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Teachers' Competence, Classroom Environment, Learning Style of Students: A Structural Model on Mathematical Ability

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Abstract

The study was conducted to develop the best fit model of mathematical ability. Specifically, it established the relationship among teachers' competence, classroom environment, learning styles, and mathematical ability. Descriptive, correlational and causal comparative designs were utilized in this study. The data were gathered from senior high school students. Moreover, sets of adopted survey questionnaires were used as instruments to obtain information from the participants. Mean, Pearson product moment correlation, multiple regression analysis and structural equation modeling were the statistical tool used. The findings revealed that reflector and activist learner and role of students/peers found to be significant predictors of mathematical ability. The best fit model of mathematical ability is best predicted by their learning styles and the classroom environment. The model suggests that that the more structured the learning style coupled with a conducive classroom environment the better the mathematical ability of the students.

Keywords: Classroom environment, Learning style, Mathematical ability, Mathematics education, Teachers' competence

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INTRODUCTION

Essential player in the teaching learning framework is the student and they are the most vital asset for any academic institution. Nowadays, students' scholastic performance is directly linked to the country's economic and social development. The students' performance plays a significant role in yielding globally competitive graduates who will become the front line of the country's manpower accountable for the country's social and economic growth (Ali et al., 2009). The assessment of student's academic performance has gathered substantial attention in previous research. It challenges aspects of academic literature and science. A student's academic performance is affected due to several factors like economic, environmental, social, personal and psychological factors. These factors are what strongly influence the student performance, but these factors contextually vary from one person to another and from one country to another.

Moreover, there are also other factors that influence a student's academic performance, like observable teacher competence and empathy. Khan (2004) stated that the significance in enhancing the competency of teaching and standards of professional teachers has developed in the field of education. It has been put into understanding that for an instruction to be considered as quality teaching, we have to take into consideration the variety of contexts and scenarios in which teachers perform. All efforts are continuously made to ensure teacher involvement offering wide repertoire of teaching situations and experiences. Classroom environment, on the other hand, is of supreme importance in monitoring and improving the intellectual

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ability of the students. However, helpful and satisfactory classroom environment enriched with enough learning facilities, and conducive climate help students become more focused and comfortable in performing their school tasks which resulted in better scholastic achievement. The forces of the environment bring a significant impact on the individual's growth and development right from the mother's womb. (Lawrence & Vimala, 2012).

In the same manner, learning style of a student is a key determinant his ability to achieve something better. Learning style should not actually be considered as an ability, but rather a preferred way of acquiring information using his abilities and make it stay on his mind. Different individuals have different learning styles. Following the definition, it means that they have their very own ways on how they absorb, process and retain new information and skills. Learning styles are typically opposite concepts, for instance random versus sequential, reflective versus impulsive. They represent two extremes of wide representation, however, where a learner falls on the gamut is neutral because each extreme has its potential boons and banes. Moreover, every style of learning is not a fixed mode of behavior. Depending on different situations and tasks, learning styles can be altered to well suit the learning situation (Reid 1987; Oxford 2011).

In the University of Mindanao in general and in UM Tagum College in particular, it has been observed that students excel in knowledge acquisition but fare considerably low in lessons requiring critical skills specifically in mathematics. This disappointing condition is evident in mathematics performance of the students. This problem is based on the previous pre-rev results of the students. Amidst the continuous development towards excellence of UM Tagum College, the researcher observed that some of the students begin scratching their heads when faced with word problem-solving. Also, the last school year's result on the test of the education students in their Pre-rev subject showed that the mean level of performance in Mathematics is 71.4 with a low descriptive equivalent. This means that even those who are graduating students still have difficulties in solving mathematical word problems. These scenarios prompted the researcher to come up with the study. The stated scenario persuaded the researcher to look for the factors that can lead to the development of mathematical ability among students. It is in this context that the researcher is interested to develop a structural model of teachers' competence, classroom environment, and learning style on mathematical ability as this can raise awareness to the intended beneficiaries of this study and possibly suggest plan to improve students' performance, thus, the need to conduct the study was established.

