Science and Mathematics Teachers' Educational Philosophies and Teaching Style Preferences

Jocelyn L. Reyes
elenjoy_dec82007@yahoo.com

ABSTRACT

Purpose of the Study: This research examined the instructional ideologies and teaching style preferences of identified science and mathematics teachers at the different levels: primary , secondary (junior and senior) and tertiary in Region IV, Philippines.
Methodology: The results were gathered using a 40-item questionnaire evaluating educational theory and a 24-item Stafforshire Teaching Styles Assessment (SETS). Stratified random sampling has been introduced to rank the 200 participants in the research. This work employed the framework of descriptive-correlation to determine the findings.
Main Findings: The study reveals that most secondary and tertiary teachers are progressivsits whilst most elementary teachers are essentialists. A few found themselves perennialist. It may be argued that science and math teachers subscribe to the ideology of intellectual progressivism, preceded by fundamentalism, then existentialism and social reconstructionism. The least to hang on to is perennialism.
Application of this Study: The most studied theory, progressivism, fits in with the accompanying instructional approach, the open yet constructive form of all-round learning. Both progressivism and the agile and versatile all-round model are student-centric and are in line with K to 12 curriculum's Philippine intellectual base. Teachers attach importance to students' needs, recognizing the students' presence as the learning cycle's nucleus. Students are given the ability to make their own learning decisions and to help design the learning cycle.
Novelty/Originality of this Study: The wide variety of skills and techniques that the science and mathematics teachers employ to keep students organized, focused, attentive and academically productive are in consonance with their philosophies of education and teaching style preferences. Educational settings in many parts of the world continuously change. Swift developments and vast innovations equip both teachers and learners with adaptation mechanisms to simultaneously swirl with the fast changing world. However, there are also status quo elements in the system like educational philosophies and teaching style preferences.

Hence, the researcher was inspired to conduct this study.

Article Received: 10 August 2020, Revised: 25 October 2020, Accepted: 18 November 2020

1. INTRODUCTION

In Higher Education Institutions (HEIs), teachers are the essential element of quality teaching and learning. Education depends mostly on teachers'competence and expertise. Teachers have many roles, from classroom planning to activities, training, discipline and motivation, and guiding students[1] . They set the tone of the classrooms, create a conducive and warm environment, nurture students and serve as role models. They are also expected to use both effective teaching strategies and adept teaching styles in teaching math and science subjects in all grade and year levels. In a study conducted by Gorgen and Tahta (2005) as cited in Unal [2], mathematics teaching is linked to more than one aspect and to other disciplines as well. The primary objective of being effective mathematical teaching is about mathematical transition of knowledge so that the students can adapt to the new case and knowledge. The educational goal is not merely to acquire and transfer knowledge, but rather to enable students to solve problems that will enable them to develop their effective thinking, critical thinking, and the skills of higher order thinking. Teachers need to help them develop their understanding of their own intelligence and their ability to understand, manage and manipulate their own thoughts [3]. To accomplish this, teachers should know how to make the lesson more fun or to come up with different ways to make teaching and learning more interactive, engaging, and meaningful. As teachers develop they can help students integrate their teaching skills into mathematical knowledge and other activities , for example, and what works best for their individuals and curriculum[4]. As 21st century teachers, one important aspect of a good teacher is being constantly open to new ideas on how to improve one's teaching; that will involve adopting new practices and developing new skills. As such, further review of one's own teaching is important for professional development[5]. Therefore it is important to note

that the role of developing and extending the teaching abilities is not simply an instructor 's particular responsibility. This is the duty of those within the school and non-school organisations to insure that this growth is supported as part of the teacher's professional growth and as part of the school's staff development as a whole[6]. To conform with students' learning interests, therefore, instructor interests in teaching maths and sciences are significant.

2. RESEARCH METHOD

This research has employed the descriptive-correlation approach with document scanning. The descriptive approach was used to define the level of benefits and disadvantages of extracurricular activities and the level of academic performances. The correlation method was used to assess the relationships between those variables. University authorities had been granted approval for this work to be conducted. Using the Slovin method for determining sample size (n=180), stratified random sampling technique was employed to evaluate the research sample. University graduates who had taken interest in extracurricular activities were taken as respondents. This research is close to the analysis carried out by Govindarajulu&Venkataramaraju[7] as it used main (questionnaire) and secondary (scholastic reports of students) outlets of data collection. Mean and correlation procedures have been employed to shed light on this study's descriptive and inferential problems. A 40-item educational theory questionnaire and 24-item Stafforshire Teaching Style Assessment (SETS) were used to collect results.

