Assessing differences in learning styles: Age, gender and academic performance at the tertiary level in the Caribbean

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The purpose of this research was to examine the differences in students' learning styles based on age and gender, and the relationships between learning styles and academic performance in a Caribbean tertiary level institution. The paper sought to make a contribution in the literature related to measuring student learning styles, including a focus on the learning styles of millennials and the relationship to factors that affect performance outcomes. The exploratory study incorporated both qualitative and quantitative data collection methods, that is, use of both a questionnaire and 3 focus groups. A purposive sample included students from a Caribbean tertiary level institution. 670 useable questionnaires were returned directly to the researcher by the participants for a response rate was 63% comprising 163 males (24.3%) and 507 females (75.7%). millennials comprised the majority of the sample totalling 509 participants (376 females and 133 males). Statistical analyses included t-tests, ANOVA and multivariate regression. The findings suggest that Collaborative learning was the most preferred learning style based on the mean scores of Grasha-Riechman rating norms. The results of t-tests indicated significant Gender differences on dependent, participant, independent, and competitive learning styles. There were significant age differences for participant, collaborative, independent, avoidant and competitive. Independent and Avoidant learning styles were significant predictors of students' academic performance. Students with more predominant Independent learning styles reported higher Grade Point Averages (GPAs), whereas students with more predominant Avoidant learning styles reported lower GPAs. The paper concludes by suggesting that more consideration needs to be given to teaching styles that match students' learning styles, especially the millennials and the need for further research.

Keywords: Learning Styles, Millennials, Age, Gender, Academic Performance

Introduction

Traditional modes of delivery in classrooms and lecture rooms are being challenged by educators and educational researchers, as they seek to significantly improve the quality of the process of teaching and the outcomes that are expected from such activities (e.g. Skiba and Barton, 2006; Banning, 2005; Prince, 2004). Effective teaching can be achieved through teachers having a better understanding of the

students of this generation's interests, values and perceptions (Rich, 2008). Varying theorists and educators have explored students' teaching and learning preferences in the classroom and this has led to a body of research on students' learning styles, patterns and strategies, and some studies contend that students' academic achievements are highly related to their learning styles (Burton-Edwards, 2016; Hamidah, Sarina & Jusoff, 2009; Joseph, 2013; Yi, Hui & Jasmine, 2011; Shankar, et. al., 2014). Burton-Edwards (2016) and Shankar et. al. (2014) collected samples from Caribbean organisations utilising the VARK instrument. Some studies have highlighted other variables which they posited are better indicators of learning than mainstream learning style variables which they contend have little to no influence on students' academic performance (Allen, 1987; Al-Hebaishi, 2012).

A number of theorists have sought to define and clarify the characteristics and themes surrounding the concept of learning styles (e.g. Cassidy, 2004; Felder and Brent, 2005; Felder and Spurlin, 2005; Stewart and Felicetti, 1992; Yilmaz-Soylu and Akkoyunlu, 2009). Grasha (1996, p. 41) defined learning style as "a personal quality that influences a student's ability to acquire information, to interact with peers and teachers and otherwise participate in learning experiences." Felder and Spurlin (2005, p. 1) describe learning styles as the "strengths and preferences in the ways students take in and process information". These definitions all posit that the concept of learning styles is concerned with the distinct ways in which students acquire and process information.

Theorists have also explored the application of this concept of learning styles to students' academic performance and achievement, finding varying results (eg. Abidin, Rezaee, Abdullah, & Singh, 2011; Warn, 2009; Komarraju, Karau, Schmeck, & Avdic, 2011). Warn (2009) conducted a study using Kolb's (1976) Learning Style Inventory and concluded that there is no significant association between the students' learning styles and their academic performance. Conversely, Abidin et al. (2011) conducted a study using Dunn and Dunn's (1986) Learning Styles Model and concluded that there is a significant relationship between learning styles and academic performance. Several researchers in the Caribbean have explored the problem of learning styles and performance at the tertiary level (Garner-O'Neale, & Harrison, 2013; Mlambo, 2011). Garner-O'Neale and Harrison (2013) and Mlambo (2011) reported that there was no significant or predictive relationship between learning styles and performance. The differing findings in the literature with regards to the relationship between students' learning styles and academic performance are indeed ubiquitous. Hence, the researcher suggests there is need for additional research to further advance the body of literature focusing on such issues.

In the context of the Caribbean, in past decades, concerns have been expressed over the academic underachievement of males in the education system at all levels. For example, the University of the West Indies has seen a steady percentage decline in male enrolment since 1981/1982 (The UWI, 2010). Figueroa (2004) contended that male academic underperformance exists in the Caribbean, but apportions causation to the 'male privileging' that exists in Jamaican society, which

paradoxically resulted in the decline of once dominant males in the classroom. Miller (1986) contends that the genesis of male underachievement resides in the policy to marginalise black men in education. Neither argument adequately deals with the declining male numbers in the UWI system and their underachievement.

Advanced information communications and digital technologies have been impacting learning and teaching in educational institutions (including tertiary level) within and outside the Caribbean, which have benefited significantly from their transformative contributions to all levels (primary, secondary, tertiary) of teaching and learning (Doiron, & Asselin, 2010; Jules, 2008). For example, moving from the old card indexing systems in libraries to advanced database systems giving very speedy online access to books and other documents, and attempts to reform curricula.