RESEARCH METHOD

The study made use of descriptive, correlational and causal comparative designs. It examined the relationship among teacher competence, classroom environment, learning styles and mathematical ability. Furthermore, this study also determined which indicators were heavily loaded with the mathematical ability. Moreover, the relatedness between the teacher competence, classroom environment, learning styles and mathematical ability were identified as a set of simultaneous regression equations. This model was specified because of the theoretical models of Walberg, (1980) which explained the linkages existing among learning variables and the scholastic outcomes of the students. In this study, learning variables refer to Teacher Competence, Classroom Environment, Learning Styles of Student and the learning outcome is the Mathematical Ability.

The data were gathered from the senior high school students of the four different private school in Davao region. Moreover, sets of adopted survey questionnaires were used as instruments to obtain information from the participants. The survey questionnaires were subjected reliability test with excellent internal consistency and were also validated by three (3) experts, one has a degree of Doctor of Philosophy in Science Education major in Mathematical Science and a Doctor of Education in Educational Management. The other experts are a Doctor of Education in Educational Management graduate and completed their academic requirements in Doctor of Philosophy in Science Education major in Mathematics Education. The instrument used in measuring teachers' competence was adopted from the evaluation of teachers by students (ETS) used by the University of Mindanao. Also, classroom environment instrument was adopted from the learning environment preferences (LEP) instrument developed by William S. Moore, Center for the Study of Intellectual Development (1987). While the learning styles, the instrument was adopted from Kolb's learning styles questionnaire used by (Honey & Mumford, 2006).

Mean was used to determine the level of teachers' competence, classroom environment, learning styles and mathematical ability. While Pearson Product Moment Correlation was employed to determine the significance of the relationship between variables. On the other hand, to determine the influence of teachers' competence, classroom environment and learning style on mathematical ability of college students, Multiple Regression was used. And Structural Equation Modeling was used to identify the model that best mathematical ability. In evaluating the goodness of fit of the models, the following indices were computed: CMIN/DF, Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and p-value. The NFI, CFI and TLI are indices that estimate goodness of fit of the tested model in relation to the null model. GFI is a fit index which tells the proportion of the variance in the sample variance-covariance matrix that is accounted for by the tested model. All of them should be greater than 0.95 to indicate good fit.

RESULTS AND DISCUSSION

This section presents the results and discussion of the data gathered from the survey conducted on the study that sought to develop a structural model of teachers' competence, classroom environment, and learning style on mathematical ability. Data are organized based on the objectives of the study.

Level of Teacher Competence

Table 1 shows the level of teacher's competence as perceived by the senior high school students. Data include the obtained mean of four factors specifically knowledge of the subject matter, teaching strategies and methodologies, classroom management and professional characteristics/traits. The results indicated a high level of teacher competence. The result means that teacher's competence was very satisfactory. This means that teachers were competent in implementing classroom management, employing strategies and methods, exhibiting behavior and enhancing communication skills of the students. Siddiqui, (2009) stated that a teacher who we can consider as competent in what they do have an integrated knowledge in planning and carrying out their teaching and brush up the contents of their lesson. The other aspects of teaching competency are the teacher's ability in using technological aids, which implies that the teacher must have the proficiency in using teaching aids. The above-mentioned statement, suggests that in order to become effective teachers, they should be able to

learn lesson planning and lesson designing as well as other techniques to be adopted in the classroom. Aside from that, they should be well-versed in facilitating learning and should be interested in professional growth which is all about acquiring knowledge throughout their life. In this way, they should be able to guide their students properly in the course of the lesson.

Table 1. Level of Teacher Competence, n= 637

Indicators	$\bar{x}$	SD	Qualitative Description
Knowledge of the Subject Matter	4.02	0.66	High
Teaching Strategies and Methodologies	3.90	0.64	High
Classroom Management	4.20	0.66	High
Professional Characteristics / Traits	4.15	0.72	High
Overall	4.02	0.55	High

Level of Classroom Environment

Shown in Table 2 is the summary of the level of classroom environment which were measured by five factors specifically course content/view of learning, the role of instructor, the role of student/peers, classroom atmosphere/activities and evaluation procedures. As shown, the results revealed a high level of classroom environment. Result means that the classroom environment is much evident as perceived by the senior high school students. The result indicates that the learner's ability was maximized in the classroom environment where they can interact with each other through discussion, collaboration, and feedback. The result is supported by Natarajan (2014) who stated that students' level of motivation and engagement and their perception of the learning environment as being socially supportive students have a positive correlation. The above-mentioned statement means that if there is a climate of mutual respect of students, it can increase feelings of confidence in their ability to complete their assignments and tasks. Those who can finish their task faster and easier are those students who are highly motivated by their classmates and teachers. Also, if the teachers and peers give emotional support to the students, most likely, they are able to focus more on their tasks and are self-regulated in the classroom.

