenum* is unpopular with students. The possibility to study according to one's individual pace and to repeat issues as often as needed, but also being able to choose when and where to learn, are regarded as very valuable. For the respondents, the work with videos was not difficult, the opposite, most wish to have more concepts promoting self-study and flexible learning. The video format is very popular because students are raised with YouTube and also like to look at videos in their spare time. In contrast, reading texts as a course preparation does not appeal to students so much. Although the subject statistics is unpopular, students like to learn with the videos. The combination of unpopular subjects and a popular medium is appreciated by most respondents. Some even think that this leads to an increase in motivation to engage oneself in statistics, because "you have a much lower inhibition level to watching a video" (Joana, 2015, 00:10:52-7). Kim is of the same opinion (2015, 00:17:59-4):

> "[…] The inhibition level, if you are demotivated, and this is probably the case with many people who are not that much motivated to engage in statistics. It is much easier to simply turn on the computer and press the play-button and to watch a video than read a book or a text. So, the motivation is different."

Apart from the aspects mentioned above, ICM shows further interesting findings, going beyond the research question. Almost all students attend the sessions at university regularly and observations showed a greater participation in discussions and more requests to speak. Three

respondents hardly attended the sessions at university. They are working while studying and one of them is a commuter. Nevertheless, they think that university sessions are an important element of ICM, because they watch the recordings of the course. Some of the respondents think that very difficult exercises have to be worked on further during university sessions, but easy exercises do not have to be discussed there necessarily.

Complex issues can be taught by video, stress the respondents, and also the observations of the students solving a complex task indicate that all students could solve the task. In previous courses, without ICM, this task was always difficult for students to solve. Unexpected results have been found regarding the comparison of students with good and less good mathematical knowledge. Respondents with moderate mathematical knowledge could attain good results in the exam. This group worked on more exercises than the students with better mathematical knowledge.

Two of the respondents even did voluntarily all the approximately 70 exercises provided. Regarding the exam grades of students attending courses before and after the introduction of ICM, an increase of the mean grade and an increase of the failure rate can be found.

Many of the mentioned results show the advantages of ICM in reducing heterogeneity. The latest mentioned results mainly refer to heterogeneity of knowledge, but the superiority of ICM can also be seen with regard to the heterogeneity in living conditions, like flexible time management and self-study.

Summary and outlook

The formulated aspects about ICM of the research question could be explored in many areas by means of qualitative interviews. Apart from this, many results have been found that go beyond the research question. Probably, the motivation to engage in statistics increases because of ICM. Especially, heterogeneous groups take advantage of the new teaching model, e.g. persons with low mathematical knowledge or students that work. However, these results cannot be generalized, so they are the basis for further research in this field.

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Editor's Note: Faculty development is more than training to improve knowledge, skills, and attitudes. It should also be directed to growth of universal human values.

Study of Faculty Development in the context of universal human values

More Sunanda Arun
India

Abstract

The scientific and technological progress though brought great advancements to almost all aspects of our life; ultimately resulted into new global challenges and difficulties. These problems have touched upon every aspect of our personal, social and collective life, be it social, educational, environmental, economic or scientific. Therefore, once again it was thought that certain universal human values are to be addressed for the better development of the personal and social development at various stages of the life from birth to the last breaths of the life.

The term Universal human values need no definition but it is an expression in the behaviour and the perception of the human being. The behaviour, expression and perception though are not measurable quantitatively, they contribute significantly in various aspects of the life and overall in the society.

In this research paper, researcher tried to study the significance of faculty development through the conduct of training programmes in the context of the universal human values. This includes: respect, consideration for others, honesty, sharing, solidarity, openness, listening, welcoming, acceptance, recognition, appreciation; brotherhood, friendship, empathy, love.

A systematic dialogue process was conducted with 318 employees of the university and feedback from 279 employees was taken to know the training areas which can contribute towards upbringing universal human values.

Through the rigorous process of various trainings by the experts, it was concluded that few universal human values contributed significantly to personal, social and organisational development. The impact of the trainings for the faculty development also raises efficiency at work place and loyalty about the organisation.

Keywords: universal human values, training, impact, feedback.

Introduction

What is faculty development? Why it is necessary? For whom it should be? What is achieved with this? What is the significance of faculty development from various perspectives and especially with respect to universal human values? Like this, there are several questions in our mind. The scientific and technological progress though brought great advancements to almost all aspects of our life; ultimately resulted into new global challenges and difficulties. These problems have touched upon every aspect of our personal, social and collective life, be it social, educational, environmental, economic or scientific. Therefore, once again it was thought that certain universal human values are to be addressed for the better development of the personal and social development at various stages of the life from birth to the last breath of the life. "Faculty development" can be one way to address better personal and social development at various stages of life.

Now, in the age of technological advancements, the term "Faculty Development" is well-known and frequently used in public, private and government sectors in almost all sectors where human

being is involved in designing, developing, manufacturing and providing services to the society. Faculty development, staff development and professional development terms are always used in settings that pertain to educators.

Faculty Development for ODL

Faculty development is a similarly used term to staff development and professional development, in settings that pertain to educators (Lawler and King, 2000).

The education sector started a step ahead in achieving and providing quality education and services through various methods. Faculty development is one of the important aspects in achieving and improving organizational quality in all fields of life including Open and Distance Learning (ODL).

In India, a huge network of ODL is already established in every state. ODL contributes 20% of the student population in higher education. ODL has now become a mass education system in India. Mass education is possible through ODL by use of various advance technologies used in teaching –learning and evaluation. To meet the challenges of the learners and societal needs, staff working in ODL system needs to be continuously upgraded by the way of training.

