

'Flexible Learning': Multiple Intelligence Theory & ICTs in Flexible Learning

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1: Abstract

Modern commentators write that the term 'flexible' in 'open, distance & flexible learning' refers to principally the flexibility of how teaching material is delivered/accessed, how a course can be taken as part of a varied programme, or from a variety of traditional and non traditional sources. Many of them comment that the modern use of the term 'flexibility' is associated with 'lifelong learning' in order to remain competitive in the workplace. *Flexibility* in this regard, is part of the language of *globalisation*. This paper argues that there should be a return to the pedagogical implications of flexibility in particular because of the emergence of modern information communication technologies (ICTs). ICTs are able to deliver learning materials in a number of different formats to suit the learning style of the particular learner. This fits in very well with a psychological theory called *Multiple Intelligences*. Examples give a clearer picture of this in relevant tertiary educational contexts.

2: Introduction

Hilary Perraton writes that the British Open University was a social political statement that tried to provide an alternative route to university education targeting particularly those aspects of society that would not find easy access to tertiary education (Perraton, 2000). As a fledgling university which tried to provide a 'open' structure, one of the defining features of such education was to provide quality education for people that could not attend a full time campus environment for the vast majority of their course. Of course such learning existed before in the shape of correspondence courses accredited by a more traditional bricks and mortar university. However, the Open University tried to embrace technology in the form of both modern print media, radio, and the emerging television sector as a way to provide additional learning environments to take the place of the traditional 'face to face' environments. Although commentators do not agree that the match is a precise replacement, 'Open Universities' became replaced more by the term *distance education* or *distance learning* and more latterly with the term *flexible learning*. One might argue that "what is in a name?" This paper argues that the name is embedded in the historical context of the time of its' most popular use, and has subtleties of meaning that have critical impacts in the way that courses are designed, run and evaluated.

The term *flexible learning* will be explored in greater detail in it's relationship to the *globalisation* phenomena that grips the *Zeitgeist* of the late 20th and early 21st century.

However, it will be argued that this forces us to ignore other, possibly original, interpretations of the notion of *flexibility*; in particular the idea of different access points to the same educational material - meaning different pedagogies rather than different technologies to access the same information. If this different use of the term *flexible learning* is combined with clearly defined learning criteria, it is argued a very powerful design paradigm emerges that may have a stronger role in deciding how *information communication technologies* (ICTs) can be usefully employed. Perraton has described ICTs in educational contexts, particularly in developing world contexts, as a technology

in search of a solution (Perraton, 2000).

This essay focusses on the university learning, because at some level it is possible to explicate what the purpose of a university education should or could be. This is not to claim in anyway that university education is in any way better or of greater value than other forms of tertiary education, or indeed any kind of education. Indeed, the same principles can still be applied to any educational arena and as will be later explained, the original psychological theory that is most relevant, actually has had more development in the primary and pre-school educational arenas. However, university education is where the most current exploration of ICTs has already occurred.

3: Flexible Learning

Most modern definitions of the term *flexible learning* are considered as one of a number of different venues which includes the term flexible. They are not always mutually compatible (Garrick, & Jakupec, 2000). There is also a temptation to think that flexible learning is analogous to open and distance education. Furthermore all these terms have covert assumptions of underlying educational and thus pedagogical philosophies. This section tries to flesh out the meaning of *flexible learning* in the broadest sense.

3.1: Flexible vs. Open & Distance Learning

Perraton (Perraton, 2000) distinguishes between 'open', 'distance' and 'flexible' learning in the main from their political discourse associated with each during the time of creation of the particular term.

Open Learning tends to be associated with 'post-Fordist' discourses and was a specific political response to education that allowed people to access higher education who normally would not have been able to access it, either because of their geographical situation, or because of their social situation (for instance forced into the labour market earlier on due to familial financial pressures. However, the 'open' side of the 'open learning' is not just about access, but in theory also allowing the learners to negotiate what it is that they would like to learn and how they feel they can be best assessed. In practice the pragmatics of this ideal are contestable.

Distance Education is historically associated with a 'Fordist' stance (Evans, 2000), most especially in the developing nations, but also historically in Anglo-Euro-American societies of the early 20th century when correspondence courses were a way for people trying to upgrade their educational qualifications having ostensibly started paid employment. Distance education since that time, has moved beyond the technology of print' and embraced modern communication technologies to try and achieve the goal of eliminating the barrier of distance. Starting off with one way broadcast channels radio and then television, it has developed into using ICTs to not only deliver 'print' and broadcast but even by being able to offer multi-channel asynchronous communication.

