

Title: Digital wisdom in the 21st Century (Sharing by Norman Kee – 30 August 2012)

Synopsis

All children, including with children with autism are naturally drawn to the digital media. Somehow, the millennial generation and digital natives are able to intuitively comprehend and traverse the overwhelming data and information of the digital age. Amongst them, are the engaging and ever evolving video games that capture not only their attention but also their ability to cognitively make sense and win the games with certain success. The current talk focusses on how parents can harness the learning from video games for the learning of cognitive skills needed in formal curriculum

Notes.

What is Digital Wisdom? Why Bother? (Prensky, 2012a,b)

- Digital wisdom is a term coined by Marc Prensky (2012a) “*for integrating the technology of our times into our thinking and decision making, doing it wisely, and sharing the results*” (p.47).
- “*Today’s humans, when enabled by today’s latest technologies, can do more, think faster, plan better, analyze more deeply, solve more difficult problems, make better decisions, and even know their own bodies far better than ever before. This to me, is clearly brain gain.*” (p.9)
- Technology is pervasive and tightly meshed into our tools for working, living and leisure.
- 21st Century is characterized by variability, uncertainty, chaos, and ambiguity and by increasingly accelerating change (Prensky, 2012b)
- Adapting to this new context is the biggest challenge to all educators which requires digital wisdom.
- Our children are living in the 21st century where “The problem of tomorrow cannot be solved with the minds of yesterday.”(Prensky, 2012a, p.12)

Why Video Games? (Kee, 2009)

- Natural attraction
- Fun
- Very engaging
- Digital Natives/Digital Immigrants
- Develops Reflective Thinking
- Passion of many children and adults
- Meaningful learning (active, constructive, cooperative, authentic, intentional)

Teaching cognitive skills using video games to children with high-functioning Autism

I have observed that my three adolescent sons with autistic spectrum disorder (ASD) to varying degrees, are able to play and achieve some level of success with Nintendo DS and Nintendo WII games, without the need to first read the game manual or refer to game hint books, which I will normally need to before I play. Their interest and perseverance in some games of interest have

led them to intuitively not only discover the properties, rules and procedures that must be mastered in order to become a “player” (Rosas, Nussbaum, Cumsille, Marianov, Correa, Flores, Grau, Lagos, Lopez, Lopez, Redriguez & Salinas, 2003) but also to win the games, perhaps learning more through situated cognition (Wilson & Myres, 2000) of the complex environment of the games than from behaviorism.

Potentially, ASDs people could improve and hone their fine psychomotor skills and eye and hand coordination skills.

People with autism do not have impairment in their understanding of physical causality, and may even be superior relative to mental-age matched controls (Baron-Cohen, cited in Wakabayashi, et al., 2007). Thus there is a need to provide ASD children with learning environment that interest them, with affordances of cause and effect (or immediate feedback) that not only sustains their interest but also have the criteria that brings about meaningful learning (Jonassen, et al., 2003).

Why COTS video games?

Video Games (computer programs) are based on logic → Causality (No impairments in ASD)

Two Paths of Harnessing

- Path 1: Harnessing existing knowledge learnt in video games for generalization to other contexts (e.g. buying in game to buying in real life context) (Mediation of transcendence)
- Path 2: Harnessing existing knowledge learning in video games for further advancement.

Familiarity with Game Context (& Winning)

Input → Elaboration (Process) → Output

Input Phase (Gathering of Information) (Mentis, Dunn-Bernstein & Mentis, 2008)

1. Perception (Clear OR Blurred and Sweeping)
2. Exploration of a Learning Situation (Systematic OR Impulsive)
3. Receptive Verbal Tools and Concepts (Precise and Accurate OR Impaired)
4. Understanding of Spatial Concepts (Well developed OR Impaired)
5. Understanding of Temporal Concepts (Well developed OR Lack of or impaired)
6. Ability to Conserve Constancies (Well Developed OR Impaired)
7. Data Gathering (Precise and Accurate OR Impaired)
8. Capacity to Consider More than one source of information (Well developed OR Impaired)

Elaboration Phase (Processing of gathered information) (Mentis, Dunn-Bernstein & Mentis, 2008)

1. Definition of the problem (Accurate OR Inaccurate)
2. Select Relevant Cues (Ability to OR Inability to)
3. Engage in Spontaneous Comparative Behavior (Ability to OR Inability to)
4. Mental Field (Broad and Wide OR Narrow and Limited)
5. Spontaneous Summative Behavior (Need for OR Impaired Need for)
6. Project Virtual Relations (Ability to OR Inability to)
7. Logical Evidence (Need for OR Lack of Need for)
8. Internalize Events (Ability to OR Inability to)
9. Inferential-Hypothetical Thinking (Ability to use OR Inability to use)
10. Strategies for Hypothesis Testing (Ability to use OR Inability to use)
11. Planning Behavior (Need for OR Lack of)
12. Elaboration of Cognitive Categories (Adequate OR Impaired)
13. Grasp of reality (Meaningful OR Episodic)