Training plays a very important role in faculty development to acquire knowledge, skills and abilities. Continuous training helps in development of the individual as well as the organization. Mostly, it offers a 'win-win' situation for both staff and the organization. Apart from this, researchers studied the significance of faculty development through the conduct of training programmes in the context of the universal human values with respect to respect, consideration for others, honesty, sharing, solidarity, openness, listening, welcoming, acceptance, recognition, appreciation; brotherhood, friendship, empathy, love. Hence this study was conducted.

About YCMOU

Yashwantrao Chavan Maharashtra Open University, Nashik is a renowned mega Open University in India established in July 1989 by State Legislature Act XX and is recognized by UGC under section 12B. Most of the employees were employed during the initial period 1990 to 1995. During these 25 years, challenges in the Open and Distance Education System and to the employees in this system also greatly increased. The first decade was the developing phase of the university and employees were fully charged to contribute in the growth of the university. This growth was reflected in reality during second decade in terms of quality and quantity. The University and its employees were at the peak of achieving an "Institutional Excellence Award" from the Commonwealth of Learning, Canada. Now, the performance of the University was almost constant during first phase of third decade.

During the initial phase, the University conducted several training programs for its selective staff. This was an alarm for the university and its employees. To meet the challenges of the teaching-learning, technological and societal needs, staff working in ODL system needs to be continuously upgraded by the way of training. Upgrading of the skills, knowledge and abilities of the staff working in ODL has become essential. Rigorous and continuous need based professional training may be an appropriate solution to enhance various required skills of the employee working in an organisation.

Therefore, the University planned to provide various faculty development trainings to all the employees from all cadres. The University tried to identify training needs of all employees of the university from upper cadre A to lower cadre D.

This paper presents a detail analysis and classification of the training needs, identified in four categories on basis of job responsibilities of each cadre working in the university. This step was

initiated by the University for personnel, professional, and social development and as well as for the development of the organization.

Review of relevant literature

A lot of literature, books and research studies are available on universal human values, human empowerment, training, faculty development, significance of faculty development, delivery of skills, productivity, etc. In this paper, relevant references are given to enrich the quality of paper. Faculty development is a continuous process in today's era. Various tools and techniques are used for faculty development. Training is one important tool. Training empowers the trainee's with new skills, knowing new concepts and having a right attitude, which results in effective working. Training is imparted by any organisation to its employees to improve individual performance leading towards increase in overall organisational performance. At the same time, feedback of training gives direction to the organisation whether the training imparted have met the expectations and objectives set and trainer was competent enough to achieve the goals set.

The results of the studies conducted by *Velada, Raquel et.al (2007)* suggest that in order to enhance transfer of training, organizations should design training that gives trainees the ability to transfer learning, reinforces the trainee's beliefs in their ability to transfer, ensures the training content is retained over time and provides appropriate feedback regarding employee job performance following training activities.

According to *Ignace Ng and Ali Dastmalchian* (2011), policies to motivate employees to undertake training and the practice of assessing training needs and effectiveness have the most impact on whether training is perceived to yield positive benefits.

Research methodology

The Yashwantrao Chavan Maharashtra Open University (YCMOU) initiated various training activities leading towards professional, personnel and social development of the employees and also to enhance qualitative output from the employees. Various need based trainings by the experts were organised to the employees of the University.

Researcher identified training needs of total 279 employees of the university from cadre A to cadre D. A questionnaire was prepared to collect feedback from the employees about their individual training needs related to their job and responsibilities. Researcher conducted face-to-face interaction for employees of each cadre from cadre A to D to know their training needs. Apart from this sample, interviews were conducted to get the opinions of the employees with respect to the impact of the training conducted.

Research objectives

1. To identify, analyse and classify training needs of the employees of Cadre A to D
2. To study the impact of training programmes with respect to various human values

Research Tools

1. Questionnaire for the employees
2. Direct open interaction with the employees
3. Interviews of the employees

Sample Size

Total 279 employees of the university

Phase 1: Need identification and implementation strategy

Face to face interaction was held with total 279 employees of the university from cadre A to D in batches as shown in Table 1.

Face-to-face interaction to identify job related training needs

Cadre	No of Employees	Participated Employees
A	72	70
B	18	18
C	155	131
D	35	25
Contractual	38	35
Total	**318**	**279**

Purpose of the interaction was discussed. They were told to identify their job related training needs. After discussion, they could think on that, thereafter a questionnaire was distributed to everyone. First part of the questionnaire was about their personnel information like, their designation, joining date, their qualification at the time of joining, qualification obtained during job, etc. In second part they were asked about training attended by them till date in the University or outside University and their details. Finally they have to write about the training required for them related to their job and also about other aspects.

Analysis of training needs:

Researcher classified, the identified training needs all the employees of the university was classified in three categories as shown in the following Table 2.

- Core Training Needs
- Managerial Training Needs and
- Personnel and Social Training Needs

Classification of training needs of YCMOU employees

Cadre	Core Needs	Managerial Needs	Personnel and Social Needs
A	44	30	21
B	36	27	31
C	14	18	22
D	10	01	25
Total	104 (37%)	76 (27%)	99 (36%)

Phase 1 Conclusion:

From this analysis, it is concluded that the employees of the university identified their training needs. About 37% core training needs 27% managerial needs and 36% personnel and social needs were identified by themselves. Table indicates, Core and Personnel and Social needs are almost equal even within cadre A to D employees.

This clearly shows eagerness of the employees towards training to enhance their knowledge, upgrade skills and attitude and develop as a complete human being. It also reflects sincerity and commitment of the employees towards their job and responsibilities; since maximum training needs belong to core and functional areas. Such type of training may help faculty to improve their work culture and attitude towards their work. Ultimately this helps at large to the employee and the organization.