Table 2. Level of Classroom Environment, n= 637

Indicators	$\bar{x}$	SD	Descriptive Equivalent
Course Content/View of Learning	3.91	0.52	High
Role of Instructor	3.91	0.68	High
Role of Student/Peers	4.08	0.55	High
Classroom Atmosphere/Activities	3.94	0.59	High
Evaluation Procedures	3.95	0.61	
Overall	3.96	0.502	High

Level of Learning Styles among Students

Reflected in Table 3 is the result of the level of learning style with the obtained mean of the four factors specifically activist learner, reflector learner, theorist learner and pragmatist learner. As shown in the results the overall mean was described as high, and all indicators have a descriptive equivalent of high which means that all the

indicators are much evident. The result denotes that the students' learning style enables them to learn using their learning orientation and their preferred way of learning. They need the stimulus and respond to the stimulus of all types of learning styles to one extent or another - it's a matter of fitting their personal learning style preferences in a given situation.

Curry (1981) define learning styles as a characteristic of cognitive, affective, and psycho-social behaviors that serve as an indicator of learner's perception, interaction with others, and how they respond to the learning environment. Aside from learning and home environment, learning style can also become a factor in the academic achievement of a student. Learning style is not actually in itself an ability but rather a preferred way of using one's abilities. Individuals have different learning styles; it means that they differ in their natural, habitual, and preferred way manner of absorbing, processing, and retaining new information and skills. Learning styles are represented by two extremes of a wide continuum and are typically bipolar entities (for example reflective versus impulsive, random versus sequential). However, where a learner falls on the continuum is neutral because each extreme has its potential advantages and disadvantages.

Table 3. Level of Learning Styles of Students, n= 637

Indicators	$\bar{x}$	SD	Qualitative Description
Activist Learner	3.79	0.58	High
Reflector Learner	4.07	0.54	High
Theorist Learner	3.88	0.55	High
Pragmatist Learner	3.93	0.55	High
Overall	3.92	0.45	High

Level of Mathematical Ability

Shown in Table 4 is the result on the level of the mathematical ability, as shown in the results, a large percentage of the students' level of proficiency are developing and approaching to proficiency, this means that developing students are those who possess the minimum knowledge and skills and core understanding but needs help throughout the performance of the authentic task. Moreover, approaching proficiency students are described as those students who have developed the fundamental knowledge and skills and core understanding and, with little guidance from the teacher and with some assistance from peers. Furthermore, a few of the students belong to Advanced and Proficient levels. The result was supported by the study of Georgiou et al (2007) which demonstrated that high performance could serve to anticipate an uplifting attitude towards math, yet such attitude, classroom climate, and teachers' characteristics could not predict stronger performance. In any case, these authors emphasize the teachers' and schools' role in shaping student's attitudes stating that, student's performance in mathematics could be improved by, for example, quality of teaching methodology, more motivated and engaged teachers or quality of course materials, which has as a significant effect on the improvement of student's attitudes towards mathematics.

Relationship of Teacher's Competence and Mathematical Ability

Shown in Table 5 is the data on the correlation between teacher's competence and mathematical ability. As shown, teacher competence has a p-value greater than 0.05; this means that there is no significant relationship between teachers' competence and

mathematical ability. The result contradicts with the study of Birch & Ladd, (1997) stated that the perceived teacher competence and warmth has a positive correlation with student's academic performance.

Table 4. Level of Mathematical Ability, n= 637

Percent of Correct Answer	Frequency	Percent	Level of Proficiency
81 - 100	1	0.2	Advance
61 - 80	41	6.6	Proficient
41 - 60	204	31.9	Approaching Proficiency
21 - 40	360	56.6	Developing
0 - 20	20	4.9	Beginning
Mean: 21 – 40			Developing

Among the indicators of teachers' competence, only knowledge of the subject matter has a p-value less than 0.05 this means that there is a significant relationship between knowledge of the subject matter and mathematical ability. Result was supported by Adeyemi (2008) who expressed that teacher experience and ability were the prime predictors of students' performance in all subjects, especially in mathematics.

