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"Decreasing Cultural Disparity in Educational ICTs: Tools and Recommendations "

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Introduction

Education is an important component of any nation's development process (UNDP, 2001). With the expansion of educational technologies, more developing countries are experimenting with such technologies and related programs to expand educational opportunities for their populations. However, stakeholders in educational programs have expressed concern that levels of access in developing countries to information and communication technologies (ICTs), the foundation of educational technologies, could generate inequitable educational opportunities (Burbules & Callister, 2000; Haywood, 1995; Lax, 2001; Lelliott, Pendlebury, & Enslin, 2000; McLoughlin, 2000; Rosen, 1998). In addition, targeted learners may experience inequitable learning outcomes if they are expected to use educational ICTs produced in another culture or country (DeFillippi, 2001; Henderson, 1996; Lu, Walker, & Huang, 1999; McLoughlin, 1999). Several factors can generate or exacerbate these cultural disparities:

- **The environments into which ICTs are introduced**
- **The types of technology used**
- **The content, philosophy and format of educational ICTs**
- **The characteristics of the learners themselves**

The purpose of this article is to help educational planners decrease cultural disparities in educational ICTs, especially in those being introduced into lesser-developed countries. The author begins by reviewing assessment techniques that have been used by educational and development professions. Then, based on the results of cross-cultural research in educational anthropology and educational technology, the author creates and pilot tests a questionnaire used to assess cultural differences between learners in two different countries. Based on the results of the pilot study and further research, the author revises the questionnaire. The revised online questionnaire will be utilized in the author's dissertation research and is available for other researchers to test as an assessment tool for educational ICTs.

Factors Affecting Cultural Disparity

Before planning to implement large-scale e-learning projects or policies, project planners should assess the educational environment to determine if it supports the implementation of educational ICTs. An assessment is especially important when considering projects for lesser-developed countries, where education is less accessible and resources are limited.

Assessing the Educational Environment

Often, educational planners have already identified, through other means, their target

learners and the geographic area in which they would like to introduce ICTs. However, Lewin (2000) cautioned planners to first determine if an accepting form of government exists and to evaluate all aspects of the existing educational system. The political structure should support the educational system with policies that support educational expansion. Such policies include those designed not just for education, but for economic growth and social freedom as well. If planners determine that changes in the educational system (administration, policies, etc.) need to be implemented before ICTs could feasibly be introduced, they may decide to postpone.

In addition, governments in developing countries often, with our without intention, restrict access to education for certain groups (Lewin, 2000; UNDP, 2001). If access to traditional education were already restricted, educational planners would need to determine if the introduction of ICTs would improve access and, if so, if access will be equitable. Community developers and educational planners work in imperfect environments, but they must decide what segments of society they are trying to reach with educational ICTs and if they are going to improve accessibility or further delimit it.
Educational planners should also evaluate the resource base of a country or government before introducing ICTs. According to Nolan and Lenski (1999), there are two types of industrializing societies: Industrializing agrarian and industrializing horticultural. In the latter, lesser-developed countries, the populations are relatively small (median size is 9 million), they contain only 10 % of the world's population and are found in only three places: Sub-Saharan Africa, Papua New Guinea and Haiti. The former, more developed countries on the sociocultural-evolutionary scale, are the industrializing agrarian societies that exist in most of Latin America, southern and eastern Asia, the Middle East, North Africa and parts of southern and eastern Europe, with a median population of 19 million (Nolan & Lenski, 1999, Figure 14.1, p. 332). Their societies contain elements of an agrarian past and an industrial present. Most of the world's population lives in these areas, with 40% in China and India alone (Nolan & Lenski, 1999).

Thus, according to the theory of sociocultural evolution, the agrarian societies are more prepared for industrialization than the horticulturists because they already possess a degree of industrial technologies, more sophisticated or functional urban centers, governmental bureaucracies, standardized monetary systems, and higher literacy rates. The challenge to industrialize is much greater for the horticultural societies. Both types of industrializing societies have benefited from technological innovations: Lower infant mortality, increased life expectancy, higher literacy, and improved school enrollments, (Nolan & Lenski, 1999). Yet, of the two types of industrializing countries, the agrarian ones are more likely to have the capacity to acquire or improve infrastructure, even though some segments of the population may still be excluded from development efforts, because they are more likely than low-income countries to garner investment support from other governments, corporations, and non-governmental organizations (NGOs). In addition, these countries could be secondary markets for existing educational ICTs, but inherent cultural barriers would have to be examined.

Low-income (industrializing horticultural) countries are more likely to be excluded from major development and investment efforts (Nolan & Lenski, 1999; UNDP, 2001). In addition, the wealthiest segment of population is typically the smallest, thereby creating a situation of little or no access to education for the masses. Introducing educational ICTs would be unlikely to enhance educational opportunities for the largest segment of the population.
Planners are advised to not rely on the existing infrastructure in a developing country because it is usually too archaic to support the newest technologies (Jones & Berry, 2000; Lelliott et al., 2000). Instead, they should investigate the use of technologies that require minimal infrastructure. For example, with wireless, satellite technology, a developing

country could bypass the specialized wiring and cabling that are required to support ICTs. In summary, educational planners should promote the introduction of educational in ICTs in the countries with supportive governments, expansive educational policies, available resources, and with an infrastructure that supports the use of educational ICTs. Planners who are interested in the overall technological profile of a country or culture can use the Technology Technical Advance Indicator (TAI) created by the UNDP (2001) as a baseline metric, especially in larger projects.

Assessing Educational ICTs for Design and Technical Compatibility

Once educational planners and community development experts have determined that a country or location can both support and benefit from educational ICTs, they still have further assessments to conduct. The successful use of educational technologies, from simple email to e-learning to online universities, is dependent upon the actual design and content of the programs as well as the technical capabilities of the targeted learners. Lu's (1999) assessment questions on content, mode of instruction, management, and the technical presentation of IMMs, could be uses a as starting point for assessing most educational ICTs, not just those intended for multicultural audiences. However, the situation is more complex. Education and ICTs are both socio-cultural constructs, making it impossible to separate the processes or technologies from cultural influences. Subsequently, culture is an integral part of every aspect of instructional design.