Phase 2: Conduct personnel and social trainings

From the selected areas, among many, one day training on "Self-development Techniques" by the experts Dr. Priti Kulkarni, Dr. Rupali Khaire and Prof. Ameet Geet, Nasik was organised for total 156 employees from Cadre C and D of the University. Four batches each of 39 numbers were formed for close group interaction as per the pre-defined schedule.

A questionnaire was developed to get the feedback about the trainer and the impact of training. Filled questionnaire was analysed for the study of the training on the employees. Few random 10% sample interviews were conducted from each cadre as shown in the following Table on the developed questionnaire.

Analysis of responses of interview schedule:

Cadre	Total No	Interview	Solidarity	Friendship	Empathy	Appreciation	Honesty
C	131	13	12	10	12	12	11
D	25	03	03	02	03	03	02
Total	156	16	15 (94%)	12 (75%)	15 (94%)	15 (94%)	13 (81%)

Responses of the employees were analysed for five international human values. Responses of the employees were taken after giving explanation to each parameter and sufficient time for thinking was given to answer each question.

Phase 2 Conclusions:

Study of faculty development in the context of Universal Human Values was analysed with respect to Solidarity, friendship, empathy, appreciation and honesty. From this analysis, it is concluded that the employees of the university 94% employees positively reacted that they feel associated to each other and with the organisation.

75% employees positively accepted that due to this training programme the bonding among the employees is enhanced and friendship gets closed due to interaction and time spends together.

Understanding and trust between each other developed empathy among 94% employees due to this training programme.

Appreciation to other is one of the important human values. This faculty development programme was successful to raise thankfulness to each other. Responses shows 94% employees realized gratitude towards each other.

It is observed that, 94% employees shown acceptance towards honesty. Employees accepted importance of honesty in social, personnel and professional life.

Overall conclusions:

This clearly shows eagerness of the employees towards training to enhance their knowledge, upgrade skills and attitude and develop as a complete human being. It also reflects sincerity and

commitment of the employees towards their job and responsibilities; since maximum training needs belong to core and functional areas.

Study of faculty development training programme in the context of international human values with respect to Solidarity, friendship, empathy, appreciation and honesty was found significant. This faculty development programme was found effective to improve the work culture, attitude towards the work, behaviour with co-workers, feeling of association, friendship and honesty.

It is recommended to organise faculty development programmes which are helpful to nurture international human values among the employees at large.

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Editor's Note: There have been many adaptations of the blackboard – more recently whiteboard - to enhance "chalk-talk" with colored pens, audiovisual media, television, interactive multi-media and computer generated displays. A "light" pen, programming capabilities and remote control add further flexibility for the creative teacher.

The potential of Wiimote Interactive Whiteboard as a teaching and learning aid

Tien Tien Lee, Kuan Nien Tan, Kung-Teck Wong, Chia Ying Lin, Wee Hoe Tan
Malaysia

Abstract

Studies showed that interactive whiteboard enhanced students' learning and supported teachers' teaching. Students were found to be more engaged, motivated and enjoy learning with interactive whiteboard. However, problems and issues in using interactive whiteboard such as installing cost, technical problem, classroom setting and users' skills were also being reported in the studies. Hence, Wiimote Interactive Whiteboard is suggested as an alternative to interactive whiteboard to be used in the teaching and learning process. It is hoped that Wiimote Interactive Whiteboard can be useful teaching and learning aids in the classroom.

Keywords: Wiimote, interactive whiteboard, teaching and learning aid

Introduction

The Interactive Whiteboard (IWB) is a technology made up of a computer connected to both a projector and a touch-sensitive board that presents the contents projected from the computer, allows users to interact directly with applications without having to be physically at the computer (Levy, 2002; Manny-Ikan, Dagan, Tikochinski & Zorman, 2011; Termit Kaur & Abdul Rashid, 2012). This technology had been widely used in the education from primary to tertiary level in United Kingdom, Australia, United States, Mexico, Italy and Britain, (BECTA, 2008; Hall & Higgins, 2005; Higgins, Beauchamp, & Miller, 2007; Manny-Ikan et al., 2011). Some significant advantages of IWB reported in the previous studies were that it motivates students to learn, encourages involvements and participations, engages students in the teaching and learning process and meets the needs of students with different learning styles and special needs (BECTA, 2004; Beeland, 2002; Hall & Higgins, 2005; Levy, 2002; SMART Technologies Inc., 2006; Termit Kaur & Abdul Rashid, 2012).

Despite the advantages, the use of IWBs encountered some challenges mainly in the installation cost, technical difficulties, classroom setting, teachers' knowledge and skills (Hall & Higgins, 2005; Levy, 2002; Wong, Goh & Osman, 2013). As solution, IWB based on the Wiimote is invented (Lee, 2007; Bosetti, Pilolli, Ruffoni & Ronchetti, 2011).

IWB based on the Wiimote

Wiimote is a component of Nintendo video game technology which acts as a gaming controller hold in hand by the player. It contains a 3-axis accelerometer, an infrared (IR) camera, a speaker, a vibration motor and Bluetooth connectivity (Lee, 2008). Wiimote IWB is a low cost IWB that uses a Wiimote controller as an infrared pen receiver. It allows users to interact with the contents on the screen using the infrared (IR) pen. The infrared camera at the tip of Wiimote will track infrared light emitted from the infrared pen, and send the mouse trigger and coordination of cursor to the computer via Bluetooth connection.

How it works?