Table 5. Relationship of Variables on Mathematical Ability

Variable	r- value	p – value
Teacher Competence	0.022	0.576
Knowledge of the Subject Matter	0.079	0.045*
Teaching Strategies and Methodologies	0.004	0.927
Classroom Management	- 0.010	0.810
Professional Characteristics / Traits	0.013	0.747
Classroom Environment	0.040	0.311
Course Content/View of Learning	0.013	0.735
Role of Instructor	0.001	0.980
Role of Student/Peers	O.094	0.017*
Classroom Atmosphere/Activities	0.019	0.630
Learning Styles	0.036	0.360
Activist Learner	- 0.076	0.055
Reflector Learner	0.096	0.015*
Theorist Learner	0.035	0.376
Pragmatist Learner	0.071	0.074

* $p \leq 0.05$ ** $p \leq 0.01$

Relationship of Classroom Environment and Mathematical Ability

Meanwhile, the classroom environment has a p-value greater than 0.05 as shown in Table 5 thus the null hypothesis is not rejected. The result means that, there is no significant relationship between classroom environment and mathematical ability. The result contradicts with Ashby et al. (2011) who stated that the classroom environment is an essential key determinant to the students' achievement in mathematics. Among the indicators, the role of student/peers shows a significant relationship with mathematical ability with a p-value less than 0.05. The result means that the role students/peers is positively associated with mathematical ability. This result conforms with Yengen et al. (2010) who expressed that students should be provided with freedom to be actively engaged in learning process. Hence, learning environment and

approaches by teachers in higher education need to be more supportive in order to foster development on students. Mwamwenda, (2015) also express that the performance of students in a subject is determined by their attitudes rather than an inability to study.

Relationship of Learning Styles and Mathematical Ability

In the same way, there is no significant relationship between learning style of students and mathematical ability as reflected in Table 5 that the p-value is greater than 0.05. The result contradicts with the study of Hamdan et al. (2008) which stated that students' learning style is a vital factor that can influence the ability of the student to acquire something better. It is undeniable that even though most if not all students have the same academic potential, they have their learning style. The learning styles should match to the subjects, methods and learning materials. Reflective learner as one of the indicators of learning style shows a significant relationship with mathematical ability. The result means that reflective learner is positively associated with mathematical ability. The result is in parallel with the views of Ozsoy et al. (2017), who stated that metacognitive control/regulation is considered as the ability to use knowledge to regulate and control cognitive processes. Metacognitive control is related with metacognitive activities that help to control one's thinking or learning. Students with high metacognitive and self-regulatory abilities actively involved in their own learning process, plan and monitor the task they are focusing on, their own study attitudes and the task and the study attitudes fits together.

Regression Analysis on Mathematical Ability

Table 6 presents the regression analysis on mathematical ability. As shown in the table, the regression model significantly predicts the outcome variable. The R2 value is at 0.032; this means that at most 3.2% of variances are explained by the three factors in the model. All the three factors have a p-value less than 0.05. Thus, each of the factors significantly influences mathematical ability.

Table 6. Regression Analysis on Mathematical Ability

Model	Coefficients[a]				
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	30.926	4.611		6.707	.000
Reflector Learner	2.674	1.160	.111	2.305	.021
Activist Learner	-3.602	.985	-.162	-3.656	.000
Role of Student/Peers	2.339	1.124	.099	2.080	.038

R2j = 0.032; F= 7.031; p-value = 0.000
Dependent Variable: Mathematical Ability

Among the three factors, the reflective learner has a greater beta coefficient followed by the role of students. The result can be concluded that for every unit increase in the reflective learner and role of students, there is a corresponding increase in mathematical ability by 0.111 and 0.099, respectively. This means that students' who like to stand back, ponder experiences, observe from many different perspectives and students who participated actively with peers in class discussions

and ask many questions as necessary to fully understand the topic will likely to develop mathematical abilities.

Active learner on the other hand, has a negative beta coefficient. The result means that there is an inverse impact of the active learners on the mathematical ability. The result means that every unit increase in the active learner, there is a corresponding decrease of 0.162 in mathematical ability. This means that the more the students get into the action and experiences on what they are trying to learn and the more they come into situations without biases, the less they develop their mathematical ability.