Age is considered an important factor in learning preferences and outcomes (Bamber & Tell, 2000; O'Donnell & Tobbell, 2007; Knowles, 1980; Montgomery & Groat, 1998) and is also influenced by modern technologies and social systems. Millennials who are born between 1982 and 2000 (18-35 years old) are socialised on modern technologies, (Barnes, Marateo & Ferris, 2007; Prensky, 2001; Rich, 2008). Revell and McCurry (2010) suggested that nurse educators should explore innovative technologies that are more suited to the characteristics and learning styles of millennials. Researchers have characterized Millennials as comfortable with technology, prefer interactive classrooms with individual feedback, peer collaboration, multi-task with ease, collaborative databases and demonstrate intolerance for traditional lecture style teaching (Carlson, 2005; McGlynn, 2005; Revell and McCurry, 2010; Roehl, Reddy & Shannon, 2013). Conversely, Barnes, Marateo, & Ferris, (2007) while supporting the multitasking orientation, contended that millennials tend more toward independence and autonomy. These findings highlight the significant reported disagreements related to millennials predominantly from the North developed countries.

Curry (1983) raised concerns related to definitions of learning and tested the psychometric properties and standards associated with twenty one models and associated measurement scales that were in existence at that time to ensure validity and reliability. These models and scales were developed to identify and classify students' preferred methods of learning in an attempt to comprehend students' learning preferences, especially in relation to the achievement of academic excellence. Curry (1983) reported nine (9) models and scales that she considered reliable and valid which included: Grasha and Riechmann (1974) Styles of Learning Interaction Model; Kolb's (1976) Learning Style Inventory; and, Dunn and Dunn (1986) Learning Style Model.

The Grasha and Riechmann student learning styles scale (1994) categorised students' learning styles into six (6) distinct categories (Grasha, 2002; 1996):

- Independent - students who learn on their own;
- Dependent - students who rely heavily on their teachers to learn;
- Collaborative - students who cooperate with others to learn;
- Competitive - students who compete with others;

- Participant - students who get involved in learning activities; and
- Avoidant - students who are reserved and apprehensive about learning.

Previous studies that utilised the Grasha-Riechmann Student Learning Style Scale suggest that there is a significant relationship between students' learning styles and their academic performance (for example: Diaz & Cartnal, 1999; O'Faithaigh, 2000; Kumar, Kumar & Smart, 2004; Julie Yazici, 2005; Uzuntiryaki, 2007; Smart, Kumar & Kumar, 2008; Hamidah, Sarina & Jusoff, 2009; Amir, Jelas & Rahman, 2011). For the purpose of this research, the Grasha-Riechmann scale was utilised to determine whether similar positive results could be derived in a tertiary institution in the Caribbean emerging economy context.

According to Uzuntiryaki (2007) students with Collaborative, Independent and Participative learning styles have higher academic achievement scores than students with Dependent, Competitive and Avoidant learning styles. Age also seems to be a factor in learning outcomes (Bamber and Tett, 2000 and O'Donnell and Tobell, 2007) and the research of Knowles (1980) and Montgomery and Groat (1998) imply that older students who can draw on life experiences tended to be more independent learners. However, Murray, Smith & Nielson (2010) reported that the age factor was not as influential in learning outcomes as purported by other studies and this study was consistent with the Caribbean based study by Garner-O'Neale and Harrison (2013) that found no relationships between age, gender and learning preferences in a tertiary level institution.

There have been varying results in relation to gender and prevalence of learning styles. For example, Baneshi, Tezerjani and Mokhtarpour (2014) reported that females had higher preferences for Collaborative, Participant and Dependent learning styles, than males who score higher on Avoidant and Independent learning styles. Hamidah et al. (2009) and Amir et al. (2011) reported that females had higher preferences than males for Collaborative, Participant, Dependent and Competitiveness learning styles. Conversely, O'Faithaigh (2000) and Kraft (1976) found that males had higher preferences than females for Independent and Competitive learning styles (they research different time periods). Other research reported that younger students were more avoidant (O'Faithaigh, 2000; Hamidah et al., 2009; Amir et al., 2011) and another study revealed that older students had higher preferences for Participative and Collaborative learning styles (Amir et al., 2011). This study explores the gender and age factors in tertiary level institutions to determine whether similar learning preferences would be manifested in the Caribbean cultural context.

There remain differing points of view and research outcomes in relation to students' preferred learning styles, academic performance and demographic variables such as age and gender in tertiary level institutions. The researcher is aware that several writers have published critiques of learning styles theories, models, instruments and measures (Cassidy, 2004; Curry, 1990; Desmedt & Valcke, 2004; Kolb & Kolb, 2005; Reynolds, 1997; Rohrer & Pashler, 2012; Sadler-Smith, 2001; Scott, 2010). This researcher concurs with Desmedt & Valcke's (2004) arguments

that the confusion seems to be more associated with distinguishing conceptual style from learning styles, and Sadler-Smith (2001), Cassidy (2010) among others, who call for more empirical research, and contend that both approaches can be validly utilised by educational researchers. This extensive controversy about the validity of learning style theory and models, and inconsistency in research findings largely from the North, do not obviate the justification for this study, to respond with scholarship to an apparent gap, that is, the dearth of literature related to the interrogation of learning styles models, theories and concepts, and variables such as age, gender and performance in under-researched environments such as the small island emerging economies in the Caribbean. Finally, in relation to millennials, one cannot assume that this age group in the Caribbean share the same perceptions and learning preferences and this assumption deserves further testing.