Several anthropological researchers (Hall, 1981; Hofstede, 1997; Trompenaars & Hampden-Turner, 1998) have shown that members of different cultures can be compared and contrasted across several dimensions. One of these dimensions, orientation towards time, illustrates how the actions of certain cultures are very future-oriented whereas other cultures base their actions on the past. Another dimension is orientation towards relationships. For example, members of the American culture (U.S.A.) tend to be very individualistic and members of the Indian culture tend to be very group-oriented. Members of different cultures have different orientations to nature or the environment (Can humans control what happens to them or is it a matter of fate?) and orientation to activity (Are people action-oriented, or content to just exist?). Researchers are continually attempting to identify and clarify these dimensions as well as others, but they have all consistently found that such dimensions do exist and that these dimensions can significantly affect how cultures interrelate and understand each other. No surprisingly, these cultural dimensions are reflected in cultural activities, such as education (Hofstede, 1997; Gardiner, 1998; Gardner, 1989, 1999) and in cultural artifacts such as educational ICTs (Henderson, 1996; Horton, 1999; Marcus & Gould, 2001; Marinetti & Dunn, 2002).

One of the most obvious barriers to access and equitable learning outcomes when using educational ICTs are languages (Marinetti, 2002; Transware, 2002). For example, in the Democratic Republic of Congo, (formerly Zaïre), the official national language is French, but there are 4 regional languages and 250 dialects. However, simply translating an e-learning program from one language to another does not necessarily remove cultural barriers. Educational researchers have noted many cross-cultural aspects of ICTs that should be considered. An e-learning program designed in the United States may be very successful in that environment. However, if it is exported to another country or culture, learners may not reap the same benefits.

Worldviews are reflected in educational design (Henderson, 1996). In a modern worldview, the purpose of knowledge is "to describe, generalize, predict and control a rational predictable world" (Henderson, 1996, p. 86). For example, this can be seen in

computer graphics with simple menus and organizational graphics that visually show the hierarchical storage of files. In the post-modern perspective, the purpose is emphasizing context, uniqueness, individuality, and a tendency toward disorder. This view can be detected in artistic graphics with hodge-podge organization, and non-conformity of design. A connectivity perspective (Henderson, 1996) accepts the view of simultaneous unity in diversity (a marriage, so to speak, of the above two views). This worldview is reflected in the use of iconic metaphors that represent a conceptual organization of information.

Values, ideologies, and images can include or exclude members of a society. Gender, class, culture, language and other features can unconsciously affect instruction. For example, this can be seen in software with all European characters, non-international symbols, vulgarity or violence or indications of values supported by the predominant culture that, in turn, excludes the values of another groups (Henderson, 1996; Wyatt, Henwood, Miller, & Senker, 2000).

Cultural maintenance refers to encompassing the values of the target group and the group's preferred cognitive style (both instructivist and constructivist styles) by including the group in design decision-making (McLoughlin, 2000). Software developed in the U.S. often contains only European humans, while other countries often include characters from two or more cultures. As an alternative, animations can be used, if it is recognizable to the majority of the cultures who will use the software. Sometimes, the characters and settings in educational media could be familiar to both eastern and western audiences from urban, developed countries. Thus, less educated or exposed participants may not comprehend certain images or icons, but again, it depends on the intended target audience.

Design issues affect access and equity (Henderson, 1996; Marcus & Gould, 2001; Marinetti, 2002; McLoughlin, 2000). In addition to the usual practices of knowing the audience and conducting target group testing and revision, the following issues also need to be assessed when designing multimedia projects for global audiences. Henderson (1996) recommended avoiding exclusionary design, which is avoiding design elements that are incomprehensible to other culture or that can be misinterpreted. She recommended avoiding an English-only language attitude and using common international symbols or icons (with a caution to avoid icons considered offensive to other cultures). Abbreviations, puns and jokes can all be misunderstood by another culture. Lastly, Henderson cautioned designers to not make assumptions about the values and customs of targeted learners because our perceptions of another culture are often distorted by our own worldview.

McLoughlin (1999) presented examples of web design that may be open to different cultural interpretations. Email, chat, and other forms of peer dialogue may impose expectations to communicate which, depending on the culture, may impose burdens on participants. Lectures (the presentation of information) are accepted differently by different cultures. Hypermedia organization could create problems for students with strong task orientation. The level of control associated with the medium may not be congruent with cultural expectations. Collaborative projects indicated the need for task sharing, which may be are understood and valued differently by different cultures. Resource sharing may be expected in one culture whereas the teacher decides the essential resources in another. Preferences for the level of learner control vary by culture, either by culture, or by imposition. In many western cultures, people seek control over their environment, while in other cultures; individuals try to accommodate the external environment (Hofstede, 1997).

The pace, the control sequence, and the accommodation of a range of student abilities are examples of differences that may be perceived in educational ICTs between two cultures (Lu et al., 1999). Cultural differences in images, sounds, and words may affect the students' learning outcomes (Lu et al., 1999). Henderson (1996) also identified what she called instructional design paradigms that can interfere with accessibility and equitable learning outcomes. For example, current western thought leans towards constructivism as the preferred philosophy or approach in educational design. However, many countries still rely on other, opposing philosophies, such as instructivism. Yet, both groups manage to produce capable, skilled, intelligent constituents. According to Henderson (1996), an objectivist/instructivist structures the environment, is accurate, sequential, direct. Performance is rewarded so that learning is cumulative, receptive and is based on practice, performing and giving accurate information on demand. It is decontextualized, cultivates set learning outcomes, and places value on replicability, reliability and control. On the other hand, constructivism emphasizes the "provision of challenging, contextualized tasks, creating dissonance, modeling strategies, supporting reflection, scaffolding cognitive performance, and providing evaluative self-monitoring so that learning is personal, individually constructed, interpretive, active, reflective, metacognitive, collaborative, and evaluative, stressing personal relevance and the cultivation of each individual's learning process. Collaboration, reflection, and active engagement are valued components" (Henderson, 1996, p. 88). In summary, there is something of value in both approaches, but the constructivist approach of western educational institutions may not serve as an appropriate educational approach in an ICT for eastern recipients.

Henderson (1996) promoted a "pragmatic design", which is really a combination of the two approaches above. The idea is to include all three worldviews, reflect society's multiple cultural realities, incorporate various ways of learning and teaching, and promotes equity of learning outcomes. She proposed three ways in which to deracialize instructional design without creating ICTs that are so one-dimensional that they make cultural differences invisible. The "inclusive approach" involves the inclusion of minority values and culture by incorporating myths, legends and tokenism. The "inverted curriculum approach" involves designing an ICT from the minorities' point of view. The Multiple Cultural Model, however, is an approach promoted by Henderson that promotes equitable learning outcomes for all learners, especially those in disadvantaged minorities or marginalized groups.