Structural Models of Mathematical Ability

Five hypothesized models were evaluated in terms of measures of fit and statistical significance of coefficients. Fit indices are also provided to give a description of model fit.

The structural model 1 describes a four-factor structure of the Teacher Competence, Classroom Environment, Learning Styles and a one-factor structure of Mathematical Ability. While, Structural model 2 describes a four-factor structure of the Teacher Competence, Learning Styles and a one-factor structure of Mathematical Ability. Structural model 3, on the other hand, describes a four-factor structure of the Teacher Competence, Classroom Environment and a one-factor structure of Mathematical Ability. Also, structural model 4 considers a four-factor structure of the Classroom Environment, Learning Styles and a one-factor structure of Mathematical Ability. And finally, structural model 5 represents a three-factor structure of the Classroom Environment, Learning Styles and a one-factor structure of Mathematical Ability.

A summary of the fit indices of the five structural models considered in this study is found in Table 7. The table reveals that using the standard values determined earlier in this study, Model 1 to 4 have not reached the criteria. Thus it is concluded that these models do not fit the empirical data in this study. In model 5, the fit indices values were closer to the prescribed values. Thus, it is concluded that the final model to describe teachers' competence, classroom environment, learning style and mathematical ability is model 5.

Table 7. Summary of Standard Fit Indices of the Five Structural Model

Model	CMIN/DF	P - Value	GFI	NFI	TLI	CFI	RMSEA
1	5.878	0.000	0.918	0.921	0.914	0.934	0.088
2	4.152	0.000	0.965	0.953	0.948	0.964	0.070
3	5.450	0.000	0.956	0.955	0.947	0.963	0.084
4	8.529	0.000	0.927	0.921	0.898	0.929	0.109
5	1.843	0.064	0.993	0.992	0.990	0.996	0.036
Standard:	<2	>0.05	>0.95	>0.95	>0.95	>0.95	<0.05

As shown in the table above, structural model 5 is the best fitting structural model as indicated that all fit indices met the required criterion. Thus, the null hypothesis states that no structural model best fits mathematical ability is rejected. This implies that the mathematical ability is best predicted by their learning styles and the classroom environment. Among the variables, learning styles has a greater effect on mathematical ability. This result conforms with the statement of Hamdan, et al, (2008) which highlighted that students' learning style is an important element that

can affect a student's ability to achieve something better. Each student has different learning style that process the information. Although nearly all students have the same academic potential, but their learning style may not be identical. The learning styles have matched to the subjects, methods and learning materials. Figure 1 shows the graphical view of the structural model 5 and its parameter estimates.