The Wiimote has to put in a fixed position so that the infrared camera can "see" the projected computer screen. The user holds a pen with an infrared LED on its tip. The Wiimote tracks and tells the position of the infrared light to the computer via Bluetooth connection, and software loaded on a computer to calibrate and to receive signal. The position of the infrared light is then used to position the mouse cursor on the screen. Hence, the pen will act as the mouse, and the interaction between the user and the computer occurs by moving the pen. Since the Wiimote can track up to 4 infrared lights simultaneously, the IWB can actually become a multi-touch IWB simply by using multiple infrared pens. Wiimote Interactive Whiteboard is working on any flat surface (UPSI, 2015).

Tools needed

Some tools are needed to set up Wiimote IWB as stated in Table 1.

Table 1
Hardware and software needed to set up Wiimote IWB

Hardware	Software
Nintendo Wii Remote	Wiimote Whiteboard v1.3.1.11 or WiiTUIO or Smoothboard
Infrared pen with a momentary switch	Open Sankoré
LCD Projector	Microsoft Power Point
Personal computer running Windows XP, Vista, 7, 8, 8.1 (32 or 64bit) or Mac OS X	
Bluetooth dongle (Only when the Bluetooth is unavailable)	
A flat, white surface or	
Clip or tape	

Wiimote set up procedure

First of all, the user has to install the Wiimote IWB software (v1.3.1.11) from the open source. When the software is installed, the user needs to connect the Wiimote to the computer. This can be done by pressing the red Sync button inside the Wiimote with the Wiimote IWB software is opened. The Wiimote IWB software will show a green status written 'Connected' if the Wiimote is paired with the computer (Figure 1 left). At this point, one of the four LED indicators on the Wiimote will lit up (Figure 1 right).

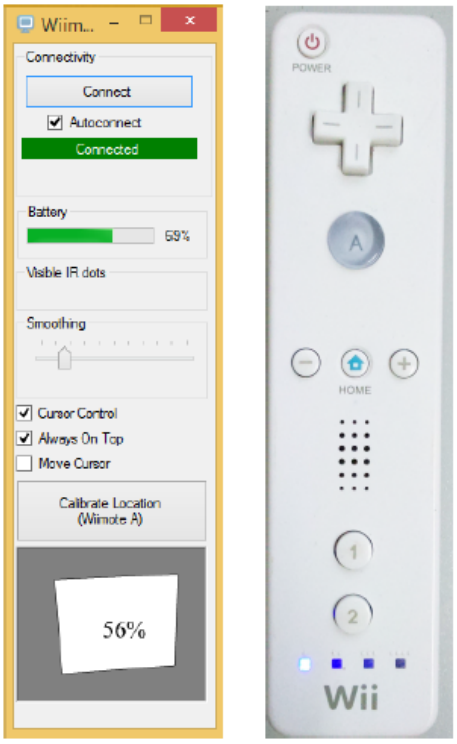

Figure 1 Connection between Wiimote and Wiimote IWB software (UPSI, 2015)

Next, the user has to place the Wiimote facing the projector screen at about 45 degrees from the surface where it is located. Make sure that the Wiimote can 'see' the entire screen. The maximum distance between projector screen and the Wiimote is 2 m. The layout of the position of Wiimote, screen and LCD projector is shown in Figure 2.

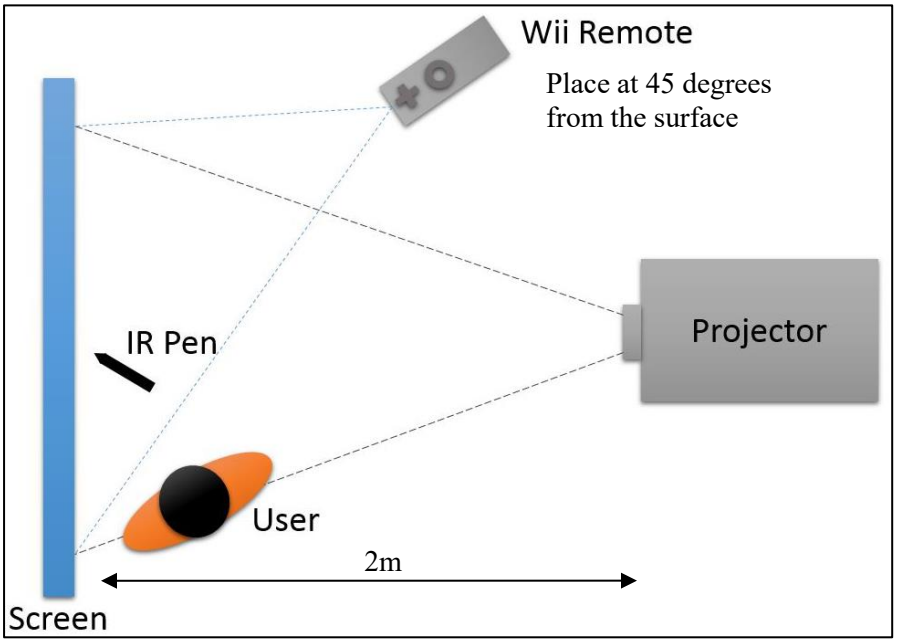

Figure 2 Position of Wiimote, screen and LCD projector (UPSI, 2015)

Wiimote IWB v1.3.1.11 is the software to connect and calibrate Wiimote. It receives infrared coordination tracked by the Wiimote and then turns it into the coordination of mouse cursor on the computer screen. So, the calibration step has to be done each time placing or changing the position of the Wiimote. Before the calibration, the user has to make sure that the infrared light from the pen is sensed by the Wiimote. This can be done by pressing the tip of the infrared pen on the screen. If there is a red dot appears at the 'Visible IR dots' (Figure 3), means that the Wiimote can receive the infrared light from the pen. Then, the user has to click the 'calibration location' button or press the A button on Wiimote to start the calibration procedure. A red cross will then appear on the screen (Figure 4). The user needs to press the tip of the IR pen on the red cross. Repeat this step for the following three red crosses appeared on the screen. After the calibration has been done, the 'move cursor' box will be checked.