Output Phase (the communicating of the outcomes of the two preceding phases) (Mentis, Dunn-Bernstein & Mentis, 2008)

1. Communicating Modalities (Mature OR Egocentric)
2. Output Responses 1(Participatory OR Blocking)
3. Output Responses 2(Worked Through OR Trial and Error)
4. Expressive Verbal Tools (Adequate OR Impaired)
5. Data Output (Precise and Accurate OR Impaired)
6. Visual Transport (Accurate OR Impaired)
7. Behavior (Appropriate OR Impulsive or Acting Out)

Example:

1. Perception (Input) [Critical and Inventive Thinking]
 - a. The cognitive skill of perception requires the child to be able to observe and abstract relevant details from the context needed for a particular task.
 - b. In school, lack of perception shows itself as inability to understand questions, as question details are not abstracted to make sense. This may be a problem if child with ASD also have short attention span as in Attention Deficit Hyperactivity Disorder.

Path 1: Harnessing existing knowledge learnt in video games for generalization to other contexts

Example:

Game context : Before throwing the fishing line, you will need to know (a) whether there is fish in the river and also (b) where is it in the river. [Critical and inventive thinking]

Formal context: Before working on your question, you will need to read the instructions first to know what you need to do and also where to write your answers. (Mediation of transcendence)

4. Understanding of Temporal Concepts (Input)

- This involves appreciating the sense of dynamic nature of happenings around us and its transient nature, which is certainly abstract.
- Students in school who face this problem are not able to tell “today” from “tomorrow” or “yesterday” and generally cannot understand or appreciate school time schedules.

Path 2: Harnessing existing knowledge learning in video games for further advancement.

Example:

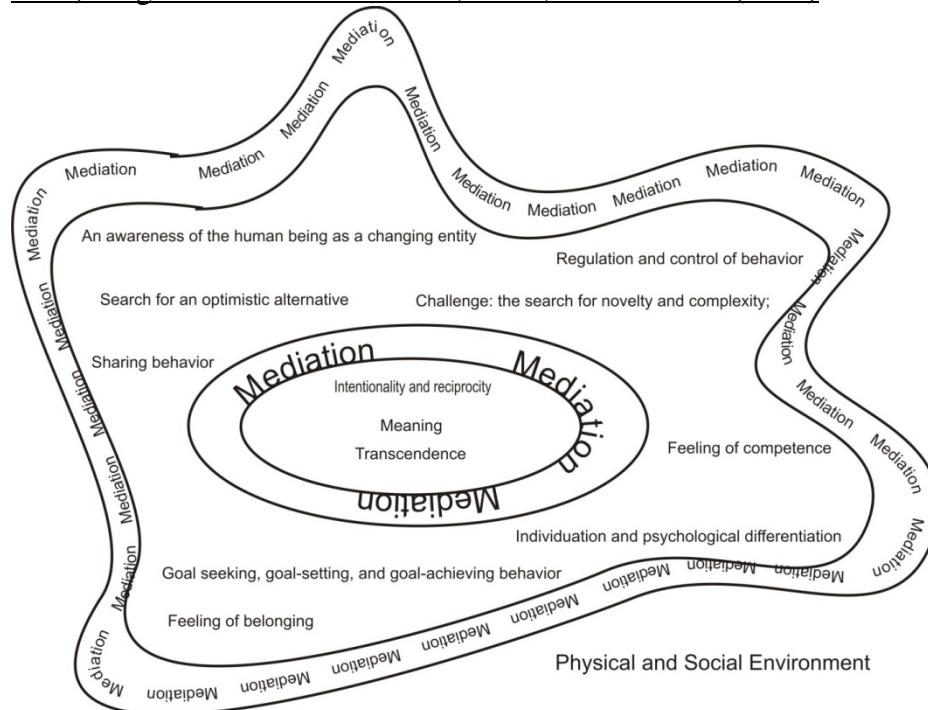
Game context : Changing the game date and time allows gamer to see Beagle slider anytime during game play [Critical and inventive thinking]

Formal context : Changing assumptions used in solving problems allows one to solve a problem. For example, let A be the unknown quantity you need to find out.

Harnessing Existing Knowledge :Appreciation of Complex Environments and Functions from Game Play.