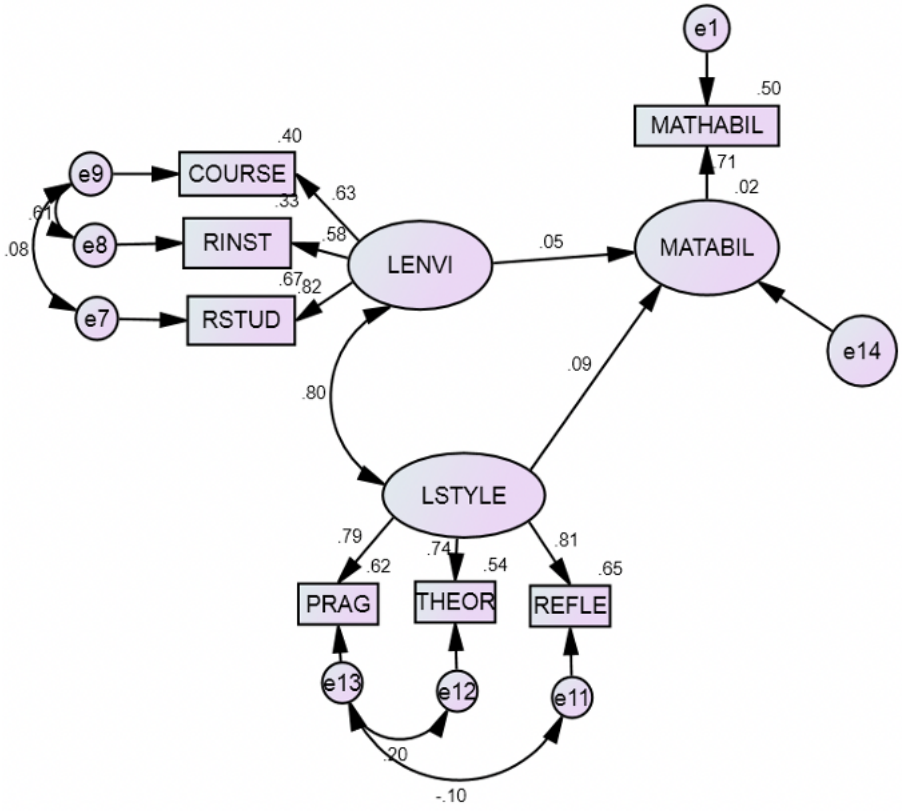

Figure 1. Structural Figure of Model 5

Legend:

LENVI - Classroom Environment
COURSE - Course Content / View of Learning
RINST - Role of Instructor
RSTUD - Role of Students/Peers
MATHABIL - Mathematical Ability
MATABIL - Mathematical Ability Test Result
LSTYLE - Learning Style
PRAG - Pragmatist Learner
REFLE - Reflective Learner
THEOR - Theorist Learner

Meanwhile, classroom environment also has an effect to mathematical ability. This is in parallel to the study of Lawrence & Vimala, (2012) which stated that classroom environment contributes a significant impact on student's performance through curricular knowledge, teaching technique and relationship with the students. It is in the favorable classroom environment that provides the necessary stimulus for learning experiences.

Moreover, teacher competence is not a significant factor in student's mathematical ability. It can be subsumed that teacher as one of the essential player in a teaching and learning framework has the power over student's learning style and the classroom environment.

Based on the above results, it can be theorized that the more structured the learning style coupled with a conducive classroom environment the better the mathematical ability of the students. This proposed theory stresses that students learning style greatly affect a student's mathematical ability, each student has the same academic potential, but their learning style may not be identical.

Moreover, the theory also stresses that classroom environment significantly affects students mathematical ability. This shows that a conducive climate help students become more focused and comfortable in performing their school tasks which resulted in better scholastic achievement.

CONCLUSION

The level of teacher competence, learning environment and learning styles of senior high school students were high and the students' mathematical ability level was moderate. Among the factors of teacher competence, only knowledge of the subject matter show significant relationship on math ability. On the other hand, Role of student/peers of the learning environment shows significant relationship with mathematical ability and reflector learner of the learning styles shows significant relationship with mathematical ability. Result also shows that reflective and active learner and role of students were the predictors of mathematical ability.

Among the five models developed, model 5 best fit the empirical data of this study. This model suggests that mathematical ability is best predicted by their learning styles and the learning environment.

On the bases of the aforementioned findings of the study and drawn conclusions, the following were recommended. First, mathematical ability of the students may be raised to a high level. Mathematics teachers and school administrators may develop comprehensive interventions such as enhancement program to addressed low performing students and those low achieving students at the end of the year may be advised to attend a re-enforcement program.

Findings revealed that the reflector learner is the best determinants for mathematical ability. Thus, teachers handling mathematics subjects may integrate or use student reflections in their mathematics class. Reflection may provide an opportunity for the students to realize when to ask and receive help, contribute to the teaching-learning environment, and as a result students will learn the materials of the course. Mathematics classes may project an environment that encourages students to share (orally and in writing) what they learned in the previous lessons. This activity may help develop students to become reflective learner.

Moreover, role of student/peers revealed as a determinant of mathematical ability. Thus, teachers may develop activities that will allow the students to develop their ability to reason and judge based on standards defined by the subject and an opportunity to think on their own, making connections between the issues discussed in class and other areas they are studying by providing them activity that will challenge them to work hard in class.

Learning style and classroom environment are the key determinant of mathematical ability. Thus, teachers may conduct a learning style inventory test at the beginning of the school year for them to prepare and design classroom activities that is suited to the learning orientation of the students. Teachers may also promote a conducive classroom environment that maximizes the learner's ability by providing classroom activities that stimulate student's curiosity and inspire their desire to learn.

REFERENCES

Abbott, S. (Ed.), (2014). Classroom Management. *The Glossary of Education Reform* (Website). Retrieved from http://edglossary.org/classroom-management.