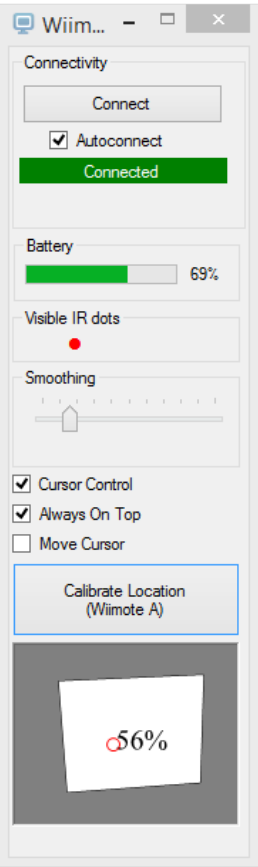

Figure 3 Red dot at the 'Visible IR dots' indicating connection between Wiimote and the IR pen (UPSI, 2015)

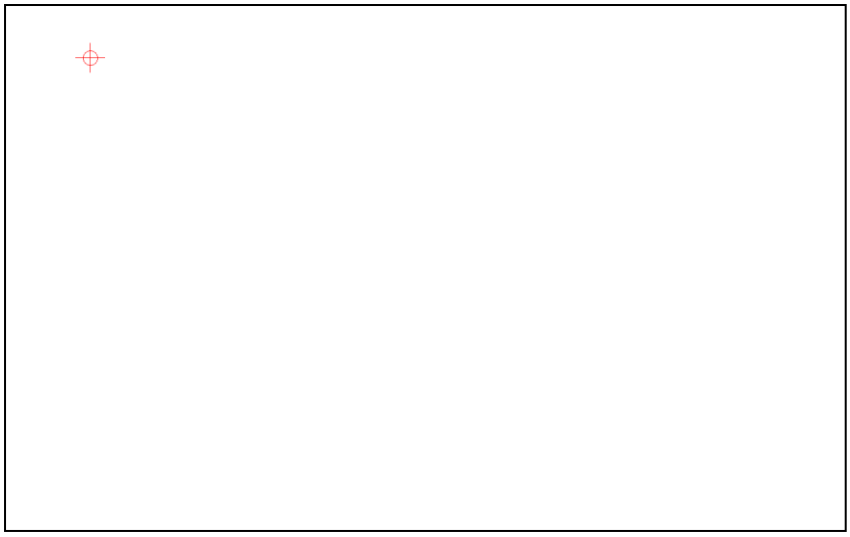

Figure 4 Red cross on the screen during the calibration step (UPSI, 2015)

Once the calibration is done, a white colour square box will be appeared in the Calibration Viewer and the Tracking Utilization. The white colour square box should be inside the grey area. The box indicates the size of the screen. The Tracking Utilization should be more than 30% (Figure 5). This value needs to be increased if the screen is larger. If the white square box is not placed within the grey area and the tracking utilization is less than 30%, repeat the calibration step.

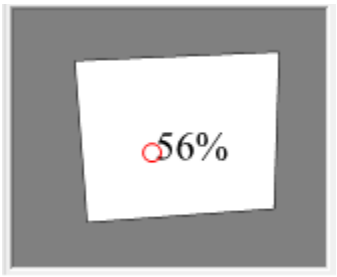

Figure 5 Calibration viewer and tracking utilization (UPSI, 2015)

Installing IWB software

When the Wiimote is set up, the user has to install the IWB software. An open source software, Open Sankoré is suggested. It is developed by DIENA based in France, compatible with any display and pointing device (UPSI, 2015). It is an ergonomic and universal program dedicated to education, open-source, scalable and free, much more than just software (Open-Sankoré, n.d.). The software enables the users to manipulate text and diagrams, access to internet, add page to the scenario, show table, view document browser, and create digital lesson activities with multimedia in the Open Sankoré main window (Figure 6).