Using the Slovin method for determining sample size (n=180), stratified random sampling technique was employed to evaluate the research sample. A 40-item educational theory questionnaire and 24-item Stafforshire Teaching Style Assessment (SETS) were used to collect results. Data sources were questionnaires and interviews from the various public and private schools in both elementary and high school (Juniors and Seniors) and teachers at the tertiary level in Region IV-A, including Cavite State University.

RESEARCH SETTING

This research was conducted in public and private schools in Area IV-A, namely primary, secondary (both junior and senior high schools) and tertiary grades.

RESEARCH SAMPLE

Convenient sampling was applied to identify the study's 180 participants. There were 60 primary, 60 intermediate, and 60 tertiary teachers required to do the two survey instruments. There were 86 teachers in science and 94 teachers in maths.

3. RESULTS AND DISCUSSION

Table 1. Distribution of Math and Science Teachers According to Level and Educational Philosophies

Level		Progressivism		Essentialism		Existentialism		Social Reconstructivism		Perennialism	
Tertiary (n=60)	Math	19	39 (65%)	5	10 (17%)	2	5 (8%)	4	5 (8%)		1 (2%)
	Sci	20		5		3		1		1	
Secondary (n=60)	Math	23	50 (83%)	6	8 (13%)				1 (2%)		1 (2%)
	Sci	27		2				1		1	
Elementary (n=60)	Math	10	18 (30%)	20	35 (59%)	2	4 (7%)	1	1 (2%)	2	2 (3%)
	Sci	8		15		2					

Table 2. Distribution of Math and Science Teachers According to their Educational Philosophies

	Progressivism	**Essentialism**	**Existentialism**	**Social Reconstructivism**	**Perennialism**
Math Teachers	52 (29%)	31 (17%)	4 (2%)	5 (3%)	2 (1%)
Science Teachers	55 (31%)	22 (12%)	5 (3%)	2 (1%)	2 (1%)
Total	107 (59%)	53 (29%)	9 (5%)	7 (4%)	4 (2%)
Rank	1	2	3	4	5

As regards the math and science teachers' educational philosophy, the study reveals the following: most of the tertiary teachers (or 65%) are progressivists; most of the secondary teachers (or 83%) are also progressivists; and majority of the elementary teachers (or 59%) are essentialists. Majority of the all teachers in the different levels (or 59%) are progressivists; Very few (or 4%) of all teachers in the different levels consider themselves as perennialists; Of the progressivist teachers, 49% of them are science teachers and 51% are math teachers; and of the essentialist teachers, 58% of them are science teachers and 42% are math teachers.

Progressive teachers seek to make the school fun and productive by preparing thought-provoking lessons. The students are actively learning within a progressive school. Students communicate with each other and establish diverse perceptions on social values such as teamwork and acceptance. This is evident at their respective colleges, as the teachers of science and math attest. Progressives agree that the emphasis of education is on the entire individual, not the teacher or the content. This philosophy of teaching emphasizes that the ideas should be tested by students by active experimentation. Education is embedded in issues that come from understanding the environment as a learner. They 're violent, and don't passive. The learner is a problem solver and planner, who makes meaning in the physical and cultural context through his or her inner experience. Good instructors provide chances to better the learners by doing so. Curriculum material from the student preferences and questions[8] is drawn. Progressive schooling, as described, should include incentives for socially relevant learning tailored to the development of young children[9].

On the other hand, essentialism is the ideology of teaching fundamental skills in the school. This philosophy advocates mental training. Essentialist educators are focused on conveying a set of increasingly challenging topics and advancing students to the next level or grade. Evidently in this study, elementary teachers are more of essentialists. The teachers utilize memorization, practice, assessment, and focused on core knowledge in reading, writing, math, science, and history.