Adeyemo, S. A. (2010). Students ability level and their competence in problem solving task in physics. *International Journal of Educational Research and Technology, 1*(2), 35-47.

Akey, T. M. (2006). *School Context, Student Attitudes and Behavior, and Academic Achievement: An Exploratory Analysis*. MDRC.

Ali, N., Ali, S., Jusoff, K., & Salamat A. S. (2009). *The Factors Influencing Students' Performance at Universiti Teknologi MARA Kedah, Malaysia*. Canadian Research & Development Center of Sciences and Cultures.

Allen, D., & Fraser, B. J. (2007). Parent and student perceptions of classroom learning environment and its association with student outcomes. *Learning Environments Research, 10*, 67-82.

Analoui, F. (1995). Teachers as managers: an exploration into teaching styles. *International Journal of Educational Management, 9*(5), 16-19.

Ashby, J., Sadera, W. A., & McNary, S. W. (2011). Comparing student success between developmental math courses offered online, blended, and face-to-face. *Journal of Interactive Online Learning, 10*(3).

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review, 84*(2), 191.

Basque, J., & Dare, S. W. (1998). Environment and apparatuship information. Journal of distance education, 13(1), 626-638.

Bosque, R. & Dore. (1998). Impact of Family Environment on Academic Achievement of Secondary School Students in Science Subject. *International Journal of Research in Economics & Social Sciences*.

Batomalaque A. E. (2012). Basic science development program of the Philippines for international cooperation. Retrieved from http://www. criced.tsukuba.ac.jp/pdf/09_Philippines_Antonio.pdf.

Corpuz, B. B. (2007). Facilitating learning: a metacognitive process. Lorimar Publishing.

Curry, L. (1981). Learning preferences in continuing medical education. *Canadian Medical Association Journal, 124*, 535–6.

Dunn, K. & Dunn, R. (1987). Teaching student through their individual learning styles: A practical approaches. Reston Publishing Company.

Gross, D. (2013). *Academic Performance: A healthy home environment*. Carfax Publishing.

Idris, N. (2005). *Pedagogi dalam pendidikan matematik*. Utusan Publications and Distributions.

Kolb D. A. (1984). *Experiential learning: experience as the source of learning and development*. Prentice Hall.

Kolb, D. A. (1999). *The learning style inventory* (version 3). Hay Group.

Lopez, A. D. (2007). The relationship between continuing professional development and demographic characteristics, professional practices, and employment conditions of school psychologists. University of South Florida.

MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. Podsakoff, P. M. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management, 26*(3), 513-563.

Medley, D. M., and Shannon, D. M. (1994), Teacher evaluation. In T. Husén and T. N.

Postlethwaite (eds), *The International Encyclopedia of Education*, 2nd ed (vol X). Pergamon.

Natarajan, R. (2014). Proceedings of the international conference on transformations in engineering education:. Retrieved from http://www.springer.com/gp/book/9788132219309

Oxford, R. L. (2011). Strategies for learning a second or foreign language. *Language Teaching*.

Polya, G. (1985). *How to Solve It*. Princeton University Press.

Reid, J. (1987). *The learning style preferences of ESL students*. TESOL Quarterly.

Salandanan, G. G. (2005). *Teaching and the Teacher*. Lorimar Publishing Company.

Sarabdeen, J. (2013). Learning styles and training methods. *Communications of the IBIMA*.

Siddiqui, M. A. (2009). *National curriculum framework for teacher education*. National Council for Teacher Education, New Delhi.

Tella, A. (2008). Teacher Variables As Predictors of Academic Achievement of Primary School Pupils Mathematics. *International Electronic Journal of Elementary Education*, *1*(1).

Turesky, E. F., & Gallagher, D. (2011). *Know thyself: Coaching for leadership using Kolb's experiential learning theory*. The Coaching Psychologist

Vogrinc, J., & Zuljan, M. V. (Eds.). (2010). *Facilitating effective student learning through teacher research and innovation*. Faculty of Education.

Vygotsky, L.S. (1962). *Thought and Language*. MIT Press.

Wade, B. & Moore, M. (2000). *A sure start with books*. Early Years.

Walberg, H. J. (1980*). A psychological theory of educational productivity*.