This research seeks to identify students' learning styles, determine differences according to age and gender, and finally, identify the relationships of these variables to students' academic performance in tertiary level institutions in a Caribbean country. The variables were operationalized as follows: Age (17-21, 22-28, 29-33, 34-40, 41-45, 46-50, 51-55, 56-60, 60+); gender (female, male); and academic performance (reported GPA scores). The Caribbean's economic, social and cultural contexts may produce differing and academically interesting results that are useful to academic researchers, practitioners/educators in tertiary education and policy making.

Four research questions have been conceptualised to address these issues and to make a contribution to the body of existing literature:

1. What are students' preferred learning styles at a tertiary level institution in the Caribbean?
2. Are there any significant differences between students' learning styles and students' age and gender?
3. To what extent do Millennials' preferences for learning styles differ from other age categories?
4. What are the relationships between students' preferred learning styles and academic performance?

Methodology

Research Design, Sampling and Participants

This research employed an exploratory research design. This approach allowed the researcher to become more familiar with the problem and to better formulate research questions. The research incorporated both qualitative and quantitative data collection methods. Hence, a survey instrument in the form of a questionnaire was used for quantitative data collection and focus groups were utilised for qualitative data collection. Purposive sampling was employed and involved a selection of students from a target population. The focus group approach was utilised in this research because in the first phase, the researcher obtained data from a questionnaire and used the focus group to clarify and gain deeper understanding of

the findings. Specifically, the focus group questions focused on issues highlighted in the quantitative results that required further interrogations and understanding.

The purposive sample was taken from a population of university students in the Department of Management Studies of the Faculty of Social Sciences, Cave Hill Campus which is located in a small island emerging economy of the Caribbean. Students were selected from the various classes offered in the department. Purposive sampling of the department was utilised for this study, because in the researcher's judgment it presented a captive population of appropriate tertiary level students. The population was determined through accessing the class lists for selected courses offered in the department. A total of 1,062 questionnaires were distributed and 670 useable questionnaires were returned directly to the researcher by the participants. The response rate was 63% comprising 163 males (24.3%) and 507 females (75.7%) which is consistent with the institution's existing aggregate female/male student ratios. Millennials comprised the majority of the sample and totalled 509 participants (376 females and 133 males); it comprises the 17-21 age group of 182 females and 77 males; the 22-28 age group of 147 females and 44 males; and the 29-33 age group of 47 females and 12 males. The age groups that ranged from 34-50 totalled 147 (121 females and 26 males). Finally, the age groups that ranged from 51-55 totalled 14 (10 females and 4 males).

Three focus groups were conducted to gather data. The first group comprised 5 participants who were students from the Department of Management and there were 3 females and 2 males, ranging in age from 23-50 years of age. The second focus group comprised 8 participants who were students from the same Department of Management and there were 6 females and 2 males, ranging in age from 29-49 years of age. The third focus group comprised 8 participants who were students from the same Department of Management in a Caribbean tertiary institution and there were 5 females and 3 males, ranging in age from 17-33 years of age.

Alpha Statistics

The results of reliability analysis are shown in Table 1. The statistics revealed an alpha score of .801 which meant that the researcher could proceed with the confidence that the scale was indeed reliable.

Table 1. Students Learning Preferences Scale - Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.754	.801	670

Procedures

The researcher prepared and submitted separate letters to all participants informing them of the purpose of the research for both questionnaire and focus groups. Additionally, there was a footnote on the questionnaire, inviting students to volunteer to be part of the focus groups and to contact the researcher if they were desirous of doing such. The cover letter assured the participants that their identity would not be revealed on the questionnaire and that strict confidentiality would be maintained. Participants were informed that it was voluntary and they could choose not to participate; hence, informed consent was achieved. Permission was sought from the various lecturers to conduct the survey in their classes during semester I classes. The researcher distributed the questionnaires over the period of one semester from 1st September to 30th October.

A semi-structured interview schedule was developed to assist with conducting data collection from the focus groups. Based on the researcher's judgment, the questions were designed to reflect some critical issues raised in the results of the survey questionnaire that were thought to require deeper probing and understanding. Specifically, focus group questions centred around students' preferred learning styles and significant difference between students' learning styles, age and gender. The same questions were utilised for all focus groups during the interviews. As part of the semi-structured nature of the interview process, systematic probing was utilised to obtain additional data. Each focus group session lasted approximately 2 hours.

Ethical Considerations

The researcher adhered to all ethical norms governing research and the research process. Informed consent was obtained prior to distribution of the questionnaire to participants as detailed in the procedures. For the focus groups, all participants were adequately informed about the nature and purpose of the research, their rights of voluntary consent and participation, confidentiality and anonymity, and the overall protection from harm. All 3 focus groups were conducted in a private setting organised by the researcher and 2 research assistants. Participants' permission to audio-record all sessions were sought and obtained to aid in accurate and detailed transcription; and written notes were also taken. All transcripts were developed to facilitate qualitative data analysis and interpretation; and also, all transcripts and data were reviewed and validated by the researcher and the research assistants. Worthy of note is that the researcher and two (2) research assistants tried to observe and control for any dominant participants in the focus group sessions.

Instrument and Data Analysis

The Grasha-Riechmann Student Learning Styles Scale (1994) was used to measure students' learning styles (see Appendix). A classification scheme of the scale was used to identify 6 learning styles that were grouped into 3 categories as opposites: Dependent/Independent, Collaborative/Competitive, and Participative/Avoidant.

The scale included sixty questions and a 5-point Likert rating scale from strongly agree to strongly disagree. Data were gathered for age, gender and academic performance. Each student who volunteered to take part in the research completed the questionnaire that assessed her/his learning styles.