In general, though philosophy type distribution varies from one another, most teachers hold the philosophy of progressivism. This ensures the teachers utilize imaginative and inventive instructional methods the correspond with the students' desired learning objectives, abilities, preferences, and personality types. Many teachers employ progressivism, as teachers of the 21st century are expected to provide expertise as global teachers defined as part of the teaching skills system. Such competencies are consistent with the national implementation of the Professional Standards (PPST) for Philippine Teachers. The PPST shall be used as a guide for both teachers' learning and development activities and shall ensure that teachers are well educated and that the K to 12 program is successfully implemented. Also, it can be used to identify and recruit students. This criteria collection[10] is used to construct all assessments of instructor success.

Table 3. Distribution of the Math and Science Teachers According to Level and Teaching Style Preferences

Level		Teaching Style 1		Teaching Style 2		Teaching Style 3		Teaching Style 4		Teaching Style 5		Teaching Style 6	
Tertiary (n=60)	Math	19	40 (67%)	6	10 (17%)	3	5 (8%)		2 (3%)	2	3 (2%)		
	Sci	21		4		2		2		1			
Secondary (n=60)	Math	15	38 (63%)	6	8 (13%)	1	4 (7%)	3	3 (5%)			4	7 (13%)
	Sci	23		2		3						3	
Elementary (n=60)	Math	20	31 (52%)	10	25 (42%)	1	3 (5%)	1	4 (7%)	3	5 (8%)		2 (3%)
	Sci	11		5		2		3		2		2	
Total (N=180)	Math	54 (30%)		22 (12%)		5 (3%)		4 (2%)		5 (3%)		4 (2%)	
	Sci	55 (31%)		11 (6%)		7 (4%)		5 (3%)		3 (2%)		5 (3%)	
		109 (61%)		33 (18%)		12 (7%)		9 (5%)		8 (4%)		9 (5%)	
Rank		1		2		3		4.5		6		4.5	

Table 4. Distribution of the Math and Science Teachers According to Teaching Style Preferences

	Teaching Style 1	Teaching Style 2	Teaching Style 3	Teaching Style 4	Teaching Style 5	Teaching Style 6
Math Teachers	54 (30%)	22 (12%)	5 (3%)	4 (2%)	5 (3%)	4 (2%)
Science Teachers	55 (31%)	11 (6%)	7 (4%)	5 (3%)	3 (2%)	5 (3%)

Total	**109 (61%)**	**33 (18%)**	**12 (7%)**	**9 (5%)**	**8 (4%)**	**9 (5%)**
Rank	**1**	**2**	**3**	**4.5**	**6**	**4.5**

Legend:
Teaching Style 1 - preferred by the all-round flexible and adaptive teacher
Teaching Style 2 - preferred by the student-centered flexible teacher Teaching Style 3 - preferred by the official curriculum teacher
Teaching Style 4 - preferred by the straight-facts no-nonsense teacher
Teaching Style 5 - preferred by the big conference teacher
Teaching Style 6 - preferred by the one-off teacher

In 2007, Mohanna, Chambers and Wall established Stafforshire Assessment of Teaching Styles (SETS)[11] and defined six teaching styles: all-around versatile and adaptable; student-centered, sensitive; official curriculum; clear truth, no nonsense; and broad lecture. With respect to the teaching style preferences of math and science students, the research shows that most tertiary students (or 67 per cent) favor the versatile and comprehensive model of all-round instruction. Moreover, most of the secondary teachers (or 63 percent) and most of the elementary teachers (or 52 percent) prefer the flexible and adaptive style of all-round education. The majority of all teachers at the various levels (or 61 per cent) prefer the flexible and adaptive style of all-round teaching. Only eight (or 1 per cent) of all teachers at the various levels choose the teaching style of the big-conference. Of all-round flexible and adaptive teachers, 50% are science teachers and 50% are math teachers; and of the student-qualified flexible teachers, 67% are math teachers and 33% are science teachers.