A diagram of the Multiple Culture Models is presented in Appendix 1. Basically, Henderson's concept is similar to that of anthropological researchers: There are several dimensions across which cultures can be compared and contrasted with respect to education and, in particular, educational ICTs. She identified 14 dimensions, although several of them are similar to each other and could potentially be clustered together. In addition, her dimensions are similar to many of those portrayed by other researches, but are specific to the design of educational ICTs. Thus, in the revised questionnaire, the author chose to move away from the original format of looking at four general cross-cultural dimensions and to focus on those related specifically to education.

McLoughlin (2000) offered further suggestions for instructional designers who hope to foster equity and the participation of marginalized learners.

· Awareness of learner needs and preferences:
Instruction and learning tasks must support differences in learning style and communication.

· Authentic task design:
Learning activities must be authentic and relevant and provide bridges to students' culture and community.
· Clear communication of aims, objectives and requirements:
Plan for maximum clarity, ease of use, and user control choice. Avoid cultural stereotypes and expectations.
· Self-direction and integration of skills:
Plan activities so that technology use and information literacy become part of student's study skills and lifelong learning strategies.

Assessing the Targeted Learners and Their Needs

Once planners have identified a supportive educational environment and appropriate educational technologies, they can turn their attention to the needs of the targeted learners. The first step is to assess which institutions could most benefit from educational ICTs. The UNDP (2001) proposed that secondary and tertiary academic institutions and institutions of workplace development would benefit more from using educational ICTs than primary schools because students were more likely to need and apply the learning. In addition, the UNDP (2001) suggested that the topics for educational ICTs should be those that support the use and future development of ICTs: Computer science, engineering, technology and related disciplines.

In most developing countries, ICTs and IMMs (interactive multimedia) that were developed in advanced countries will be incompatible, perhaps even incomprehensible, in developing regions (Jones & Berry, 2000). Planners need to assess the experience of their target groups. Are they well informed users with outdated ICTs, or are they new users who are comfortable with recently introduced ICTs? Students learn about information technologies in different ways, at different levels of sophistication. Planners should gather data on the experience and demographics of the targeted learners, such as age, experience, type of experiences, and access to ICTs.

Limited experience with all ICTs by the majority of the marginalized population will radically influence usage and acceptance. Chen (1999) recommended that, in order to the support of stakeholders during the assessment and implementation of ICTs, planners should engage in "mediated social interaction" in order to ensure participation. Secondly, those mediating the use of educational technologies needed to persevere in generating a shared vision with all participants in order to accomplish their intended educational goals. Merely making ICTs available did not ensure successful engagement.

Designing an Assessment Tool

The original questionnaire in Appendix 2 was used in a pilot study to discern cultural differences that affected communications, especially communication mediated by technology, between employees from two cultures, employed by the same organization. It was not designed to detect cultural differences in educational ICTs, although the author was heading in that direction. The questions on cross-cultural dimensions are based on a training tool called the "Culture Compass" (Chu, 1996), which, in turn is based on the works of Hofstede (1997) and Trompenaars (1998). The revised questionnaire in Appendix 3, based on design recommendations from the research and the Henderson's Multiple Culture Model (1996), will be used to identify differences in educational ICTs as perceived by two cultures. This would be an initial step towards designing an instrument for detecting cultural differences in educational ICTs.

The questions in the original questionnaire were not validated, as it was used primarily as a training tool for a multinational corporation. The questions in the revised questionnaire were reviewed and validated by a focus group comprised of members of both cultures under study: India and the United States. However, the author assumes other researchers intending to use the questionnaire will complete their own validity and reliability tests. The second assumption is that if other researchers plan to compare results, that this tool will be used in a similar environment: It was intended to assess the cultural differences between employees of a multinational corporation using an identical online training program.

Methodology

The first questionnaire was pilot tested with two groups of employees: computer programmers in the U.S. and India, working for the same corporation. There were 15 members in each group, randomly selected from list of computer programmers, developers, engineers, and analysts. It was presented via the company's Intranet. The author used the original version as both a training tool and as a statistical exercise for a research course. The purpose of the tool was to highlight cultural differences between the two groups and to reflect on how those differences might affect communication between them. Since the groups communicated primarily through electronic means, questions were also asked about their experiences and comfort level with information and communication technologies. Demographic questions were included primarily to describe the two populations; however, the results indicated that demographics might be related to familiarity and comfort level with ICTs.

The research question for the original questionnaire (Edmundson, 2001) was, "Are there any significant cultural differences between US employees and Indian employees, working for the same US-based corporation, which may interfere with communication?"

Hypothesis #1

There are no significant differences in the following 4 cross-cultural characteristics between the two groups:

1. Orientation to time
2. Orientation to activity
3. Orientation to human relationships
4. Orientation to the environment/nature

There were 12 questions, all ordinal. Three questions were presented differently for each of the 4 orientations, based on the training tool designed by (Chu, 1996). The assumption was that the four characteristics were related to how different cultures communicate. The author explored this assumption in follow-up discussions of the assessment tool and indeed, the dimensions appeared to be related to communication styles and difficulties. However, the author used the first draft of the questionnaire as a corporate training tool, so the questions should still be validated if it is going to be used as an ICT assessment tool.

Hypothesis #2

There are no differences demographically between the two groups (beyond citizenship/nationality):

1. Age
2. Gender
3. Number of years computing or programming experience
4. Number of years working in an American technical corporation or environment.
Because the communications appeared to be exacerbated by the use of electronic communication media, survey participants were also asked about the number of years experience with the following technologies:
1. Telephone conferencing
2. Video conferencing
3. Web conferencing
4. Email
5. Online chat or discussion groups
6. Online training (computer or web based)

Results

In the pilot study, there were significant differences between the following characteristics of the two groups under study, using the student's t-test with alpha = .05:

· The two groups were significantly different in their orientation to time and to nature/environment.
· There were significantly more males in the Indian group.
· The average age range of the Americans was significantly different (older) than the average age of the Indian group.
· Of the six ICTs listed in the questionnaire, the Indians were significantly more comfortable with Online Chat/Discussion than were the Americans. There were not significant differences between the other five ICTs: Teleconferencing, videoconferencing, web conferencing, email or online training.

While the group sizes in this study were small, the differences indicated by the results proved helpful in revising the questionnaire to be used as an assessment and research tool.