Data analysis

Quantitative data analysis was conducted utilizing SPSS and involved the following statistics:
- Descriptive statistics such as means and standard deviation
- ANOVA (analysis of variances)
- Sample t-tests
- Multivariate Regression Analysis

Qualitative data from the focus groups were analysed using thematic analysis followed by coding. The researcher focused on common themes running through the data and then analysed the data in the context of the research questions. The focus groups facilitated the researcher's understanding of issues related to the research questions and emanating from the questionnaire. The researcher was guided by Taylor and Bodgan (1998), who suggest that qualitative analysis should include the following: careful interpretation of words spoken, non-verbal cues, developing generalizations and writing descriptive summaries. These procedures assisted in answering the research questions.

Limitations

Effectiveness of the process was contingent upon faculty members in the Department of Management Studies agreeing to allow their classes to be surveyed and to giving the researcher permission to distribute the survey. This meant that the lecturer would have to agree to allocate specific time for the research activity to occur during the lecture, which meant that the lecture on that day had to be shortened. Some faculty members could not accommodate the survey. There was no time to explain terms used in the questionnaire such as Avoidant, Collaborative etc. and there was limited access to official records such as GPA, hence, students' were asked to report their GPA scores in the questionnaire.

Results

Preferred Learning Styles

Research question 1 enquired about students' preferred learning styles. The results depicting the various learning style preferences of participants in the sample are shown in Table 2 and present the mean, Grasha-Riechmann rating norms (1996) and standard deviation for the various learning styles. Results indicate that Collaborative was the only learning style that was rated within the high range (3.63 in the range 3.5-5.0), based on the Grasha-Riechmann (1996) rating norms for

the learning style scale. All other learning styles fall within the moderate range, based on the same rating norms. Of these moderate rating norms, Dependent learning received the highest moderate rating (3.80 in the range 3.0-4.0) followed by Participant (3.70 in the range 3.1-4.1). Other ratings were: Competitive (2.35 in the range 1.8-2.8), Avoidant (2.62 in the range 1.9-3.1) and Independent (3.33 in the range 2.8-3.8).

Table 2. Learning Styles

Students' Learning Styles	GRASHA RATING NORMS	MEAN	SAMPLE STANDARD DEVIATION
Collaborative	3.5-5.0 (high)	3.63	.61
Dependent	3.0-4.0 (moderate)	3.80	.53
Participant	3.1-4.1 (moderate)	3.70	.61
Competitive	1.8-2.8 (moderate)	2.35	.65
Avoidant	1.9-3.1 (moderate)	2.62	.69
Independent	2.8-3.8 (moderate)	3.33	.46

Differences by Age and Gender

Table 3 shows the results of t-tests and ANOVA used to test for differences in student gender, age and learning styles.

Gender

The results of t-tests indicate significant gender differences on Dependent (T=3.03, $p<.001$), Participant (T=3.66, $p<0.0001$), Independent (T=2.49, $p<.05$), and Competitive (T=3.68, $p<0.0001$) learning styles. There are no significant results for Collaborative and Avoidant learning styles.

Age

The statistics indicate significant age differences for: Participant (F=8.72, $p<.0001$); Collaborative (F=2.11, $p<.05$); Independent (F=3.90, $p<.0001$); Avoidant (F=12.08, $p<.0001$); and Competitive (F=7.46, $p<.0001$). There is no significant difference for Dependent learning.

Table 3. Gender, Age, Registration and Learning Styles

Students Learning Styles	Gender (T-Test Results)		Age (ANOVA Results)		
	T	*P*	*F*	*P*	
Dependent	3.03**	.003	.33	.96	
Participant	3.66***	.000	8.72***	.000	
Colloborative	1.88	.06	2.11*	.03	
Independent	2.49*	.01	3.90***	.000	
Avoidant	1.89	.06	12.08***	.000	
Competitive	3.68***	.000	7.46***	.000	

Gender and Learning Styles

In terms of gender, males have mean scores that were marginally higher than females in three (3) learning styles: independent (male, M=3.40; female, M=3.30), competitive (male, M=2.53; female, 2.32) and avoidant (male, M=2.70; female, M=2.59). Females have mean scores that were higher than males on dependent (female, M=3.82; male, M=3.69), participant (female, M=3.74; male, M=3.56), and collaborative (female, M=3.63; male, M=3.53) learning styles (see Table 3).

Table 4. Gender and Learning Styles

	Sex of participant	N	Mean	Std. Deviation	Std. Error Mean
Independent	male	163	3.40	.473	.034
	female	507	3.30	.466	.019
Avoidant	male	163	2.71	.676	.049
	female	507	2.60	.692	.029
Collaborative	male	163	3.54	.594	.043
	female	507	3.63	.620	.026
Dependent	male	163	3.70	.519	.038
	female	507	3.82	.528	.022
Competitive	male	163	2.53	.639	.047
	female	507	2.32	.653	.027
Participant	male	163	3.56	.618	.045
	female	507	3.74	.599	.025

Age and Learning Styles

In terms of age and learning styles preferences (see Table 5), two (2) age groups reported mean scores that were above the sample mean of M=3.32 for independent learning: the millennials - 17-21 (M=3.39) and 22-28 (M=3.37). These age groups also score above the sample mean (M=2.62) and highest for avoidant learning (M=2.87 & M=2.66). The 41-45 age group (M=3.86) reported the highest scores for dependent learning. The millennials 17-21 and 22-28 reported highest scores for competitive learning (M=2.48). The 51-55 (M=4.19) and 41-45 (M=4.02) age groups scored highest for the participant learning style.