Flexible Learning encompasses a host of different meanings, but the most prevalent appears to be the association (rightly or wrongly) with the discourse on *globalisation*. This theme is explored in more detail in the following sub-section. The table below outlines the differences and similarities between the different learning styles.

	Defining Feature and/or Differences	Similarities across all/some modalities
Open	Social political move towards access & equity .	Open learning with an emphasis on 'access' meant that often 'distance education' was part of the educational 'strategy'.
	Online education encourages learning through dialogue.	the notion of the educational programme being 'open' means that it shares similarities with 'flexible' learning.
	Online education encourages learning through dialogue.	
Distance	Distance Education (especially in developing countries) has been driven by perceived national demand, rather than 'lifelong' learning philosophy.	overcoming distance and spatial distance problems is common in both Open and Flexible Learning.
	Utilise technologies to overcome distance/attendance barriers.	
	Enables large numbers of students to be accessed.	
Flexible	Modern discourse places it both as a result of, and a cause of globalisation .	flexibility of programme structure means some similarity with 'Open Learning'.
	Ability to be accessed through ICTs (time/space compression).	
	Much more emphasis on access to education 'on the job'.	
	Modular programme structures favoured.	advantages in being able to choose the time and place of study, shares the same positive benefits as distance learning.
	Global reach by high profile departments into the rest of the world	

Table 1: Differentiators and similarities between different learning philosophies.

Another way to consider this would be to think of a Venn diagram which has overlapping functionality between the different learning approaches, and yet contains enough differences to suggest that these terms are not synonymous.

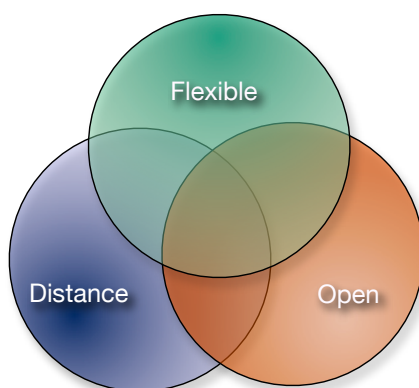


Figure 1: Distance, Flexible & Open Learning Venn Diagram with overlapping functions, methods and educational philosophies.

3.2: Flexible Learning & Globalisation

Many commentators have made the association between *flexible learning* and *globalisation* (Jakupec, 2000). That is associations of learning are made in a globalised economy where 'efficiency', 'scales of economy', 'competitiveness' and 'up-skilling' tend to be dominant buzzwords (Nunan, 2000; Kellner,).

The association of 'lifelong learners' is also made but not in the Jungian sense of personal growth, or indeed the same lifelong learners that underscored the 'open' learning movement - but in the economic and increasingly 'globalised' sense of remaining at a competitive advantage in the modern and every changing workplace .

However, it may not have started off that way. Thorpe (2002) for instance feels that the dominant features that were first introduced with *flexible learning* where those that in an ideal implementation, had student learning as an emphasis. Similarly Bottomley (2000) cites an unpublished paper from Deakin University whose author Calvert states:

"Underpinning principles [of flexible learning] include primary emphasis on student learning; catering for diverse backgrounds and learning styles of students; accommodating diverse learning environmental recurrent education as a lifelong process and the appropriate use of information and communications technologies to facilitate learning" cited in Bottomley(2000) p.98.

However, the strong association of *flexible learning*, *globalisation* and the relevance of the workplace as an alternative to the traditional monopoly of knowledge and learning, appears to be the norm for the moment (Garrick, 2000; Usher, 2000)

4: Multiple Intelligence Theory

Given the above conceptualisations of 'flexible learning', it seems surprising (for this author) that a strong association has not been made more prominently between *flexible learning* and a psychological/educational theory developed by Harvard developmental psychologist Howard Gardner, called the theory of *Multiple Intelligences*.