“Through games such as “Animal Crossing : City Folk”, he begins to appreciate societal functions and responsibilities, such as the need to work for “bells” to pay up his house mortgage, to buy furnishing to improve his house, as well as the feeling of success by donating “bells” for society improvement projects with claps and acknowledgement from other avatars

Mediated Learning Experience (Modified using Amoeba Organism Metaphor).(Kee & Chia, 2011) Original Source : Feuerstein, Klein, Tannenbaum (1999)



Below is an example of how mediation may be carried out: (Kee & Chia, 2011, 121 – 123)

Step 1

1. Select Video Game (e.g. Animal Crossing on Wii)
2. Observe a subject in game play (e.g. shown intense interest to harvest pears, coconuts or fishing to sell to Tom Nook for bells and buy some of his shop's goodies)
3. Deliberate on opportunities to mediate learning or zone of proximal development (ZPD). (e.g. ability to repeat activities of collecting fruits, sell fruits and thereafter purchasing goods of his interest, suggesting readiness to construct the concept of work in society)
4. Plan lesson dynamically focusing on process of learning.

Step 2: Mediation of Intentionality and Reciprocity (example)

1. Dynamically assess about the subject's readiness to engage in conversation about his activities.
2. If ready, praise the subject that he is making a lot of bells and becoming rich enough to buy a lot of goodies. Check for his response.
3. If the subject reciprocates positively, attempt mediation of symbols used in society for the activity (e.g. I see you are working very hard, collecting fruits to sell to Tom Nook for bells. Daddy is also working, teaching and writing papers in NTU to earn money. Use more examples, so that the subject becomes familiar with words, commonly used to describe the activity)
4. If the subject responds positively to selection and framing of the activity to focus, move on the mediation of meaning.

Step 3: Mediation of Meaning

Goal: Dynamically encourage the subject to use words like work, job, earnings, salary in his activity so as to allow multiple opportunity to associate words with activity for construction of meaning in doing.

1. Praise the subject that he is making a lot of bells and becoming rich enough to buy a lot of goodies.
2. Check for his response.
3. If the subject reciprocates positively, attempt mediation of symbols used in society for the activities (e.g. I see you are working very hard, collecting fruits to sell to Tom Nook for bells. Daddy is also working, teaching and writing papers in NTU to earn money.)
4. Use more examples, so that the subject becomes familiar with words, commonly used to describe the activity. Eventually, check to see if the subject could independently use the introduced words in context of activity.

Step 4: Mediation of Transcendence

Goal: Promote the generalization to settings beyond the game activity

Possible Strategy: Use of analogy through token economy through use of information in Tables 2-5 below.

Table 2 (Source: Kee & Chia, 2011, p.122)

Virtual World (bells currency)				Home World (stars currency)			
Job	Activity	Goods/Service	Unit Price	Job	Activity	Goods/Service	Unit Price
Farmer	Harvest	Pears	100	Laundr y-man	Wash clothes with washing machine		Clean set of clothes
Farmer	Harvest	Coconut	500	Laundr y-man	Iron clothes		Ironed set of clothes
Fisher-man	Fishing	Type A	300	Cleaner	Sweep floor		Cleaned floor
Fisher-man	Fishing	Type B	1500	Cleaner	Mop floor		Mopped floor

Table 3 (Source: Kee & Chia, 2011, p.122)

Virtual World (Tom Nook's Shop)		Home World (Home Shop)	
Item	Unit Price (bells)	Item	Unit Price (stars)
T.V. Set	3000	Hamburger sweet	5
Washing Machine	2000	Kit Kat	20
House Mortgage	200000	Nintendo DS	10000

Table 4 (Source: Kee & Chia, 2011, p.122)

Food Court (Tiong Bahru Kopi Tiam)				Food Court (Tiong Bahru Kopi Tiam) - Extension			
Job	Activity	Goods/Service	Unit Price (\$)	Job	Activity	Goods/Service	Salary (\$)
Chicken rice stall owner	Selling	Chicken rice	3.50	Chicken rice stall owner	Selling	Chicken rice	3500
Drink stall owner	Selling	Coke	1.50	Drink stall owner	Selling	Coke	3000

Table 5: Possible Extensions of Learning Table 2 (Source: Kee & Chia, 2011, p.123)

Concepts	Examples
Profit – Loss	Development of strategic thinking (example : Growing more coconut trees instead of pear trees as each harvested coconut fetches more bells.)
Opportunity Cost	
Addition	
Multiplication	How many coconuts do I need to sell to buy the grandfather clock at 3000 bells?
Productivity	
Entrepreneurship	Development of altruism (Example : Donating fossils found to the museum for the benefit of all in the town to preview)

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