Table 5. Age and Learning Styles

Age range	Gender	Total No.	Standard Deviation	Indep	Avoid	Collab	Depend	Compete	Particip
17-21	F	182	Mean	3.39	2.87	3.52	3.77	2.48	3.52
	M	77	SD	0.42	0.67	0.61	0.55	0.63	0.61
22-28	F	147	Mean	3.37	2.66	3.59	3.78	2.48	3.68
	M	44	SD	0.50	0.63	0.63	0.53	0.68	0.58
29-33	F	47	Mean	3.28	2.47	3.63	3.82	2.22	3.77
	M	12	SD	0.43	0.58	0.52	0.44	0.56	0.41
34-40	F	52	Mean	3.18	2.29	3.70	3.81	2.06	3.90
	M	16	SD	0.45	0.69	0.57	0.47	0.55	0.58
41-45	F	44	Mean	3.28	2.24	3.73	3.86	2.01	4.02
	M	5	SD	0.48	0.53	0.58	0.44	0.57	0.48
46-50	F	25	Mean	3.11	2.29	3.68	3.83	2.32	3.98
	M	5	SD	0.58	0.79	0.73	0.57	0.65	0.70
51-55	F	10	Mean	3.15	2.19	3.89	3.79	2.35	4.19
	M	4	SD	0.40	0.81	0.61	0.59	0.64	0.58
	Total = 670		SD	0.46	0.69	0.62	0.51	0.67	0.61

Learning Styles and Academic Performance

Multivariate regression analyses were conducted to examine the relationships among the students' learning styles and academic performance (measured by students' GPA). The results are presented in Table 7. The regression model explained 2.6 percent of variation in academic performance and emerged statistically significant. Two of the 6 learning styles are significant predictors of students' academic performance: 1. The independent learning style; and, 2. the avoidant learning style. Students with more predominant independent learning styles reported higher GPAs, whereas students with more predominant avoidant learning styles reported lower GPAs.

Table 7. Learning Styles and Academic Performance

Students Learning Styles			
	Beta	*t*	*p*
Independent	.133	2.517*	.012
Avoidant	-.167	-2.588*	.010
Colloborative	-.026	-.450	.653
Dependent	-.110	-1.898	.058
Competitive	-.007	-.123	.902
Participant	-.066	-.930	.353

Note: $F_{(6, 388)} = 2.78$, $p = .01$. Adjusted R-square = 2.6%

Focus Groups

The findings of the thematic analysis are presented in this section. There were several themes that were gathered from the focus group sessions and they are presented in the context of the questions discussed during the group interviews.

To address the question related to students' preferred learning styles, students were asked about their preferences in terms of how they learn best.

To address the first question related to what are students' preferred learning styles, the participants in all three focus groups were asked to about their preferred learning styles. An assessment and comparison of participants' responses identified the following main themes: 1. Dependent learning is the preferred style; and, 2. Learning styles are adjusted to fit lecturers' preferred teaching style. Most participants identified dependent learning as the most widely utilised learning style among students in the tertiary level institution, but there was a caveat. The participants explained that students adjusted their learning styles to accommodate the teaching style or styles of each lecturer. For example, one participant in the millennial age range stated that:

> *"Our classes are mostly controlled by the lecturers and students are prepared to make the necessary adjustments to pass the exams...even if that means following exactly what the lecturers want without question..."* (**Millennial participant**)

Another participant in the 40-45 age group stated that:

> *"We feel that if we don't do exactly what the lecturers want, we might pass... so we give them [lecturers] what they want so that we can pass our courses and get out of UWI."* (**40-45 participant**)

To address the second question related to any significant differences between students' learning styles and students' age and gender, the participants in the sample in all three focus groups were asked about what they perceived as any differences between their learning styles and age; and then their learning styles and gender. An assessment and comparison of participants' responses identified the following main themes: 1. The 17-33 years of age (millennials) learn differently from other age groups; 2. Gender influences how individuals learn. For example, one participant in the millennial age range stated that:

> *"We young people raise up with computers and technology, and should be allowed to use them in school. We don't like to do a lot uh [of] talking in the classroom and hate group work."* (**Millennial male participant**)

Another participant stated that:

> *"Lecturers do not understand how we learn, but we can be texting, listening to the lecture and taking notes all at the same time. Some lecturers get annoyed. We like things that can help us learn quickly and pass the exams... we love online notes in elearning."* [Elearning is an online web based educational platform] *(**Millennial female participant**)*

A mature student informed that:

> *"I prefer the lecturer to allow me to have enough time to better understand all the theories and concepts... to spend time involving me in the classroom*

*with discussion and explanations. I was out of school for a little while and may take a little longer to understand things." (**Female participant in the 41-45 age group**)*

In relation to gender and learning, a participant contended that:
*"From secondary school I would say that boys would always behave differently in class. Girls [females] are more serious and do learn differently from boys [males]. We girls help each other and prefer to work together much more than boys do. (**Female participant**)*

Another participant stated that:
*"Maybe it's the testosterone in us that makes the classroom so boring to be honest. Men like competitive sports and competitive games… I can spend hours on my Play Station 4. Maybe because we like sports so much and even making sport in class (laugh). (**Male participant**)*

Another participant recounted that:
*"You see that group-work thing… too many classes in management got group projects and I hate them. You can' depend on the other students to do their part. Let me do my project myself." (**Male participant**)*

Finally, a female participant opined that:
*"From secondary school I have found it easy to ask the teacher questions and even at UWI still find it easy to meet with the lecturer or tutor if I do not understand something. I often visit my lecturers during and even outside office hours if I need assistance with tutorial assignments or projects." (**Female participant**).*