The Revised Questionnaire

The purpose of the revised questionnaire in Appendix 3 is to explore the differences between the two groups of employees from two cultures (the U.S. and India) in the same corporation when they take an identical online training course. The new instrument will have 3 parts. Part 1 will contain the same questions used in the pilot study, with a slight change in the lowest age range to ensure that no one under 18 is involved in the study. Part 2 contains questions based on the 14 cross-cultural dimensions of education, as identified by Henderson (1996). (For more information on how the author wrote the questions and designed the question format, please contact the author at: aedmunds@waldenu.edu.) In Part 3, the author asks questions about what features the participants used, did not use, and to what extent. The answers to these may be related to cultural preferences. In addition, there is a free text field for participants to offer their perceptions of the cross-cultural aspects of the online training course because the author cannot assume to have included all pertinent questions in the questionnaire. The author will also be analyzing the actual training results of the two groups to determine if there were differences in learning outcomes.

The revised purpose of the questionnaire it to determine if there are any cultural disparities between the two groups that could affect learning outcomes. At this point, the questionnaire will be limited to identifying differences without correlating them to a cause. However, it is hoped that other researchers will continue to work with either this assessment tool or a variation that encompasses the issues discussed in this article. Each use will bring planners and stakeholders closer to understanding how to effectively decrease cultural disparities in educational ICTs. If such a tool proves to be accurate, it could be applied in many ways towards the goal of providing access to educational ICTs and equitable learning outcomes for multicultural groups.

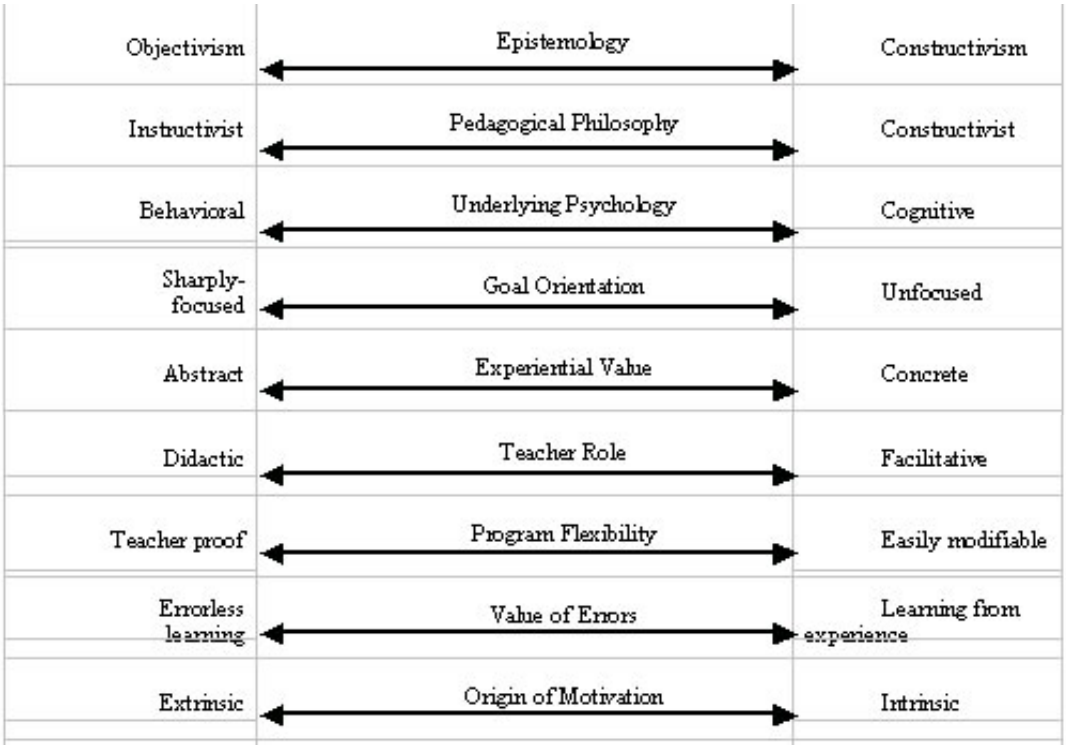
Conclusion

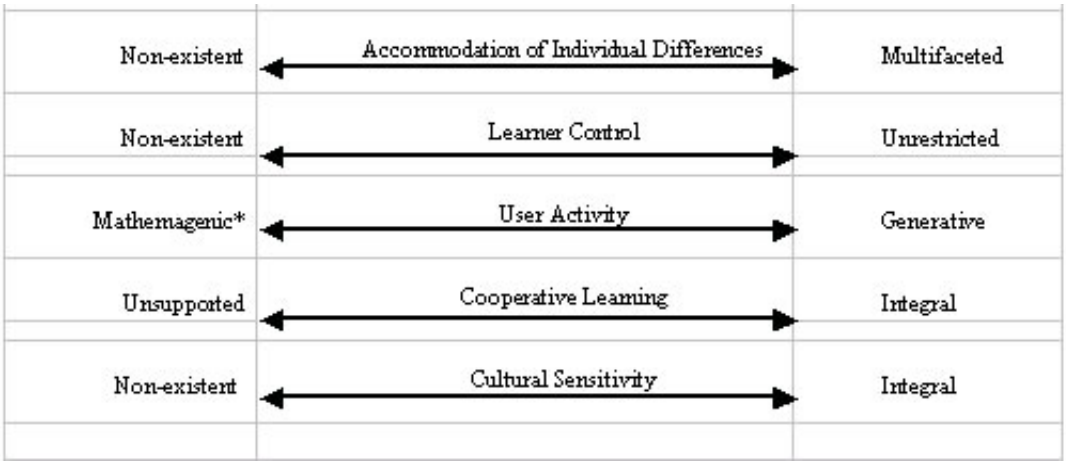
Lu (1999, p. 43) stated that, "Few guidelines exist for avoiding cultural stereotyping in educational multimedia titles. Nor are there specific guidelines to address international audiences." Thus, it is hoped that the assessment techniques proffered in this paper, synthesized from the works of several authors, will contribute to the goal of creating educational ICTs that are accessible, culturally conscionable, and that promote equitable learning outcomes.

Many facets of educational ICTs should be evaluated to ensure equitable learning outcomes, whether they are intended for a multicultural group within a corporation, for a multicultural classroom, or for a marginalized group in a developing country. Additionally, there are many constraints to planning, implementing, designing and developing educational ICTs. However, the overall goal is to improve the human condition with access to information, knowledge, and education. This potential assessment tool will be only one small step in that quest. Yet, it could be useful in all stages of ICT development.

A Diagram of the Multiple Culture Model (14 Dimensions)

From (Henderson, 1996)





***Reeves adopted the terms mathemagenic and generative from Hannafin's work in 1992 (Reeves, 1994). Mathemagenic learning environments enable learners to "access various representations of content, whereas generative environments "engage learners in the process of creating, elaborating or representing knowledge (1994, p. 11)"**

Definitions of the 14 Cross-Cultural Dimensions of Learning

From (Henderson, 1996);(Reeves, 1994)

1. Epistemology: Objectivism – Constructivism.
Objectivism is knowledge acquisition reflected in ICT as comprehensive, structured and accurate knowledge measured by tests. Constructivism is reflected as individually constructed knowledge with multiple perspectives, 'measured' by the ability to create learning strategies meta-cognitively.