The theory of *Multiple Intelligences* (MI) made its debut on the international arena with Gardner's book *Frames of Mind* in 1983 (Gardner, 1983). Originally ignored by the developmental and individual differences (intelligence) psychologists, it was embraced by many educationalists as a way to understand learning-style differences between their pupils and students (Gardner, 1999; Gardner, 2006). The theory goes briefly something like this. Intelligence in this sense is defined by the bio-psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in that culture. Originally there were seven defined intelligences: logical intelligence - normally we would understand this as mathematics in its purest form; communication intelligence - or language; spatial intelligence - an ability to be able to know how things relate in space (or time) to each other; musical intelligence; kinaesthetic intelligence - an ability to know how one's body is moving through time and space, and indeed how to move it so; inter-personal intelligence - understanding other people very well; intra-personal intelligence - understanding one's self very well. Gardner never considered these seven to be an immutable set of categories (Gardner, 1999), but rather that at the time of writing, appeared to be the intelligences that helped individuals to 'process information ... to solve problems or create products of value'. In the late 90s he added a potential eighth intelligence - naturalistic or classification intelligence, which is the ability to understand the natural world, both in terms of classification and also in understanding ecological principles (Gardner, 1999).

Gardner (1991) provides an account of human cognitive development that suggests that each of us tends to have better abilities in some of the intelligences rather than all of them - in fact this was one of the defining features of the theory that went against the others stating that there was some sort of generic intelligence (or 'g'). Children appear to be pre-disposed to use one 'intelligence' to try and understand issues that fits more naturally in the realm of another. If this does not work, then the child may find difficulties in that particular realm. For instance, a child may have natural abilities in language and music intelligences. When the early primary pupil tries to grapple with mathematics, there is a possibility that the child can transfer some of the understanding of addition because of the properties of harmonics in music and is in fact able to 'translate' her understanding back to a teacher because of her language abilities. But if she cannot make this association, then of course she may not grasp her initial brush with mathematics leading to a self fulfilling set of circumstances that leads her to grow up believe that she 'cannot do maths'.

What may be of particular interest to ODFL course and programme designers, is the recommendations that Gardner proposes as learning institutions and/or agents (depending on how they are viewed). Gardner makes specific reference to *apprenticeships* as a valid way to guide children through their educational development which of course sits well with the theory of legitimate peripheral participation (Lave, & Wenger, 2002) and concern by the same designers with a sense of the *Community of Practice* (Guile & Young, 1998; Lankshear, Peters, & Knobel, 2002; Billet, 2002). Gardner also makes reference to the notion of 'living museums' as ways to give students multiple entry points that allows them to explore and genuinely learn a topic according to their proclivities of certain intelligence(s). This of course is very much the 'flexibility' of the pedagogical ideal in *flexible learning* that Nunan and Thorpe were describing (Nunan, 2000; Thorpe, 2002).

5: Can MI Guide ODFL Design?

Most of Gardner's writing has been concerned primarily education from pre-school to the mid teenage years. However, his starting point for the provocatively subtitled book *How Children Think & How Schools Should Teach*, starts off with the observations that graduate students across many disciplines have demonstrably NOT taught understanding, evidenced by the fact that when honour grade physics graduates from MIT or John Hopkins university are asked relatively simple questions such as which forces operate on a coin half way up it's trajectory when thrown straight upwards - then tend to reply with the same naive answers that a primary school child would¹. This is very much in keeping with personal observations of the learning styles that appear to predominate at the *University of the South Pacific* (USP).

USP is a regional university that has twelve participating Pacific island nation states, with three main campuses and a strong 'Distance and Flexible' learning arm which often has associate centres in each of the countries. Anecdotal evidence from employers in the region often states that a USP graduate is 'lost' without the boundaries set by a written assignment, along with associated text book and clearly identified library sources: clearly something that occurs rarely at best in the commercial and government worlds outside of USP.

1. Typically they answer that there are two forces operating, the initial force 'going up' and gravity 'pulling down'. The correct answer is in fact only one force gravity. Students are applying 'Aristitolean physics' rather than 'Newtonian'.

One of the innovative learning experiences that was tried at USP between 1996-2002, was a leadership simulation programme. In this students took on a variety of roles that not only simulated the leaders of the Pacific negotiating a communiqué on a particular issue of regional relevance, but also students took on the roles of technical advisors, journalists, conference organisers and advocacy groups. Between 50-110 students would take part in this annual event which had students from all disciplines within the university and even students from other national and international tertiary institutions taking part. No formal evaluation has taken place on this programme, but time and time again staff members would hear from the participating students that the multi-disciplinary nature of the programme meant that these students felt they were learning more in the simulation environment than they did in their combined formal course lectures. Many 'simulation alumni' have often communicated back that they still actively use the experiences that they had in the simulation for their current work. It could be argued that the simulation is the tertiary equivalent of a 'living museum' that Gardner refers to as a complimentary educational institution (1991).

