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PANDEMATHEMATICA APPROACH: MATH LEARNERS PREFERENCES

MA. CHONA S. RIZADA, PhD
Dean – Graduate School, Palawan State University, Puerto Princesa City, Palawan.
Corresponding Author email: chonarizada@yahoo.com / ma.chonarizada@yahoo.com

Abstract

This paper presents the learning preferences in mathematics courses during pandemic, their attitudes and academic performance using digital and technologically enhanced learning process. The objective of this study is to determine the learning preference of college students in their mathematics classes. This study used qualitative and quantitative methods of research that involved 82 college students taking mathematics courses. The results show that mathematics students learnt with 5 R's during pandemic learning styles this includes research based learning (RBL), relevance learning (ReL), rationalized learning (RaL), Relax learning environment (RLE) and rapport oriented learning environment (ROLE). In general, these pandemic learners preferred to learn with a fun and dependent on the technology available today they call it digital learning. The pandemic mathematical learning styles is recommended in teaching mathematics courses.

Keywords: *pandemathimatica, Math learning preference, learning style, math learners, pandemic learners.*

1. INTRODUCTION

The digital learners are said to be computer wizard generation (Lancaster & Stillman, 2002). , also known as the Net Generation those have been raised in an era of instant access (Coomes & DeBard, 2004; Lancaster & Stillman, 2002). Their learning preferences are through multi-media; their form of communication is text messaging, chatting using mobile phones. They preferred to use the web- based tools such as the internet, online courses, online journals, and downloads. The attitudes of millennial generation student's style of learning use, preferences resulted to acquiring and retaining knowledge easily.

The teacher who taught this digital student has been concerned with if and how his or her students are learning the material (Marías, 1970; Smith & Clurman, 1997).

The digital pandemic learners have a more global orientation and understand the need for interconnectivity in the worldwide market (Alch, 2000). Millennia's are part of a generation merely depends on technology (Pelton & True, 2004). That has experienced real-time games and reality television MTV, (music video), which has been around all of their lives (Coomes & DeBard, 2004).

The pandemic digital is techno-wizard, techno- fluent, technologically dependent (Lewis, 2003; McGhee, 2006; Zemke, Raines, & Filipczak, 2000). millennia's owned technological and digital gadgets such as laptops, iPods, mobile phones and other high-end devices on which primarily used in their learning (McCasland, 2005, p.8).

The digital learners are dependent on cell phones, and other communication digital

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technologies (McCasland, 2005). Technological connectivity through text, messaging, chatting, group chat, web conferences, blogging and video game, e-mail, instant messaging and chat rooms where they are critically active (Cox, 2004). Digital learners are accustomed to relating and collaborating with others through technology. They like teamwork, but they prefer to work together and collaborate in teams with their generational peers (Lancaster & Stillman, 2000; Skiba, 2006). Also described as self-reliant and independent, millennia's are known for their ability to create with technology (Marston, 2005; Martin, 2005). Digital learners communicate via technology (Murray, 2004, p. 106).

This digital generation concern about the effects on their learning process they used to study in front of TV, phone calls, while exploring, eating, and talking as well (Frand, 2000). Routine multitasking behavior may have shortened their attention span and caused them to lack critical thinking skills and introspection (Murray, 1997). Digital technology plays a vital role in the young people learning the process which advanced compared to adults in using this tools (Trei, 2006, p.2). In the next years, this generation thinks, behave or act differently, or expecting different things because of this digital learning (Trei, 2006, p.1). Approximately higher than two-thirds young adults use instant messaging and play video games (Trei, 2006) – an absolute indication of changed attitudes towards learning and interaction.

2. METHODOLOGY

This study will address the questions regarding the learning preferences of the Millennial. What are millennia's preferences of learning methods? Which teaching format is preferred? How do they try to improve their knowledge? Student's mathematics courses were invited to participate in a survey. Approximately 82 students take part in the study. The survey response of the 82 surveys returned. The respondent's reaction includes the demographic data of the interviewees and their perceptions and experience in learning during pandemic online classes. The survey instrument focused on college students' preferences of learning, specifically for an active learning process.

The sample also only included those digital learners in the advanced stages of education, an opportunity not available for all students. Within this cohort, there are still some "have not's" regarding the access to technology (Brownstein 2000). The study also only reached those with Internet access. Web based surveys may not get the responses from those who are not comfortable with technology (Shannon, Johnson, Searcy & Lott, 2002).