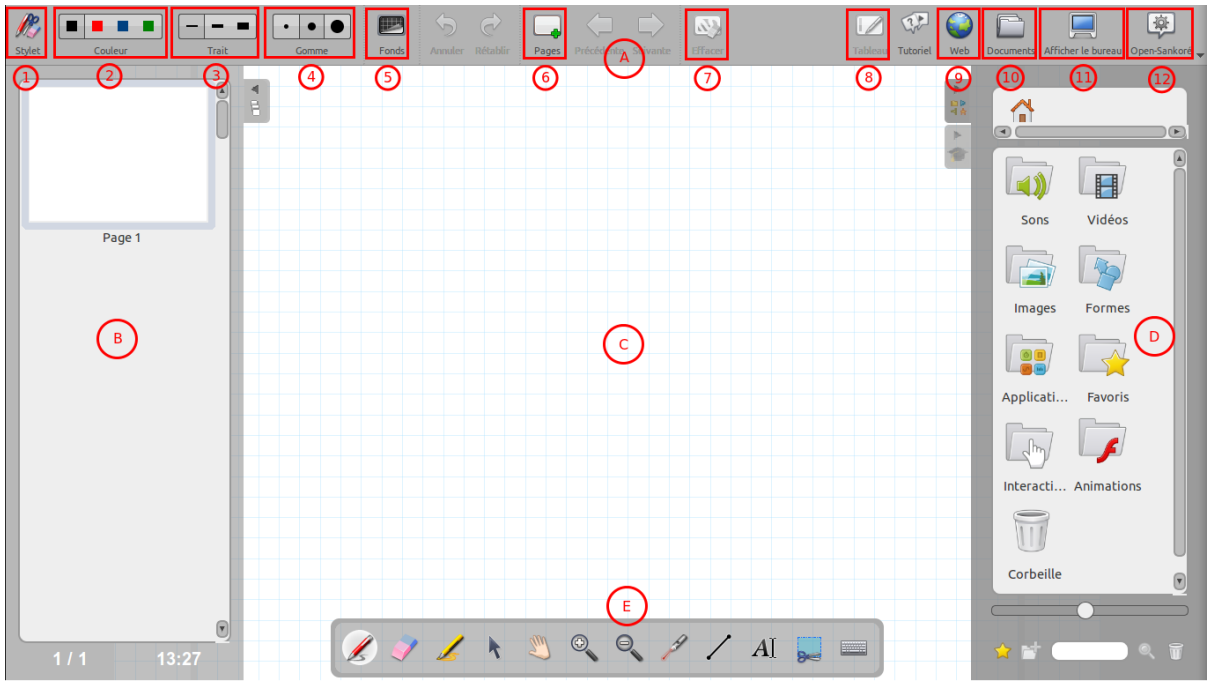

Figure 6 Open Sankoré main window (UPSI, 2015)

Advantages of Wiimote IWB

Interactive whiteboard was reported to be a useful tool to enhance teaching and support learning due to its flexibility and versatility, multimedia presentation, efficiency, supporting planning and the development of resources, modeling ICT skills, interactivity and participation in lessons (Smith, Higgins, Wall & Miller, 2005). All the mentioned benefits of IWB can be found in Wiimote IWB by using the Open Sankoré software.

In terms of flexibility, Wiimote IWB can be used in any room provided the surface for the projector screen is flat. The user just needs to bring along the Wiimote, projector, IR pen and laptop. Any wall of the classroom can be the projector screen. In contrast, IWB needs to have the bulky whiteboard which is difficult to move around. Some schools installed the IWB on the wall making it static and this will become a constraint for short students (Wong, Goh & Osman, 2013). Besides that, some IWBs were not placed in front of the classroom due to the location of the power outlet (Hall & Higgins, 2005; Wong, Goh & Osman, 2013). Students complained that they cannot see the board very well. Visibility of the IWB also reported to be a major problem in using IWB in the classrooms (Hall & Higgins, 2005; Wong, Goh & Osman, 2013). Blinds need to be installed in the classrooms to block the sunlight and reduce the reflection of the lights on the board. Reflection issue can be solved by using Wiimote IWB as the projector screen will be any wall in the classroom. The concrete wall is not as bright and as smooth as the IWB. Hence the reflection of the sunlight on the projector screen (wall) is minimum compared to IWB.

Wiimote IWB has the similar versatility functions to IWB. The applications offered by IWB such as using web-based resources in whole-class teaching, showing video clips to help explain concepts, demonstrating a piece of software, presenting students' work to the rest of the class, creating digital flipcharts, manipulating text and practicing handwriting, saving notes written on the board for future use, quick and seamless revision (Hall & Higgins, 2005; SMART Technologies Inc., 2006), drag and drop, hide and reveal, highlighting, animation, storage and recall, feedback (Glover, Miller, Averis & Door, 2007) can be done by Wiimote IWB.

Wiimote IWB enables the users to design and edit the text, audio, visual, graphic, simulation and animation. The users can type or even write on the projector screen using free hand with the help of IR pen. This is good for the small kids who just start to learn writing. Audio, graphics, animation and video can be accessed easily by using the web browser. The users may worry about the copyright issue. Bosetti, Pilolli, Ruffoni and Ronchetti (2011) suggested that the learning objects which obtained from the web only shared locally, closing them in a Learning Managing System (LMS). So, the copyright issue is solved.

Wiimote IWB provides interactivity and participation in the classroom as the IWB do. Teachers can have students come over to the projector screen to drag and drop the answers, match the correct diagrams, identify the errors on the text, play games and many more. The big projector screen enables the whole classroom members to see what is happening and they get involved along the lesson. The IR pen is equivalent to the mouse of the computer, hence the use of IR pen needs some practice to gather experience and to make it looks natural while using it. Users have to make sure that their bodies do not block the Wiimote so that it can track the infrared light emitted from the pen.

Almost all functions provided by IWB can be done by using Wiimote IWB. The most important issue is the cost of installing Wiimote IWB is much cheaper than the traditional IWB. Installing an industrial IWB needs more than 1000 € compared to only 50 € for Wiimote IWB (Bosetti et al., 2011). In Malaysia, the cost of setting up an e-classroom containing a desktop computer, a LCD projector and an interactive whiteboard is approximately more than RM 8000, about half of the cost is just to purchase the IWB. Hence, Wiimote IWB is a better alternative for the schools which are facing financial problems in developing e-classrooms.

Conclusions

As conclusion, no doubt that IWB has positive impacts on students' learning and motivation. Students who learn in the IWB classroom were found to be more motivated and enjoy the lessons. However, several challenges and problems of using IWB were identified, namely classroom setting, visibility of the board, technical support and teachers and students' skills. Wiimote IWB was invented as an alternative for the current IWB since it offers the similar functions as IWB with a lower cost. Study had been carried out and the results showed that the Wiimote IWB roughly equivalent to their industrial counterparts (Bosetti et al., 2011). Hence, we highly recommend the use of Wiimote IWB in Malaysia's classroom especially those schools with limited funds in developing e-classrooms.