The point being made here is that there is strong anecdotal evidence to suggest that a multiple entry point on learning topics as suggested by Gardner, is of just as much relevance to genuine understanding, as it is for the earlier school years.

5.1: ICTs as a tool to delivery 'flexibility' as defined by MI

As valuable as the leadership simulation was for the students, this does not easily translate to the vast majority of students who are studying at a distance. However, MI theory focusses on the principle of multiple access points as being the guiding principle that allows students the freedom to approach the learning material in a variety of different ways. As previously mentioned, this fits in well with the pedagogical conceptions of *flexible learning*. Whilst Thorpe has been critical of the implementation of the ideals (Thorpe, 2002), the increasing possible both dial up and broadband access is becoming a reality even for the Pacific region. ICTs then may provide a viable avenue for realising the pedagogical aims of *flexible learning* that fits well with MI.

5.2: Flexible Learning Through MI & ICTs: an example

It is taken as a given that the end goal of a USP graduate is to be innovative, creative (in their thinking processes) thinkers and planners in order to contribute effectively to helping solve the current problems the Pacific region faces. In fact the students that graduate from USP need to be 'flexible' in their thinking skills, the very attribute that Evans discusses with (2000).

5.2.1: University Teaching Goals for the Pacific Region

Small Island states in the Pacific region (i.e. not including New Zealand or Australia) are undergoing strong transformations with resulting tensions as the region transits from traditional to modern societies (Taylor, 2005). To cite some brief snapshots of the region: the ground fresh water lens of Kiribati's main island Tarawa, is polluted because of overpopulation; Nauru's island is now a moonscape due to the open cast mining of phosphate; ethnic tensions in Papua New Guinea, Fiji and the Solomon Islands has resulted in armed conflict and atrocities committed against people that appears to be a similar precursor to the bloodshed that is prevalent in the African sub-continent and within the Middle East region; there is serious debate that low lying atoll islands such as Tongatapu in Tonga, and Tuvalu, will vanish beneath a now acknowledged rising sea level within the next 50 years; the social ills of unplanned urban drift such as rising crime, depression, suicide and drug usage is all too visible in both Papua New Guinea and Fiji; the HIV virus has struck Papua New Guinea that shows similar infection patterns of the sub-Sahara Africa 10 years ago. There is no indication currently that the other

Pacific island nation states are learning appropriate lessons from the past, as STI rates and teen out of wedlock pregnancies continue to rise.

This is not the forum to discuss to what extent or why these problems exist, but it does throw into sharp relief that education has to play a critical role in avoiding the negatives aspects of societies in transition. In particular it is university education that is normally looked towards for providing tomorrow's leaders, pioneers and innovative thinkers for solving the problems of today and most likely exaggerated ones compared to those of today. For the moment this essay will not try to defend why this is necessarily so, except to note that if existing traditions or social mechanisms existed (not requiring University or similar training as outlined above), then they are noted for their muted voices on these issues; suggesting that they are ineffective, or unable to function as before. This approach to education falls very much in the vein of what philosopher Stephen Law has recently titled 'Liberal Education' (with the emphasis on a capital 'L'), to denote willingness to question ideas and actions, but mutual respect and acceptance of institutions, organisations or leaders right to continue the way they are (2006).

5.3: Research Skills at USP

One area that this author has been involved in considerably has been in the teaching of research skills, design and analysis for behavioural and biological sciences, from first year through to postgraduate and MBA student learning. The central function of appropriate research skills in a variety of scientific, social, behavioural and ethno-cultural contexts is apparent in being able to not only ascertain the relevant issues at hand, but also in being able to evaluate the success of any planned programmes and/or interventions planned. The changing nature of the different types of research that is required for the region, both social, scientific and commercial - means that it is not enough to simply give out formulaic strategies for research and analysis². Instead genuine understanding of issues is required to cope with the changing demands of the unique social and cultural situations that are occurring in the Pacific as mentioned above. The harsh reality though is that research skill courses taught at most Universities, are not enjoyed, either by the lecturer or the student because of strong perception that complicated mathematical techniques are required. It is normally a 'necessary evil' to be completed as part of a programme requirement. So to summarise:

- USP graduates are required to be innovative and flexible learners.
- Therefore they need genuine understanding of the principles of good design and research to be able to adapt to unique situations.
- Students are reluctant pupils of research courses, most of them being number shy, dread the thought of a research course that includes even the simplest mathematical computations for statistics.
- Experience from a Leadership simulation exercise, suggest that tertiary students gain much from having a multi-access point to a central topic being taught.