3. RESULTS

Of the 82 respondents, 44 were female, and 38 were male. This disparity is not surprising considering the demographics of the school; only about 39% of students are male. To answer the question: What study methods help you to understand a course topic better? Students show that listening to recorded lectures dominates among strongly agreed on research methods, adding notes in class to printed PowerPoints

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slides were approved by the majority, typing notes in a class in power points disagreed and reading materials before class is firmly opposed.

Table 1: Study methods of the pandemathematics math Learners

What study methods help you to better understand a course topic?				
	Strongly agree	**Agree**	**Disagree**	**Strongly disagree**
Typing digital notes in class	(20.83%)	(27.78%)	**(36.11%)**	11(15.28%)
Adding notes in class to printed PowerPoint slides	(27.78%)	**(34.72%)**	(26.39%)	(11.11%)
Typing notes in class in PowerPoint slides	(25.00%)	(25.00%)	(34.72%)	(15.28%)
Reading the digital material before class	(13.89%)	(27.78%)	(11.11%)	**(47.22%)**
Reading the digital material after class	(20.83%)	(22.22%)	(30.56%)	(26.39%)
Listening to recorded lectures/videos	**(34.72%)**	(25.00%)	(20.83%)	(19.44%)

To answer the question what types of electronic resources do you use for your assignments?" social media like you tube , virtual classrooms and websites for group chats and video conferencing were rated as frequently used others were seldomly used such as e-books, e-journals, emails, blogs/wikis. Wikipedia.

Table 2: Preferred Electronic resources of pandemathematics math Learners

What types of electronic resources do you USE for your assignments?						
	Strongly agree	**Agree**	**Disagree**	**Strongly disagree**	**Mean**	**Remarks**
E-books	20	20	22	20	2.68	Seldom
E-journals	22	20	20	20	2.58	Seldom
E-mails	21	21	20	20	2.69	Seldom
Web sites (groups chats/ videos conferencing)	21	41	10	10	3.10	Seldom
Blogs/wikis	22	27	23	10	2.61	Seldom
Virtual classroom	**67**	**10**	**3**	**2**	**3.82**	**Frequently**
Wikipedia	30	22	15	15	2.99	Seldom
Social web (You tube)/	**70**	**5**	**5**	**2**	**3.920**	**Frequently**

The mean of 4.92 was noted for "always used" Facebook, social web applications (4.66), and YouTube (4.59) while Google meet (3.75), Wikipedia (3.64) were noted most often used and Myspace, online library, and other sources were noted as sometimes used. An additional item reiterated the preferences of Google and "other" search engines over library resources when asked how an information search started.

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What types of electronic resources do you USE for your assignments?							
	Always	**Most often**	**Sometimes**	**Rarely**	**Never**	**Mean**	**Remarks**
Online Library	**17**	20	21	17	7	3.32	sometimes
Google meet	26	24	18	6	8	3.75	most often
Wikipedia	22	22	26	7	5	3.64	Most often
Social web applications	**25**	**25**	**23**	**7**	**2**	**4.66**	**Always**
Facebook	**69**	**6**	**5**	**1**	**1**	**4.92**	**Always**
Myspace	13	11	15	31	13	2.72	sometimes
You tube	**47**	**21**	**8**	**4**	**2**	**4.59**	**Always**
Other sources	26	14	15	19	8	3.43	sometimes

Google was again the most used starting point followed by “other.” As Wikipedia was not included, it is possible that “other” included Wikipedia which one respondent wrote in as an answer.

For the item regarding preferences of learning course material, the majority of the 82 respondents strongly agreed (42.9%) and agreed (42.9%) with preferring PowerPoint slides along with lectures. Collapsing strongly agree and agree on categories and strongly disagree and disagree categories, other learning method results were:

I learn from video clips that relate to the class material. (86.8% agreed, 13.2% disagreed)

I like a mixture of activities using Technologies in a large class (91.3% agreed, 8.7% disagreed)

Having to solve problems in class helps me learn the course material using math application software's (92.3% agreed, 6.8% disagreed)

I prefer lecture as the format of class instruction (47. 3 % agreed, 62.6 % disagreed)

I consider class discussion in small groups with other students to be a valuable way to learn the course material using online chat groups/ technologies. (63.6% agreed, 16.4% disagreed)

I think doing group work in class is a valuable way to learn material such as the game based solving. (72.3% agreed, 27.8% disagreed)

I think frequent quizzes over the reading or assignments are a good idea in the form of games (80.2% agreed, 19.8% disagreed).