2. Pedagogical Philosophy: Instructivist – Constructivist
Instructivist ICTs stress goals and objectives and are founded in behavioral psychology. Constructivist approaches encourage metacognitive learning strategies. They are based on previous concepts or schema.

3. Underlying Psychology: Behavioral – Cognitive
This pits the concept of behavioral psychology against cognitive. However, most behaviorists are not as extreme in their thinking as Skinner was! This is an ongoing debate.

4. Goal Orientation: Sharply-focused – Unfocused
These are represented clearly delineated goals versus self-discovery.

5. Experiential Value: Abstract – Concrete
Abstract, indicating 'removed from reality' is opposite on the spectrum from Concrete, indicating relevance to the learner's world.

6. Teacher Role: Didactic – Facilitative
A teacher's exposition of knowledge (such as a lecture) is contrasted with techniques in which the teacher facilitates learning without controlling outcomes.

7. Program Flexibility: Teacher-Proof – Easily Modifiable
This reflects the extremes of keeping teacher input out of 'instruction' to the development of programs that are flexible to change.

8. Value of Errors: Errorless Learning – Learning
Students learn until either they generate no errors, or they use errors as part of the

learning process.

9. Motivation: Extrinsic – Intrinsic
Motivation either originates from factors separate from the learner (like the need to get an 'A') to that which comes from within, a true desire to learn.

10. Accommodation of Individual Differences: Non-Existent – Multi-Faceted
Since learning and knowledge are structure, there is no need for accommodation of individual differences. In contrast, knowledge and learning are presented in a variety of ways so that learners can utilize what most suits their preferences.

11. Learner Control: Non-Existent – Unrestricted
The learner must either learn along a predetermined path, or learn by discovery, which means the learner has unrestricted control of the path.

12. User Activity: Mathemagenic – Generative
Learners have the opportunity to access the same content, but in different ways, or instead, they engage in the process of creating, elaborating, etc.

13. Cooperative Learning: Unsupported – Integral
Either learners work independently of others, or learning is encourage through cooperative activities among learners.

14. Cultural Sensitivity: Non-Existent – Integral

Either the cultural differences are completely ignored (even if unintentionally) or they are an integral part of the ICT.

Applying Assessment Criteria to the 14 Continua

Using the questions applied to the extreme poles of the 14 continua (Appendix 4), assessment criteria can be defined for the assessment tool. In Table 1 below, examples of each pole are given to better illustrate what the assessor should be seeking. The example used is a web-based course designed to teach teachers about learning styles.

EXAMPLES	CHARACTERISTICS	DIMENSION	CHARACTERISTICS	EXAMPLES
The web-based training course that has a comprehensive outline of material to be learned that is hierarchical and detailed. The implication is that, once learners have learned about X learning styles, they have mastered the topic.	ObjectivismIs it comprehensive, structured and accurate, with knowledge measured by tests?	Epistemology	ConstructivismDoes it reflect individually constructed knowledge with multiple perspectives, 'measured' by the ability to create learning strategies meta-cognitively?	The web-based training course allows participants to learn about X learning styles, but then they are required to cite examples of how they could adapt their teaching to accommodate each style.
Each section of the web-based	InstructivistDoes it stress goals and	Pedagogical Philosophy	ConstructivistDoes it encourage	In the training course on

training has clearly identified and measurable learning objectives, so participants know exactly when they have 'learned' the desired material	**objectives and is founded in behavioral psychology?**		**metacognitive learning strategies, such as those based on previous concepts or schema?**	**learning styles, participants are asked to relate those styles to examples they have seen in their work or lives and suggest ways in which they might have taught differently**
Learners are expected to complete tasks exactly as ordered	**BehavioralAre only 'correct' responses accepted?**	**Underlying Psychology**	**CognitiveAre learners allowed to build knowledge based on previous experience?**	**Learners are allowed to extrapolate their experiences into learning**
As long as the learners 'know' the different learning styles, they have successfully achieved the goals	**Sharply-FocusedAre there clearly delineated goals?**	**Goal Orientation**	**UnfocusedIs self-discovery promoted?**	**One activity in the course has participants reflecting on what they learned and how they learned it, then analyzing their own learning style based on what they discovered.**
More or less memorizing content, learners are not expected to relate content to their past or potential experiences.	**AbstractIs it 'removed from reality'?**	**Experiential Value**	**ConcreteDoes it indicate relevance to the learner's world?**	**Learners are encouraged to apply 'knowledge' of learning styles to their activities at work and thus, are expected to learn from the actualization of those experiences.**
The instructor of the course is the expert and all questions or concerns	**DidacticIs the teacher's exposition of knowledge (such as a lecture)**	**Teacher Role**	**FacilitativeDoes the teacher facilitate learning without controlling outcomes?**	**When students have questions or concerns that they could,**

can be resolved by this expert	**predominant?**			**with some help, resolve or discover answers on their own, the instructor helps them learn to learn instead of providing direct answers.**
Once students can consistently define and describe the X learning styles, they have 'learned'. Until then, all errors are indicators of faulty learning	**Errorless LearningMust the students learn until either they generate no errors?**	**Value of Errors**	**Learning from ExperienceDo students use errors as part of the learning process?**	**If students analyze a learning style incorrectly, they are merely being offered another opportunity to learn…by recognizing their error and then correcting it**
The instructor contributes knowledge; it is up to the student to learn it. The teaching techniques would not be the cause of faulty learning	**Teacher proofIs the teacher input into 'instruction'?**	**Program Flexibility**	**Easily modifiableDoes the teacher participate in the development of programs that are flexible to change?**	**The instructor recognizes his/her faulty instructional activity and modifies it to suit the learners**
Students are memorizing facts and definitions to pass the course.	**ExtrinsicDoes motivation originate from factors separate from the learner, (like the need to get an 'A'?**	**Origin of Motivation**	**IntrinsicDoes motivation comes from within, a true desire to learn?**	**Students are genuinely interested in learning new knowledge or skills and applying them to real life situations**
Only text reading and drill-and-practice are offered as course activities	**Non-ExistentSince learning and knowledge are structure, is there accommodation of individual differences?**	**Accommodation of Individual Differences**	**MultifacetedIs knowledge and learning presented in a variety of ways so that learners can utilize what most suits their**	**Students can read text, watch online videos or analyze case studies in order to learn**