5.4: Five Access Points to Teach Research

Gardner (1991) has suggested that five entry points might be sought when considering a topic to be taught. The form nexus points of different intelligence configurations. The table below outlines how

2. Said slightly tongue in cheek, but the formulaic approach would be: try to put in the buzzwords *randomized stratified sampling*, along with the use of *Likert scales* if possible and always include an *ANOVA* in the analysis, preferably with a graph with *regression fit* somewhere in the title of the graph.

these approaches could be used to frame the course programme:

	Access Approach	Intelligences employed.
1	Experiential – the hands on 'get dirty' approach. Students go out, collect data, enter it and manipulate it and then try and interpret the results	kinaesthetic, inter-personal
2	Logical – the one that starts with axioms and draws conclusions based on rules of logic. Typically, research uses this approach which uses the 'no-nonsense' mathematical approaches.	logical/mathematics
3	Narrative – favouring an approach that is based more around analogies or story telling. Students are encouraged to consider the research as a 'story' which has a distinct beginning [typically the 'Introduction' of their formal report], middle [the methods and results section] and end ['discussion']. Students need to keep their 'story line' simple enough that they could explain the 'story' to an intelligent 15 year old.	language, interpersonal, intra-personal
4	Aesthetic – with an appreciated and sensitivity to artistic endeavours. This can be used both in terms of the aesthetic of 'design' or research (typically, how can one use design to get the same information with less effort – not the 'brute force' approach)	musical, spatial awareness, logical
5	Foundational – with a stronger philosophical approach using core defined values. Here the relevance of the research underscores the notion that research is but a 'tool' to answer significant questions: has crime really gone up; is there a market of boutique tourist development; is the Pacific sedative root crop <i>kava</i> really dangerous to your liver; has the quality of life index increased, decreased or stayed the same in the last decade?	inter-personal, language

Table 2: Five different access points to access a teaching topic.

These are probably not the only approaches that could be used but they do provide a starting point. Indeed, one can see that there are other intelligence profiles that could be put together as a way to stimulate the teacher to present the material in novel ways.

Perhaps as importantly, providing a multiple accessed point into the topic may allow students to try any number of them, to provide a fuller and more holistic picture of the research skills required. This author has used most of these approaches, however, they can only be used one at a time. There simply is not the time to provide all five approaches in the conventional face to face approach. ICTs on the other hand may provide a viable way to present relevant five approaches simultaneously.

So an ideal would be that a *flexible learning* approach using ICTs would have the topic of research (say) presented with an entry point that asked students to chose whether they thought they were more 'narrative' or 'foundational', or 'logical'. Or indeed there could be a separate branch that asked students a few choice questions the first time they use the system, and from this there is a suggestion that they might use a particular entry access point to the topic. Students enter a chosen access point where the relevant information is presented in a manner that is more conducive to their pre-disposed way of understanding the world. The *aesthetic* might be presented with an illustrative and well crafted graphic data presentation to get them 'hooked' into understanding the power of research; the *foundational* student starts with the bigger overall picture that defines the need for research to understand, and subsequently guide policy; the *logical* student would (and currently does) approach the topic through a more mathematically minded approach.

6: MI & Current ODFL Design Theories

One area of overlap between MI theory and an oft cited theory of learning with respect to flexible learning environments, is that of *legitimate peripheral participation* (Lave, & Wenger, 2002) which had its origins in the study of apprenticeships. Gardner has identified the apprenticeship model as a specific learning environment which should be embraced with respect to MI theory (Gardner, 1991). True Lave & Wenger were not advocating apprenticeships as a model of learning, but rather as a way to understand how learners become experts in a field. Nevertheless, one must posit that if this is how learners do in effect learn, then should this not be something that is actively promoted? Certainly this appears to be the intention of many ODFL commentators (Brown & Duguid, 1996; Morgan, Russell, & Ryan, 2002; Lea, & Nicoll, 2002; Billet, 2002; Wegerif, 1998).