Discussion

Preferred Learning Styles

According to the Grasha (2002) ratings norms for the learning styles scale, collaborative is the only style that falls within the high range and is the dominant or most influential learning style. Collaborative learning means that there is a higher propensity for students in the sample to prefer to cooperate with each other, share ideas and talents, and like working in groups or teams. Learners like in-class discussions, group projects (not individual) and involvement in course design. The learning style with the second highest preference is Dependent learning with the highest of the moderate ratings. Dependent learning means that students prefer to be given information and instructed in the classroom. Students who prefer Dependent Learning, subordinate their independent thinking and preferred learning preferences to what they perceived as the lecturer's preferences for teaching. Additionally, dependent learners place greater demands on the teachers/lecturers as the students rely on them to help them learn. In other words, they prefer classrooms

that are teacher centered and based on instructivist principles. Paradoxically, this style of learning is associated with 'teacher-centred' approaches in the classroom, in an age when experts are contending that student-centred teaching is best-practice and better facilitates learning (Armbruster, Patel, Johnson & Weiss, 2009; Palak & Walls, 2009). There is also an age factor here as the Millennials which are the majority in the overall sample had a higher preference for independent learning, but this will be elaborated within the section dealing with age and learning styles. Based on the issues raised in this section, there are obvious implications for the teaching philosophy and assessment methodologies utilised by the lecturers in this tertiary level institution in the Caribbean.

The focus groups that were conducted with students produce results that show some measure of alignment with the findings of the Grasha questionnaire. Participants stated that there were many students who preferred dependent learning. Students in the focus groups indicated that they and other students often assessed the teaching style and expectations of the lecturer and thereafter adjusted their learning style in order to pass the course. As they put it 'give the lecturers what they want' and this could be best achieved when they just do what is required and look to authority figures for specific guidelines on how and what to do. This suggests an instructivist's approach by the lecturers as opposed to a 'constructivist'. In this context an Expert and/or Formal Authority teaching style seems to be suggested by students in the sample, and is aligned to dependent learning styles. This finding is consistent with Cluster 1 as proposed by Grasha (2002) as the primary learning styles of expert/formal authority are best aligned to Dependent, Participant or Competitive learners.

When the comments of students in the focus groups are considered there may be need for further research to investigate the claims. In particular, those claims related to lecturers unwittingly influencing students' adaptation of dependent learning in the classroom, thereby producing a vicious circle. This suggests that there could be a paradoxical misalignment between the students' preferred learning styles and lecturers' best-practice teaching style.

Differences in Gender and Learning Styles

In relation to gender, the t-test results indicate that there are no significant differences between students' gender and preferences for collaborative and avoidant learning styles. This suggests that male and female students have no perceived differences in terms of preferences or desires for collaborative and avoidant learning in class. Further, it suggests that there is nothing unique about male and female preferences for collaborative and avoidant learning. Alternately, Competitive and Independent learning have significant differences in relation to gender in the study. The independent and competitive learning styles preferences for male students are consistent with the findings of the focus groups and consistent with the findings of Cheeseman, Simpson, and Wint (2006) who argued that males preferred university departments that were more competitive. It differs from Garner-O'Neale and

Harrison (2013) who did not find any significant relationship between gender and learning preferences. The preferences for dependent, participant and collaborative learning by females are also consistent with the findings of the focus groups. These findings that relate to both male and female are partially similar to the results of studies conducted by Baneshi, Dehghan Tezerjani and Mokhtarpour (2014), Hamidah, Sarina and Jusoff (2009), Amir, Jelas and Rahman (2011), O'Faithaigh (2000) and Kraft (1976). The main variation from this study is in the research findings of Amir et al., (2011) and Baneshi et al., (2014) where they reported that females have higher preferences for competitiveness than males.

These results on gender generally seem to support the argument that males and females learn differently. It suggests that males are more individualistic and may prefer to work on their own or they may compete against other students, whereas, females are more participant and may want to get the most out of the class and enjoy the experience more than males. Worthy of note is the fact that in our sample, females accounted for 75.7% (507) of respondents and males 24.3% (163) of respondents. In the tertiary institution sampled the Faculty of Social Sciences' ratio of male to females averages 3:1 - 75% females to 25% males (Faculty of Social Sciences Statistics, UWI, 2015). These results have implications for teaching style, philosophy and methodology in tertiary level institutions and will be dealt with in the implications section of this paper.

Differences in Age, Millennials and Learning Styles

The ANOVA results indicate that age does influence students' learning choices in this sample of tertiary level institutions. This finding is supported by Bamber and Tett (2000) and O'Donnell and Tobell (2007) who argued that age differences affect learning outcomes. However, they are different from results reported by Garner-O'Neale and Harrison (2013) where they did not find any significant relationship between age and learning preferences. The results of the test for age differences reveal that dependent learning is the only learning style that is not significant for differences in the sample and this suggests that all age ranges have similar preference for dependent learning. It implies that all age groups perceive or desire similar things in relation to Dependent learning. Noteworthy is that the 41-45, 51-55 categories have the highest preferences for dependent learning. This is of particular interest as dependent learning is the style that is rated 2nd with regard to Grasha-Riechmann's rating norms.