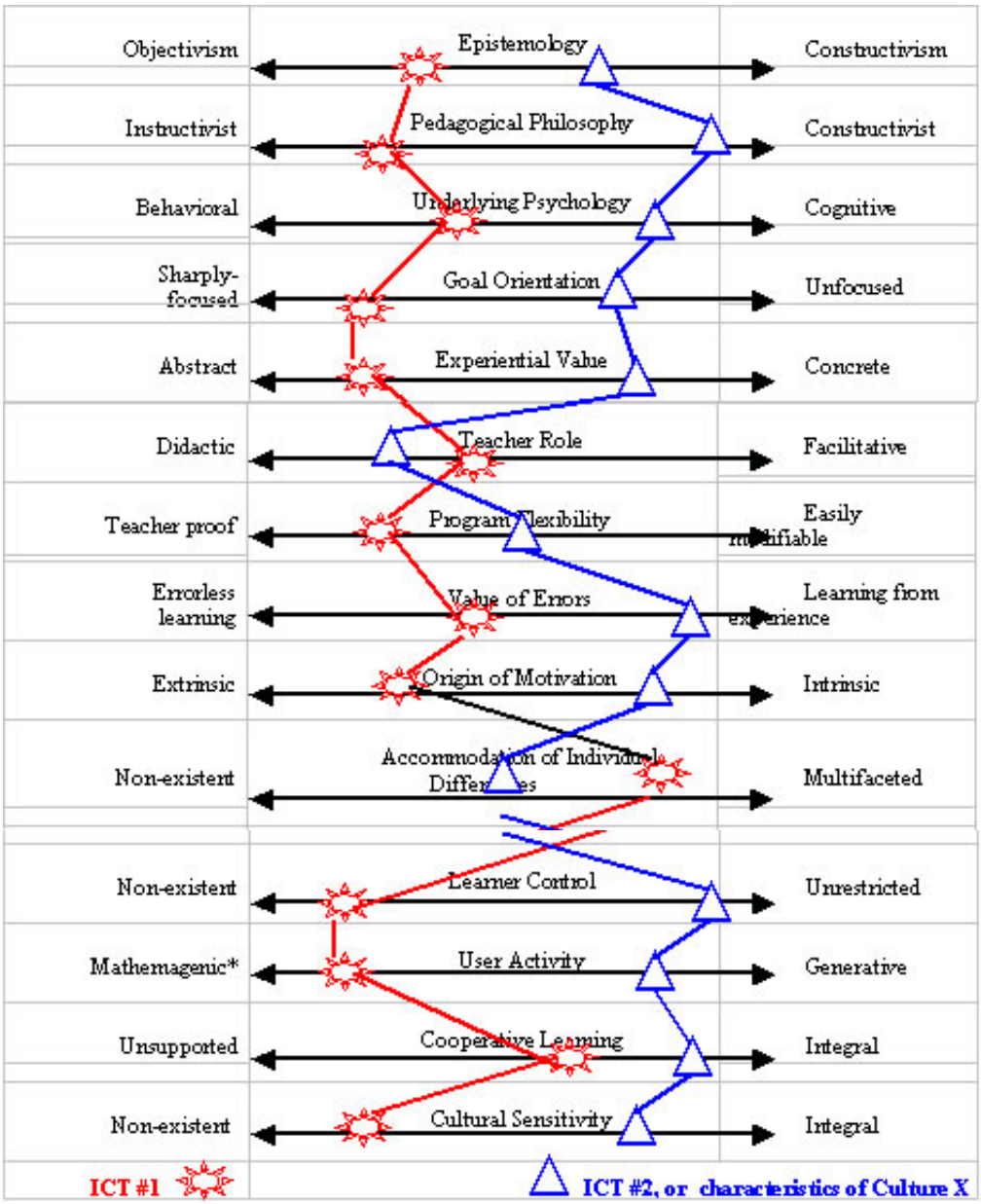
			preferences?	the X learning styles.
The learners are sequentially mastering the X learning styles and will know when their learning is complete	Non-ExistentDoes the learner learn along a predetermined path?	Learner Control	UnrestrictedDoes the learner learn by discovery, which means the learner has unrestricted control of the path?	The learners can chose the learning activities that appeal to them
	Mathemagenic*Do learners have the opportunity to access the same content, but in different ways?	User Activity	GenerativeDo learners engage in the process of creating, elaborating, etc.?	Learners are allowed to expand upon other uses of knowing learning styles and are asked to research an example
Each learner protects his or her knowledge, as success is determined by mastering the topic to the instructor's satisfaction	UnsupportedDo learners work independently of others?	Cooperative Learning	IntegralIs learning is encouraged through cooperative activities among learners?	The instructor provides activities which allow learners to exchange ideas and experiences, thus augmenting the information and skills learned
The instructor assumes that all learners will learn equally by the way he/she teaches and by the activities presented.	Non-ExistentAre cultural differences are completely ignored (even if unintentionally)?	Cultural Sensitivity	IntegralAre cultural differences an integral part of the ICT?	The instructor or designer of the web-based course attempts to keep images and examples free from stereo- types and uses internationally recognized symbols.

How the Assessment Tool Would Work

Obviously, some of the cross-cultural dimensions above overlap and, when the assessment

tool is put into practice, the author may consider combining some of them. Diagram 2 illustrates how the author used the tool to assess the characteristics of an e-learning course. The person evaluating an educational ICT would review an entire educational ICT, as both a student and as an instructor. The evaluator could then, for example, 'rate' each of the 14 dimensions in the ICT on a scale from 1-5. It should be stressed that neither pole (1-5) is right or wrong. Rather, the evaluator will discover that because of worldview and other cultural influences, educational ICTs will reflect the culture in which the ICT was designed or created. The idea is to simply compare educational ICTs for identifying possible differences in dimensions that could generate inequitable learning outcomes.