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THE UNIVERSITY OF THE FUTURE

by Donald G. Perrin Ph.D.

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- Imagine a university without walls where you select programs, courses and mentors from leading institutions of higher learning, libraries, museums and technical institutes throughout the world.

- Imagine a university designed for non-traditional learners where learning can take place anytime, anywhere and where the learner makes the choices.

- Imagine a university that operates 24 hours a day, 360 days a year where you can participate in live courses or complete the courses in your own timeframe.

- Imagine a university that is truly international, multicultural and multi-lingual, where courses are originated in different countries, cultures and languages.

- Imagine a university where you design your program of studies based on your needs, interests, preferred learning style and method of evaluation.

- Imagine a university where computers, interactive multi-media, electronic libraries, and the information superhighway play a major role in providing a full range of interactive courses and services.

- Imagine a university where the curriculum is oriented to future needs, prepares you for real jobs and initiates placement strategies at the time you enroll.

- Imagine a university where ingenious, creative and collaborative efforts are rewarded and programs are future-oriented, exciting and relevant.

The university you are imagining will soon become real. It is called The University of the Future. Its mission is ***to inspire global transformation through learning***. Inspire means there is a focus on motivation and positive outcomes, global means worldwide and transformation implies significant change of a positive nature. Learning is the ability to apply, analyze, create and value what is learned and to use it for the advancement of civilization.

Note: The University of the Future is a virtual learning environment, not a physical campus or place. This project is a joint venture of the Alquist Center for Innovative Learning at San Jose State University and Vital Pathways of Mountain View, Calif.

TARGET POPULATION--NON-TRADITIONAL LEARNERS

Most institutions of higher learning serve traditional learners--those who are dependent on skilled teachers to organize, present and evaluate knowledge ant skills in their discipline. Approximately half of a university freshmen class is students who recently graduated from high school. In a typical university setting, nearly half of the freshmen students drop out in the first year. It is believed that this loss reflects the difficulty of transferring to an environment where students are responsible for their own learning. It may also be because the predominant teaching style of a university is lectures and that students with incompatible learning styles are not well supported.

Hansen, Silver and Strong's Learning Styles Model recognizes four learning styles--directive, inquiry, creative and cooperative. People learn in all modes but one style is usually dominant or preferred. The university lecture is a directive style of learning--a step-by-step development toward goals set by the instructor. Students who are curious like to move ahead on their own. Students who are creative are frustrated by slow and linear presentation. Students who prefer team activities are stifled by lack of interaction. The result is that curious, creative and cooperative learners--the non-traditional learners--may come to be considered by their teachers as disruptive, disobedient or even poor students.

FAMILYAND PROFESSIONAL COMMITMENTS

The majority of non-traditional learners are more mature, more independent and often have substantial commitments to their jobs and/or families. They are less able to commute to the physical campus or fit university schedules into their work schedules. They want to participate in setting goals and be responsible for their own learning.

In traditional or directive learning the instructor controls goal-setting and presentation of the lesson. In the other three quadrants, students participate in goal-setting and assume greater responsibility for learning. Inquiry encourages curiosity, exploration and critical thinking. Creative cultivates insight, imagination and innovation. Cooperative fosters interaction, collaboration and team skills.

Silver points out that asking students to learn in a style that is not natural for them is like asking them to write with their other hand. Many learners are classified as learning disabled when really they learn in a different way. Educators such as *Bruce Joyce* have developed methods for facilitating learning that capitalize on the curiosity, creativity and social participation of students. Silver advocates teaching around- the-wheel (using all teaching-learning styles within a lesson) to involve a wider range of students and make learning more varied and interesting.

THE NON-TRADITIONAL LEARNER

The University of the Future targets non-traditional learners, persons over 24-years-old who are independent learners and cannot easily attend a physical campus. This is the largest untapped market for education worldwide, and may represent up to 80 percent of the potential market for degree courses in virtual universities. In the future, as the flexibility of the virtual university becomes evident, it may also recruit significant numbers of traditional learners.

The student has the option of doing all of his or her courses at one university and receive a degree from that institution, or select from the offerings of all collaborating universities to receive credit and a degree from the University of the Future.

BENEFITS TO PARTICIPATING UNIVERSITIES

Students are not the only beneficiaries of the virtual university Educational institutions that generate courses in electronic media formats--television or computer-based-- can benefit by marketing their courses to a broader population through the University of the Future. The student pays the normal university fee for the course. The institution provides one set of materials to the University of the Future, a value added vendor which does marketing, advising, evaluation and record keeping.

CURRICULUM RESOURCES

Curriculum is available in electronic media from hundreds of universities worldwide and comes in many forms from libraries and databases to packaged courses. Electronic libraries include print, audio, film and video resources housed in repositories around the world including the Library of Congress, government agencies (NASA, NIH, NSF, NLM and museums), television networks (ABC, CBS, NBC and PBS), news networks (Associated Press, CNN, Reuters and Tass), publishers (Encyclopedia Britannica, Grolier, Macmillan and National Geographic), privately owned information resources (dialog), and the resources of the Internet.

Printed books are costly to produce and publishers are seeking other ways of marketing their information products such as online information systems and CD-ROMs. Courseware and packaged courses include video and digital media and a variety of course structures based on combinations of these resources with other learning activities. Video includes live-interactive television courses and teleconferences. Videocassette courses may be recorded versions of live courses or specially produced for learning from tape.