6.1: Massive Multiplayer Online Role Playing Games

One arena (pun intended) that appears to have slipped under the radar in ODFL discussions in terms of being a viable learning route that appears to be flexible, open and can employ a variety of different 'intelligences' to achieve an end goal, is in the online recreational game playing phenomena. The quasi-official title is *Massive Multiplayer Online Role Playing Games* (MMORPGs) that sprung out of the 'multi-user dungeons' textual network gaming platform in the very early days of networked computers. With strong graphical elements allowing users to 'see' and 'interact' in a virtual world that includes seeing a first person perspective, or that of themselves as a chosen avatar. The interesting thing about these virtual worlds is that there is something of a learning curve, but there is strong peer support to provide new gamers access into the world. Furthermore, the MMORPGs encourage team play so that players must co-operate often in their virtual identities, they have different skills or attributes to bring to the game play. One of the most popular is called *World of Warcraft*³, or *Guild Wars*⁴. The nomenclature of the latter evoking the apprenticeship phenomenon. Players take on personalities that have certain value, such as strong fighting skills, or far stronger powers to cast magical spells. These are team combat scenarios with players learning to utilise their 'powers' in a co-operative way to defeat other teams, or computer controlled foes. The modern games can allow team members to converse and strategize in real time during game play. Learning how to play and how to work as a team is of course a skill learnt like any other. back to the

One MMORPG of particular interest to education is called *Second Life*⁵. This is not so much a 'combat game' with specific goals, but rather it is a simulation of a world. In this world things can be built by players, there is a currency in this game which can even be exchanged for 'real' money. Some players are earning 'real' money by building items (games and even 'clothes' or 'skins' for the avatars for example). The creators of the game consider it to be a social experiment to see if things can be learnt in this world that could potentially help or be translated into our non-cyber 'real' world. If this all starts to sound like science fiction, it certainly has not put off recent research in the direct educational possibilities that *Second Life* can bring. Childress & Braswell (2006) report on their attempt to utilise the special educational spaces set up in *Second Life* which had their students taking a course which required them to enter a special 'building' containing three floors. The first was

3. <http://www.worldofwarcraft.com>

4. <http://www.guildwars.com>

5. <http://secondlife.com>

instructional guides to using the *Second Life* environment. The second floor was specifically for their course work, including live chats with their tutors and their peers as well as outside links to the web and instructional videos. The final floor was a coffee lounge floor for socialisation - that is socialisation within the simulated reality of *Second Life*. Although no formal evaluation was done on the effectiveness of the instructional mode Childress & Braswell feel that:

Combined with this increased realism and interactivity will also be innovative teaching models and new ways of learning. These innovative models will most likely address critical thinking and problem-solving, and will be based upon real-world, highly social learning experiences. Advances in artificial intelligence may well promote the integration of pedagogical agents (learning agents) into the teaching/learning models; agents that will customise materials for each learner, based upon the learner's own individual needs. (Childress & Braswell, 2006) p. 194.

Of course this kind of enthusiasm for technology overcoming the problems of access to traditional face to face teaching has been touted with broadcast, television and of course ICTs as we understand them now being email and web page access but without a resounding revolution in the quality and desirability in distance and flexible learning (Perraton, 2000). However, MMPORGs may suggest avenues in which ICTs can indeed deliver an alternative to face to face teaching and learning because of the strong social elements that can occur within these environments. One suspects that a significant (but not total) proportion of the missing social issues neglected in ICT usage (including ODFL) that Brown & Duguid so eloquently highlight, could be at least partially addressed in this environment (Brown, & Duguid, 2002). Certainly it is not uncommon to hear of significant social relationships and friendships being formed through intense immersive MMPORGs. However, more MMPORGs do suggest that ICTs are slowly coming of age where significant educational opportunities exist which tap in more to the MI approach that Gardner espouses.

7: Conclusion

It is easy to get caught up in the Zeitgeist of an era which states that *flexible learning* the discourse is primarily about issues to do with *globalisation*. But the theory of MI is an exiting psychological addition that concerns itself primarily with the pedagogical implications of *flexibility*. It appears to embrace ICTs as a viable tool to provide multiple avenues for students to access genuine learning opportunities, rather than the accusation that Perraton makes of ICTs are potentially a "... medium seeking a role." (Perraton, 2000) p. 147-148 (strictly he was speaking about satellite technology in this quote). One arena that appears to already offer rich avenues for 'access' to learnt material is in the new and emerging field of very large interactive graphic games, or MMORPGs. This would appear to be exiting times for considering design of ICT material to support effective learning in current ODFL courses.

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