Diagram 2:Example of Using the Revised Multiple Culture Model (MCM) to compare ICTs



***Reeves adopted the terms mathemagenic and generative from Hannafin's work in 1992 (Reeves, 1994). Mathemagenic learning environments enable learners to "access various representations of content, whereas generative environments "engage learners in the process of creating, elaborating or representing knowledge (1994, p. 11)"**

While it is beyond the scope of this article, the research of Hall (1981),Hofstede (1997), Trompenaars (Trompenaars & Hampden-Turner, 1998) and others have identified cross-

cultural dimensions that appear in all cultures with similar, polarized variations. For example, their general findings were that members of western cultures tend to be very independent and not too impressed with authority. In contrast, members of eastern cultures are less dependent and highly respectful of authority. These differences are transposed into educational artifacts such as ICTs. In a real example, an Indian software developer had designed an educational ICT to teach project management skills. The course instructor was a recognized expert in project management. The course was administered to Indian and American employees of the same software company. The Indian students passed the course quickly and with excellence. On the other hand, most of the American students did not complete the course (boredom with the style in which it was taught) and those who did complete it found it to be highly unrelated to their needs. Taking this educational ICT resulted in inequitable learning outcomes. Why? Because the Indian students respected the 'expert', were motivated because it was a way to get ahead at work, and were acclimated to the linear style of teaching. On the other hand, the American students wanted real life applications, were only motivated if they could see something in it for themselves and expected more interactive, varied ways in which to learn project management skills.

Again, the approach used in the Indian-designed ICT was not 'wrong' per se. However, designers or consumers of such courses need to assess the cultural dimensions of educational ICTs to avoid inequitable outcomes.

Conclusion

Many facets of educational ICTs should be evaluated to ensure equitable learning outcomes, whether they are intended for a multicultural group within a corporation, or for a marginalized group in a developing country. Additionally, there are many constraints to planning, implementing, designing and developing educational ICTs. However, the overall goal is to improve the human condition with access to information, knowledge and education. This tool for assessing cultural dimensions would be only one small piece of the complex puzzle. Yet, it could be useful in all stages of ICT development or in evaluating existing ICTs, especially used in conjunction with the questions from the original pilot study. The author intends to pursue the development and use of the MCM model as an assessment tool in further research.

Appendices

Appendix 1: Criteria for Software Review

Taken from (Lu et al., 1999).

Content:
1. Is content accurate and factual?
2. Is content interesting for student?
3. Is content educationally important?
4. Is content appropriate for intended users?
5. Is content free of errors in grammar, spelling, usage, etc.?

Mode of instructions:
6. Is new vocabulary presented appropriately?
7. Are new concepts presented appropriately?
8. Can students control pace?
9. Does program offer student options to skip familiar materials?
10. Does program offer student options to repeat instructions?
11. Can students control sequence?
12. Does the program accommodate a wide range of ability?
13. Is feedback useful and appropriately stated?

14. Does the program reflect knowledge of learning theory?

Management:
15. Does the program track and record student information and progress?
16. Can students use it by themselves?
17. Can it be used collaboratively?

Technical Presentation:
18. Are graphics, sound used appropriately in the program?
19. Is the program free of bugs?
20. Are directions clear?
21. Is the interface transparent and easy to use?
22. Is reading level appropriate for intended users?
23. Does the program allow a variety of different kinds of user input – voice recording, typing in words, singing, choosing via the mouse, etc.?
24. (Question added after study): Are the images, sounds, and words culturally authentic?

Appendix 2: Original Research Questions

The research question for the original questionnaire (Edmundson, 2001) was, "Are there any significant cultural differences between US employees and Indian employees, working for the same US-based corporation, which may interfere with communication?" The questions were derived from a training tool based on the works of Hofstede (1984) and Trompenaars (1998):
Hypothesis #1
There are no significant differences in the following 4 cross-cultural characteristics between the two groups:
1. Orientation to time
2. Orientation to activity
3. Orientation to human relationships
4. Orientation to the environment/nature
There were 12 questions, all ordinal (Likert-scale). Three questions were presented differently for each of the 4 orientations. The assumption was that the four characteristics were related to how different cultures communicate. This assumption was explored during follow-up discussions about the training tool and indeed, seemed to be related to communication styles and difficulties. However, this Pilot Study was only used as a training tool to expose corporate employees to possible barriers to cross-cultural communication, so the questions remain to be validated.

Hypothesis #2

There are no differences demographically between the two groups (beyond citizenship/nationality):

1. Age
2. Gender
3. Number of years computing or programming experience
4. Number of years working in an American technical corporation or environment.
Because the communications appeared to be exacerbated by the use of electronic communication media, survey participants were also asked about the number of years experience with the following technologies:

1. Telephone conferencing
2. Video conferencing
3. Web conferencing
4. Email

5. Online chat or discussion groups
6. Online training (computer or web based)

Appendix 3: Original Questionnaire

Cross-Cultural Perspectives

This form is an abbreviated version of a training tool used in corporate classes. When you have completed the 22 questions, please click on 'Submit' at the bottom of the page. All information is confidential. Data will be compiled and analyzed anonymously.

Questions 1 – 12: Select one statement in each group that is most similar to your perspective:

1.
- **My decisions are primarily guided by what I have learned.**
- **I "go with the flow" and adapt my decisions to quickly changing circumstances.**
- **When I make a decision, I focus on the result I am looking for**

2.
- **I tend to take each day as it comes.**
- **I tend to keep lists of tasks that I need to accomplish each day.**
- **In time, things do tend to work themselves out.**

3.
- **It is hard for me to stop worrying about upcoming events or deadlines.**
- **Life has its own wisdom. Worrying is a waste of my energy.**
- **Let us focus on all that today brings and take care of the rest one day at a time.**

4.
- **We are meant to attend to nature's needs as much as to our own.**
- **Humanity's progress and survival depend on our control of natural resources.**
- **Nature's own power will determine our progress and survival; humanity's power can neither match it nor truly control it.**

5.
- **In truth, we are much better off now that we can make more effective use of our natural resources.**
- **For all our great plans and projects, nature could put humankind in its place in an instant.**
- **" Effective use of natural resources" is the same as saying "exploitation of the natural world."**

6.
- **No matter where you live, in the country or the city, there are a variety of forces operating which control your destiny.**
- **In my life, I strive to live simply, which is closer to the natural world.**
- **Modern conveniences actually help us appreciate the natural world.**

7.
- **Developing my potential and my sense of self is the most important thing I can do with my life.**
- **Being alive and healthy is the most important thing to me; my accomplishments are secondary.**
- **It would be a waste if I did not achieve something important in my life.**

8.
- **I prefer to relax and enjoy life as it comes.**
- **Peace of mind is possible regardless of external circumstances.**
- **I feel useless if I am not doing something constructive with my time.**

9.
- **Taking action is more important than commitment to a belief.**

- ◯ **We exist only in relation to other people.**
- ◯ **It is essential t be a good person; being a successful person is not the point.**

10.
- ◯ **You've got to be guided by what you think is right, even if you can't please everyone.**
- ◯ **It works best to have a good leader make the decisions; everyone should cooperate accordingly.**
- ◯ **Decisions affecting a group are more effective if everyone participates in the decision-making.**