Major suppliers of television-based courses include Mind Extension University, National Technological University, the Open University in England, Stanford, MIT and hundreds of universities and colleges with television outreach including the Television Education Network at San Jose State. San Jose offers its courses live, on-campus; live via- television at regional centers, schools and industries; and on videocassette. This provides a range of options for learners with schedule conflicts and those distant from the campus.

Digital courseware includes Computer Assisted Learning, Hypermedia and Multimedia available online through the Internet and other information services or accessed from diskettes or a CD-ROM. Digital media online or in CD- ROM format is increasingly provided by publishing companies such as Microsoft and National Geographic. There is a spectrum of course formats that bridge electronic libraries and courseware. One example is the Shell Course, an activity template that enables the students to generate the information base for the course as they do their research. Such courses are used to study communities or build worlds that do nor yet exist through team research, brainstorming and innovation. Such courses are extremely popular because they push out the frontiers of knowledge, involve students physically and intellectually and offer opportunities for imagination and creative thinking.

EVALUATI0N METHODS

The University of the Future will develop methods of evaluation to inform students of their progress and it provides instructors with tools to learning. Assignment of letter grades is not consistent with the philosophy of the University of the Future. Credit will be given when the student reaches the required level of performance. In a traditional university courses are of finite size and only a set number of students can participate in a given semester. The University of the Future will develop its own evaluation instruments to facilitate classes of any size. The integrity of a course and its evaluation procedures must be maintained to protect the University of the Future, the university that supplies the course, and the student. It is important that whatever method of evaluation is used, it is consistent with the learning style of the student and the goals of the course.

PARALLELS BETWEEN PHYSICAL AND VIRTUAL UNIVERSITIES

A university is a community of people with diverse interests and goals. The common focus of learners is personal growth and job skills. Its resources include libraries, instructors, classrooms, laboratories, administrative offices and social/recreational facilities.

ù Instruction. In the virtual university learning resources are replicated in electronic formats--the electronic library and the Internet, television, interactive video, desktop video, and multimedia instruction with live discussions via telephone or continuing dialog through computer forums and bulletin boards. Laboratories can be simulated or local community resources can be used.

Administration. Administrative functions are accomplished online on a 24-hour basis, with human resources always available.

Social/Recreational. These areas are least well served by a virtual university. For this reason traditional universities will usually be preferred by recent high school graduates.

Control. In a virtual university, the learner makes the choices from a broad range of courses, institutions and professors. Courses are adapted to the schedule and learning style of the learner and customized for specific needs. Courses can start and end at any time, and operate 24-hours. (Compare this with a traditional university where the institution retains control. The student has only a limited selection of courses and professors, schedules are inflexible, and rules are punitive for students who do not fit into the calendar and the rules prescribed by the institution.)

Facilities. In a virtual university, funds for construction, operation and maintenance of classroom buildings can be diverted to produce and maintain courseware, networks and human services. Personal counseling. tutoring. mentoring and other services are available online by telephone or via other communication technologies. Such services would be staffed by professionals and volunteers on a 24-hour basis.

Charter. To encourage experimentation with new university structures, the state of California has made provision for Charter Universities that are exempted from state accreditation guidelines for a period of five years. This should be sufficient time to establish and validate the systems of recruitment, instruction, evaluation, graduation and resource management to meet the requirements of the accrediting agencies. Continuous quality improvement based on surveys and student feedback will ensure efficient operation with high quality courses and supporting services.

THE ADMINISTRATIVE HUB

The hub of the university will be a powerful computer management system backed by human resource personnel. It will operate 168 hours per week to enable admission, advisement, registration, accounting, course selection, course delivery and record keeping from widely distributed sources. Curriculum and courseware will be selected from leading institutions of higher education worldwide based on the following criteria:

If instructor taught, the instructor must be nationally acclaimed for his/her teaching ability - curriculum design, presentation, quality of interaction, audiovisual materials, handouts, relationships with students, and assessment tools.

If media taught, the courseware must meet University of the Future technical and pedagogical standards, which reflect those of instructor taught courses. Courseware should be validated to ensure it achieves its stated objectives with target groups similar to students of the University of the Future. Courseware not yet validated will be so labeled and may be charged at a lower rate. Courses validated by the University of the Future will be given the its Seal of Approval. Universities wishing to add this seal to promote the sale of their products will pay a charge for the right to use the seal.

Courses will be modular and accurately described so that students can design custom courses to meet their specific needs. Interdisciplinary courses and programs, new academic disciplines and cutting edge technologies will be given high curriculum priority.

Deans for each discipline will explore the implications of current trends and innovations and develop a cadre of scholars with a future focus. For example, science will focus on the effects of weightlessness on human growth and development, design of closed ecosystems for space stations, new energy sources, space exploration, space manufacturing and the population of space. Art will focus on future themes and styles, computer art, fractals, holography, etc. And communications will focus on architecture for future computers and super-computers, compression algorithms, object-oriented design and artificial intelligence.

PROGRAM DESIGN

The University of the Future will develop a catalog of established courses, course shell structures and resources that can be used by students to design an individual program of study. Students will be encouraged to design holistic programs to prepare them for their

proposed profession or career. Students will have the option to receive special training such as:

- speed reading with increased comprehension for up to 20,000 words per minute;
- visualization and image interpretation;
- mind mapping, planning and memorization skills;
- team planning and facilitation for design, production and evaluation; and
- interpretation skills for non-verbal communication.

PROJECTED IMPLEMENTATION SCHEDULE

1995 Develop business plan, seek funding, set up prototype management hub

1996 Implement courses in the Silicon Valley region to test prototype system

1997 Expand program to state of California

1998 Expand program nationwide

1999 Expand program worldwide

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