Interestingly, solving problems in class, a mixture of course material and preferring regular exams with a variety of ways to earn grades ranked in the 90th percentile. The lowest ranking (62.6%) of the items was for the lecture as the format of class instructions but still agreed by the other respondents. Having to solve problems in class helps me learn the course material using math application software's (92.3%) was a majority as highly ranked as others.

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How important methods of study were perceived to improve their learning of course material was asked by the following item in Table 3 below Table 3. Important methods of study were perceived to improve their learning of course material.

Table 3: Important methods of study were perceived to improve their learning of course material

	Very Important	Important	Somewhat Important	Unimportant	Mean	Remarks
Dyad	5	10	18	39	1.74	Somewhat Important
Peer tutoring	18	14	19	21	2.40	Somewhat Important
Minute paper	9	19	12	32	2.07	Somewhat Important
Lectures	3	20	23	26	2.00	Somewhat Important
Discussion	10	14	16	32	2.03	Somewhat Important
Game based Learning	**20**	**26**	**18**	**8**	**2.81**	**Important**
Take home Test	5	14	18	35	1.85	Somewhat Important
Web group discussion	**10**	**25**	**21**	**16**	**2.60**	**Important**
Online chat	**15**	**24**	**21**	**12**	**2.58**	**Important**
Online based learning	**25**	**22**	**15**	**10**	**2.86**	**Important**
Team Based Solving	16	18	20	18	2.44	Somewhat Important
Problem based Learning	16	20	18	18	2.47	Somewhat Important

Online based learning (2.86), game based Learning (2.81), web group discussion (2.60) and online chat (2.58) were rated as important others were rated as somewhat important. However, lectures, Discussion and Minute paper methods were ranked as the lowest among the rest. This could be the result of the efforts of the student using the material and the design and method of the material itself.

The students learn with 5 R's for millennial learning styles, Techno-literacy is the preference of the millennial students in learning mathematics which they preferred rapport oriented learning environment (3.33) wherein they like instructors showing personal interest in their most preferred learning styles and easy to be with, they hate terror teachers; Relax learning environment (3.13) which is usually fun; research based education (2.96) ; Rationalized learning (2.86) , wherein less authoritative background teaching environment; and entertaining; and relevance learning(2.69) which are aces at "searching " and discovering information.

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5 R's	Mean	Remarks
Research based Learning	2.96	Preferred
Relevance Learning	2.69	Preferred
Rationalized Learning	2.86	Preferred
Relax Learning Environment	3.13	Preferred
Rapport Oriented Learning Environment	3.33	Preferred

4. CONCLUSIONS

The results of this study indicate there many uses of technology, such as typing notes in class and searching online during pandemic is useful however, the challenges is the internet connectivity. It is still interesting to see that in a school where laptops and internet connections are required of students, it is a small percentage for typing notes. As for research, the low percentage of scholarly research sites is a concern. In the 2007 study, Millennial students used Google frequently and thought Google a more useful tool than those provided by the library and often used Wikipedia for assignments. (Nicholas & Lewis).

The mathematics students learn with 5 R's for millennial learning styles; they most preferred to use technologies in solving mathematics problems using web application tools available in the internet and easily get bored with the traditional and conventional way of teaching mathematics. Pandematimatica or use of techno literacy is the preference of the students during pandemic in learning mathematics which they preferred research based learning, relevance learning which are aces at "searching " and discovering information; Rationalized learning , wherein less authoritative environment teaching environment; Relax learning environment which is usually fun and entertaining; rapport oriented learning environment wherein they like instructors showing personal interest in their most preferred learning styles and easy to be with, they hate terror teachers.

Teaching methods will have to adapt to engage and educate this generation continually. Their interest in multimedia is shown by their answer of favoring PowerPoint's in classes. But does that just add entertainment and prevent discussion or problem-solving. There was an indication that these respondents did value group work, problem-solving and case analysis. But does the preference of more testing indicate short term memory and not retaining the knowledge of future needs and analysis. In general Pandematimatica an interesting techno literacy preferences of the students.

5. RECOMMENDATIONS

There are some opportunities for future research about this generation and their learning preferences. Indeed, a larger sample could be used, and yearly comparisons could yield more information. An assessment of learning could be measured. Relation to other generations and faculty attitudes as well as the personality of the participants and gender differences could be discerned. This kind of learning is one that should be investigated. Web sites may become more familiar with learning methods. Just as E-learning has shown cost savings for workplaces (Macpherson, 2004), educational

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institutions may recognize a benefit both financially and in student learning through new technological methods. Educators and managers will have to adapt to new means of engagement to attract and retain the millennial students and workforce.

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