11.
- ◯ **It is the individual I respect – not his or her position.**
- ◯ **Leaders of a group deserve respect because of the position.**
- ◯ **First and foremost comes unity; people who think of themselves first live at the expense of others.**

12.
- ◯ **The head of a group has to take responsibility for its success or failure.**
- ◯ **If someone in my group is having a problem, I am partly responsible for resolving it.**
- ◯ **I am accountable for my own success or failure.**

13. **How many years have you worked for a technical corporation or in a technological environment?**

[ ]

14. **For each of the 6 types of communication media, please describe your comfort level:**

Teleconferencing:

Teleconferencing:

15. [Not comfortable or unfamiliar with it ▾]

Video conferencing:

16. [Not comfortable or unfamiliar with it ▾]

Web conferencing:

17. [Not comfortable or unfamiliar with it ▾]

Email:

18. [Not comfortable or unfamiliar with it ▾]

Online chat or discussion groups:

19 [Not comfortable or unfamiliar with it ▾]

Online training (computer-based or web-based):

20. [Not comfortable or unfamiliar with it ▾]

21. **Your Age, please**

[Under 30 ▾]

22. **Gender:**
- ◯ **Male**
- ◯ **Female**

23. **Your location:**

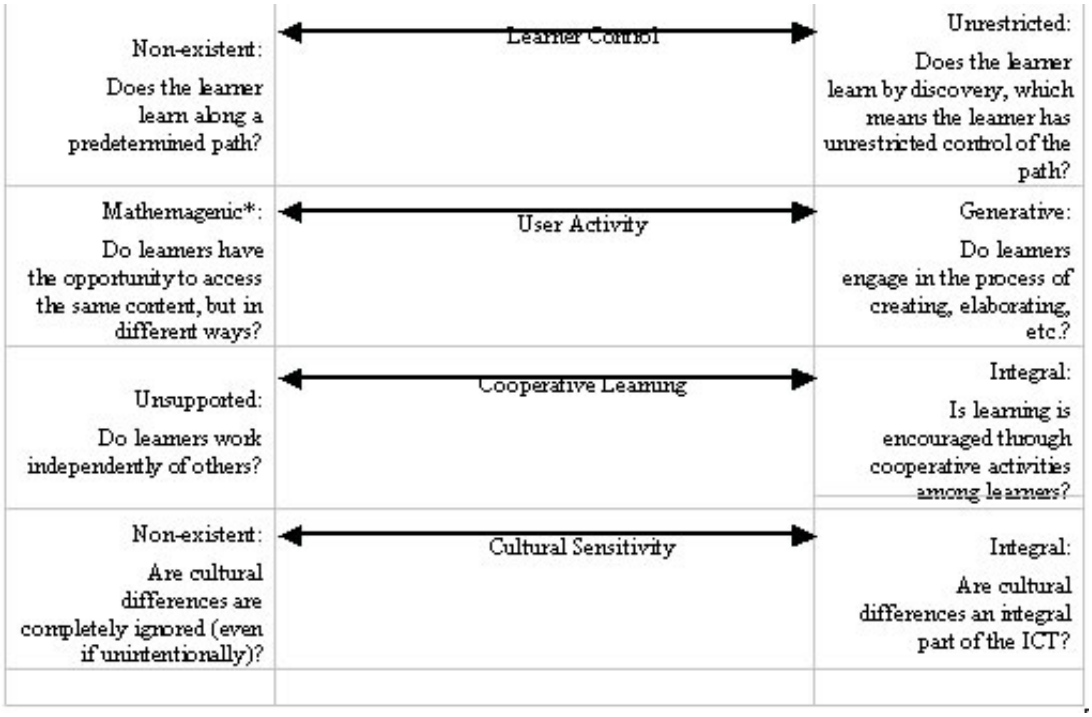
◉ **United States** ◯ **India**

[Submit] [Reset]

Questions 1-12 adapted from 'The Culture Compass' by Paula Chu
In Experiential Activities for Intercultural Learning by H. Ned Seelye, Editor (1996)
Form designed by Andrea Edmundson, Professional Development Manager.

Appendix 4: Application of Criteria to Continua Poles
Derived from (McLoughlin, 1999)

Objectivism:		Constructivism:
Is it comprehensive, structured and accurate, with knowledge measured by tests?	Epistemology ⟷	Does it reflect individually constructed knowledge with multiple perspectives, 'measured' by the ability to create learning strategies meta-cognitively?
Instructivist: Does it stress goals and objectives and is founded in behavioral psychology?	Pedagogical Philosophy ⟷	Constructivist: Does it encourage metacognitive learning strategies, such as those based on previous concepts or schema?
Behavioral:	Underlying Psychology ⟷	Cognitive:
Sharply-focused: Are there clearly delineated goals?	Goal Orientation ⟷	Unfocused: Is self-discovery promoted?
Abstract: Is it 'removed from reality'?	Experiential Value ⟷	Concrete: Does it indicate relevance to the learner's world?
Didactic: Is the teacher's exposition of knowledge (such as a lecture) predominant?	Teacher Role ⟷	Facilitative: Does the teacher facilitate learning without controlling outcomes?
Teacher proof: Is the teacher input into 'instruction'?	Program Flexibility ⟷	Easily modifiable: Does the teacher participate in the development of programs that are flexible to change?
Errorless learning: Must the students learn until either they generate no errors?	Value of Errors ⟷	Learning from experience: Do students use errors as part of the learning process?
Extrinsic: Does motivation separate from the learner, (like the need to get an 'A'?	Origin of Motivation ⟷	Intrinsic: Does motivation desire to learn?
Non-existent: Since learning and knowledge are structure, is there accommodation of individual differences?	Accommodation of Individual Differences ⟷	Multifaceted: Is knowledge and learning presented in a variety of ways so that learners can utilize what most suits their preferences?



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BIOGRAPHY OF ANDREA EDMUNDSON

Andrea Edmundson has been a corporate educator, trainer and consultant for the past five years at Misys Healthcare Systems in Tucson, AZ, where she has been responsible for training employees and clients in a face to face environment and online, using a multitude of educational ICTs. She will be completing her doctoral dissertation, "The Cross-Cultural Dimensions of E-Learning", in November 2003 at Walden University. Prior to her corporate work, she was the Coordinator of Occupational Education at Pima Community College and a self-employed training consultant. As a consultant, she

has trained Peace Corps Volunteers, host country nationals and governmental and NGO personnel in over 15 African countries, Eastern Europe, the Pacific and in Haiti. In this article Andrea combines her international development experiences with her experiences the online environment in the hopes of creating a valuable tool for assessing educational ICTs.

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