The millennials have the highest ratings for independent, avoidant and competitive learning styles; all are statistically significant in relation to ANOVA tests. These age groups also represented the majority of the sample and is indeed a significant number which cannot be ignored. These results also bring attention to issues related to teaching style, philosophy and methodology as the male youth seem to learn differently from females. The results also seem to support arguments that Millennials see the world differently and learn differently, hence according to Rich (2008), teachers should be mindful of their learning interests, value systems

and perceptions. Roehl, Reddy and Shannon (2013) argued that the classroom should be flipped to accommodate active learning, incorporate technology and learner-centred activities. However, many researchers from North argue that millennials are collaborative, group oriented learners, but the findings in this sample suggest otherwise in finding them to prefer independent and avoidant learning. This researcher's results are consistent with those of Barnes, Marateo and Ferris (2007). Further research is required to more deeply explore the relationship between gender, age and preferences for competitive and independent learning. In particular, the different learning preferences of Millennials in tertiary institutions in small-island emerging economies deserve further investigation, considering the unique cultural contexts that may impact outcomes.

Learning Styles and Academic Performance

Generally, the results support the findings of previous researchers (Amir et al., 2011; Hamidah et al., 2009; Smart et al., 2008; and, Uzuntiryaki, 2007) who reported that learning styles impact academic performance in tertiary level institutions. Specifically, the results of the regression analysis indicate that in this sample only Independent learning predicted enhanced students' academic performance and as was stated previously this learning style is associated with millennials aged 17-28. In independent learning, the student prefers to work on his/her own, has high self-confidence, but can still be open to the ideas of others (Grasha-Riechmann, 2002). This is juxtoposed against the findings that independent learning received a moderate rating in the sample and also that males have a higher preference for independent learning. Grasha-Riechmann (2002) argued that his cluster 4 provides the best match of independent learning with delegator, facilitator and expert teaching styles. Noteworthy is the non-significant or predictive relationship between learning styles and performance reported by Garner-O'Neale and Harrison (2013) and Mlambo (2011) in their studies of tertiary level institutions in the Caribbean. This research argues that based on the Grasha-Riechmann (2002) cluster framework, it is suggested that lecturers should utilize a delegator approach along with facilitator and expert. Worthy of note is that avoidant learning which is the only other statistically significant result has an inverse relationship with performance. That is, as Avoidant learning increases, student academic performance would decrease. In our sample, Avoidant learning is more highly preferred by males and millennials aged 17-28.

Implications

Practice

The outcomes of this research are likely to provide important data related to students' preferences in relation to learning and academic performance outcomes. There are implications for teaching styles and strategies in relation to both full-time and part-time students in the sample as the results indicate that the millennials and over 40s have significantly different learning preferences; the over 40s tend

to be part-time students. The research suggests that the over 40s prefer learning styles that are more collaborative and participative, whereas, millennials prefer independent, avoidant and competitive. It supports previous research by Grasha, Howard Gardiner and others who argue for appreciating multiple intelligences and use of blended learning approaches in the classroom.

Policy

There are policy implications since the research suggests that males and females in the sample have different preferences for learning styles and as such, formal systems, regulations and processes should consider potential different requirements. For example, revised and innovative policies on course design and assessment design in the tertiary level institution may assist in responding to the varying needs of the different students. Female students may require more direct contact and liaison with the lecturers and tutors in any semester. Flexible assessments may need to cater to the competitive and more independent male students' orientation, and the collaborative and participant learning preferences for females. Finally, the institution may need to enforce a strict policy related to teacher training for lecturers and teaching staff.

Theoretical and Statistical

The research tested the reliability of the Grasha-Riechmann scale that measures student learning styles preferences in a different cultural context ie. small islands emerging economies. It highlighted various learning issues that require further theoretical analysis, vis-a-vis, how males and females learn in formal and informal settings.

Future Research

There is need for further research to test the applicability of the Grasha-Riechmann scale in wider national and regional samples in tertiary level institutions in the small island developing economies of the Caribbean. Also there needs to be further research that deconstructs the role and importance of gender in learning environments in both educational and business organisation's contexts. Many organisations conduct internal training and development initiatives, which also involve teaching and learning activities aimed at improving worker performance on the job through enhanced learning. Further research is required to more deeply explore the relationship between gender, age and preferences for competitive and independent learning. Additionally, there is need to test the relationship between learning style preferences and alignment to teaching styles. Avoidant learning is counterproductive and research may be needed to determine why students with this preference persist. Finally, research is needed to determine the extent to which teaching style and learning style mismatches, negatively affect male and female learning outcomes in tertiary level education in the Caribbean; longitudinal studies utilising a representative random sample would add significant value to the body of literature.

Conclusion

The results suggest that gender and age do have some relationships with students' learning styles. Significant age differences were reported for participant, collaborative, independent, avoidant and competitive; gender differences for dependent, participative, independent and competitive. The research implies that millennials are worthy of more detailed research and it was Ng, Lyons and Schweitzer (2012) who contended that millennials are more culturally reflective of an evolving global culture which has impacted their personal interests, values and perceptions of reality. The findings imply that the independent learning style has some significant positive impact on students' performance and conversely, avoidant has an inverse relationship with students' performance.

The research also has implications for teaching styles and the extent to which lecturers design their course assessments and teaching methodology to fit the varying learning styles of students. Finally, there is need for further research, especially longitudinal studies into learning and teaching styles in Caribbean tertiary level institutions."

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LEARNING STYLES SCALE

STUDENT VERSION

© Grasha-Reichmann (1994)

This questionnaire is designed to assess the various learning styles preferred by students. The tool was developed by Grasha and Reichmann (1996) and is widely used in research that investigates aspects of teaching and learning in educational institutions.