Many of the math and science teachers favor the all-round, agile and versatile approach to instruction. The next choice is the versatile, student-centered model; with the formal curriculum design accompanied. The teaching styles of straight-fact nonsense teacher, major lecturing teacher and one-off teacher were not popular among them. The most researched philosophy, progressivism, is in line with the accompanying teaching process, the all-round functional and realistic methodology as all are student-centered and are in line with K to 12 curricula Philippine theoretical bases. Teachers attach importance to students' needs, recognizing the students' presence as the learning cycle's nucleus. Students are granted opportunities to make their own learning choices and contribute to the nature of the learning process. The broad variety of strategies and methods used by science and mathematics instructors to maintain students coordinated, centered, diligent and academically successful are in keeping with their instructional and teaching style expectations ideologies. In many parts of the world educational settings are constantly changing. Swift developments and extensive innovations equip both teachers and learners with adaptation mechanisms to swirl with the fast-changing world at the same time. However, there are also elements of the status quo in the system such as educational philosophies and preferences of teaching style. This inspired the researcher to conduct this study. The original instrument for surveying teaching philosophy was adapted and slightly modified in this study[12]. Progressivism, essentialism, perennialism, liberal reconstructivism and existentialism were the prevailing ideologies.

4. CONCLUSION (10 PT)

Based on the study findings, it can be concluded that teachers of science and math adhere to the educational philosophy of progressivism, followed by fundamentalism, then existentialism and social reconstructionism. The least to hold on to is perennialism. Many of the math and science teachers favor the all-round, agile and versatile approach to instruction. The next preferred one is the flexible, student-centered style; followed by the official style of curricula. The teaching styles of straight-fact nonsense teacher, major lecturing teacher and one-off teacher were not popular among them. The most discussed philosophy, progressivism, suits the related system of

teaching, the all-round paradigm agile and egalitarian since both are student-centric. Math and science teachers emphasize students' curiosity, and consider students' speech as the core of the learning cycle. Students are given incentives to make their own learning decisions and relate to learning cycle design. The researcher would like to find out how these teaching styles align with the students' learning style to ensure an effective teaching and learning process for future study.

Provide a statement that what is expected, as stated in the "Introduction" chapter can ultimately result in "Results and Discussion" chapter, so there is compatibility. Moreover, it can also be added the prospect of the development of research results and application prospects of further studies into the next (based on result and discussion).

REFERENCES

[1] M. Unal. "Preferences of teaching methods and techniques in mathematics with reason" *Universal Journal of Educational research* 5 (2): 194-202. Http://www.hrpub.org. Turkey: Ahi Evran University. DOI: 10.13189/UJER.2017.

[2] I. Görgen&H. Tahta. "Liselerdematematiköğretimisürecindekiöğretmen davranışlarıileöğrencibeklentilerininkarşılaştırılması" MilliEğitimDergisi, 33, 166. [12] Grant, C. E. (1984). Cited in: Unal, M. [2017]. Universal Journal of Educational Research 5 (2): 194-202, 2005.

[3] A.M. Aquino. "Facilitating human learning." 2nd ed. Manila: Rex Book Store. p.1, 2015.

[4] M. Santos-Trigo. "Mathematical problem solving: an evolving research and practice domain." ZDM Mathematics Education, 39, 523–536. [34], 2007.

[5] R.M. McGill. " Mark. Plan. Teach." London: Bloomsbury, 2017.

[6] C. Kyriacou. "Essential teaching skills." 5th ed. Oxford: Oxford University Press. p. 33, 2018.

[7] K.Govindarajulu&D. Venkataramarajulu. 'The importance of knowledge management in the government training institution and its issues &cahllenges – a case study." *International Journal of Civil Engineering and Technology (IJCIET) 8 (11), 2017.*

[8] Philosophical perspectives in education. In: Https://www.oregonstate.edu.

[9] J. Dewey. "Experience and education" New York: Macmillan, 1938.

[10] Department of Education Order no. 42 s.2017. "Philippine Professional Standards for Teachers (PPST). National adoption and implementation of the Philippine Professional Standards for Teachers." Retrieved: June 8. 2020.

[11] C. Persaud. "Teaching styles: the ultimate guide."In:https://tophat.com/blog/teaching-styles/ on June 22, 2019.

[12] **Educational Philosophy Survey.** Uploaded by api-273026065. **Retrieved from https://www.scrib.com/doc/249317087/education al-philosophy-survey on January 20, 2019.**