The process in completely voluntary and as such you can choose not to complete the questionnaire. If you agree to complete the questionnaire we thank you for volunteering to complete it. The process will be completely anonymous and you do not have to write your name on the questionnaire.

The questionnaire has 60 questions. Try to answer all questions and respond how you really feel about the various questions. It should take you just about 20 minutes to complete.

Please pay special attention to the rating scale below; it utilises a 5 point likert scale which ranges from strongly disagree to strongly agree. Take a few minutes to familiarise yourself with the rating system. For example, for question 1, if you strongly agree with the statement that "I am confident of my ability to learn important course material", then you should place an X in the box with the column numbered 5.

You can now begin the short questionnaire by placing an X in the appropriate boxes for each question.

1=strongly disagree; 2=moderately disagree; 3=undecided; 4=moderately agree; strongly agree=5

		1	2	3	4	5
1.	I am confident of my ability to learn important course material					
2.	I often daydream during class					
3.	Working with other students on class projects is something I enjoy					
4.	Facts presented in textbooks and lectures usually are correct					
5.	To do well, it is necessary to compete with other students for the teacher's attention					
6.	I usually am eager to learn about the content areas covered in class					
7.	My ideas about content are often as good as those in the textbook					
8.	Classroom activities generally are boring					
9.	I enjoy discussing my ideas about the course content with other students					
10.	Teachers are the best judges of what is important for me to learn in a course					
11.	It is necessary to compete with other students to get a grade					
12.	Class sessions typically are worthwhile					
13.	I study what is important to me and not always what the instructor says is important					
14.	Very seldom do I become excited about material covered in a course					
15.	I enjoy hearing what other students think about issues raised in class					
16.	Teachers should state exactly what they expect from students					
17.	During class discussions, I must compete with other students to get my ideas across					
18.	I get more out of going to class than staying at home					
19.	Most of what I know, I learned on my own					
20.	I generally feel like I have to attend class rather than like I want to attend					
21.	Students can learn more by sharing their ideas with each other					
22.	I try to do assignments exactly the way my teachers say they should be completed					
23.	Students have to become aggressive to do well in school					
24.	Everyone has a responsibility to get as much out of a course as possible					
25.	I can determine for myself the important content issues in a course					
26.	Paying attention during class is difficult for me to do					
27.	I like to study for tests with other students					
28.	Teachers who let students do whatever they want are not doing their jobs					
29.	I like to get answers to problems or questions before anybody else can					
30.	Classroom activities are generally interesting					
31.	I like to develop my own ideas about course content					
32.	I have given up trying to learn anything from going to class					
33.	The ideas of other students help me to understand course materials					
34.	Students need to be closely supervised by teachers on all course related projects					
35.	To get ahead in class, it is necessary to step on the toes of other students					
36.	I try to participate as much as I can in all aspects of a course					
37.	I have my own ideas about how classes should be run					
38.	In most of my courses, I study just hard enough to get by					
39.	An important part of taking courses is learning to get along with other people					
40.	My notes contain almost everything the teacher said in class					
41.	Students hurt their chances for a good grade when they share their notes and ideas					
42.	Course assignments are completed whether or not I think they are interesting					

43.	If I like a topic, I usually find out more about it on my own					
44.	I typically cram for exams					
45.	Learning should be a cooperative effort between students and faculty					
46.	I prefer class sessions that are highly organised					
47.	To stand out in class, I try to do assignments better than other students					
48.	I complete course assignments soon after they are given					
49.	I prefer to work on class related projects (eg. Studying for exams, papers) by myself					
50.	I would like teachers to ignore me in class					
51.	I let other students borrow my notes when they ask for them					
52.	Teachers should tell students exactly what material is going to be covered on a test					
53.	I like to know how well other students are doing on exams and course assignments					
54.	I complete required reading assignments as well as those that are optional					
55.	When I don't understand something, I try to figure out for myself before seeking help					
56.	During class, I tend to talk or joke around with people sitting next to me					
57.	Participating in small group activities in class is something I enjoy					
58.	I find teacher outlines or notes on the board very helpful					
59.	I ask other students in class what grades they received on tests and assignments					
60.	In my class, I often sit towards the front of the room					

DEMOGRAPHIC PROFILE:

Age Range: 17-21   22-28   29-33   34-40   41-45   46-50   51-55   56-60   60+

Male: ……………   Female: ………………

Country of origin: …………………………..

Ethnic Origin: Afro-Caribbean   Indo-Caribbean   Indian   American African

                (Other) …………………………………………………………………

Faculty: ……………………………………………………………………………

Department: …………………………………………………………………………….

Registration status: (circle as appropriate)   Part-time   Full-time

Programme of study: …………………………………………………………………..

Courses taken during semester: …………………………………………………….

……………………………………………………………………………………

……………………………………………………………………………………

GPA Range: (circle as appropriate)

- 3.6 up

- 3.0-3.59

- 2.0-2.99

- 1.0-1.99

Rate Your Current Overall Performance (PLACE X IN RELEVANT BOX)

POOR	AVERAGE	GOOD	VERY GOOD	EXCELLENT

Work experience: Please state period as follows:

Months ………………………………

Years ………………………………..

Indicate the qualifications you entered university with: (circle as appropriate)
- CXC/ 'O' levels
- Associate degree
- Diploma
- CAPE
- Degree
- Mature entry

Please Note:

Those students who may be interested in voluntarily participating in related Focus Groups following completion of the questionnaire, kindly contact Dr. Akhentoolove Corbin at 417-4304 (office) or 245-6486 (cell).