

# Argumentative Discourse Analysis Focusing On the Issues When Teaching Science of Physics and Mathematics in Academic Institutions in Philippines, Region 2 and Libya

<sup>1</sup> Abduljalil Ebrahim Abdulhadi,<sup>2</sup> Adel Ali Diab

<sup>1</sup>Department of physics, Faculty of Science, Bani Waleed University

<sup>2</sup> Department of Mathematics, Faculty of Science, Bani Waleed University

Corresponding Author: <sup>1</sup> Abduljalil Ebrahim Abdulhadi,<sup>2</sup> Adel Ali Diab

---

**Abstract:** This Argumentative Discourse Analysis (ADA) was conducted to gather issues, concerns and challenges in teaching Science of physics and mathematics in Region 02, Philippines and two schools in Libya. It was participated by Academicians from different educational institutions in Libya and in the Philippines particularly in Region 2. Responses and insights were gathered from teachers who hold administrative positions in their workplaces. There are six respondents in this ADA. Four of them are from the Philippines while the remaining two are from Libya. These respondents are Teachers, and Department Heads in Schools that offer Science of physics and mathematics.

A close ended questionnaire was floated to respondents and their responses were summarized and analyzed accordingly. Mean and percentage distribution were used to analyze the profiling of schools and respondents while issues or challenges and recommendations are properly summarized. As a result, many of issues/challenges associated with the learning of science of physics and mathematics in schools can be avoided if science teachers/ educators are cognizant of both the cognitive abilities and the type of learners. Based on the results of the study, the following recommendations should be considered. Reduce academic curricula while merging some of them if possible. Revise and enhance the contents of the curricula to properly equip the students with competitive background. Provision of professional development for science in-service and preservice teachers that include learners' development and motivation. Foster a more productive learning environment. Encourage inquiry-based learning by posing questions and problems that require students to investigate, analyze data, and draw conclusions. Faculty retooling and recalibration of learning materials that can be suitable at the emergence of new breed of learners of this generation. Learning materials should be centralized and there must be provision of necessary laboratory equipment and reagents that can be used to teach basic laboratory skills and techniques to students.

**Keywords:** curriculum, teachers, evaluation, Argumentative Discourse Analysis, physics and mathematics.

---

Date of Submission: 03-02-2024

Date of acceptance: 14-02-2024

---

## I. INTRODUCTION

The development and execution of curricula frequently run into several issues. Some of instances, albeit they can vary based on the circumstance and educational level are the following but not limited to: First, lack of alignment with learning objectives, this is when the curriculum fails to successfully align with the anticipated learning outcomes or goals of the educational program, this poses one of the biggest issues. This inconsistency may cause a discrepancy between what is expected of learners and what is taught. Second, is the inclusion of outdated or irrelevant content in the curriculum. In rapidly evolving fields, such as technology or science, it is crucial to regularly update the curriculum to keep pace with the latest developments. Failing to do so can result in students being taught information that is no longer accurate or applicable. Third, are unavoidable occasions when curricula have too much substance, which causes packed lesson plans and insufficient time for in-depth understanding.

Teachers could thus speed through lessons without giving their learners enough time to thoroughly understand the material. In addition, the effectiveness of the curriculum can be hampered by an inadequate assessment mechanism. It becomes challenging to effectively assess students' development if evaluations do not correspond with the learning objectives or do not measure higher order thinking skills. Additionally, a restricted concentration on test preparation rather than a comprehensive education may result from an overemphasis on standardized testing. The successful implementation of a curriculum might be hampered by a lack of chances for teachers to get professional development. To comprehend the objectives, subject matter, and teaching

techniques of the curriculum, teachers need to have proper training and assistance. Without the proper professional development, teachers could find it difficult to properly deliver the curriculum.

Careful planning, regular evaluation, and a dedication to continual progress are all necessary for solving these issues. To ensure the curriculum's efficacy and relevance in the shifting educational landscape, it is critical to involve pertinent stakeholders, offer chances for professional development, and frequently review and update the curriculum. As Professors at universities, we recognize the significance of comprehending the challenges encountered in the curriculum to devise solutions that would benefit students, university, and professors. Hence, this argumentative discourse analysis has been developed.

## II. METHODOLOGY

This Argumentative Discourse Analysis was participated by Academicians from three Higher Education Institution in Region 02 and two schools in Libya. A close ended questionnaire was floated to respondents and their responses were summarized and analyzed accordingly. Participating respondents were selected as long as they teach science of physics and mathematics in their school and they must be willing to participate in the conduct of this Argumentative Discourse Analysis.

Mean and percentage distribution were used to analyze the profiling of schools and respondents while issues or challenges and recommendations are summarized in this paper.

## III. RESULTS AND DISCUSSIONS

This Argumentative Discourse Analysis was done through the participation of representatives from different educational institutions in Libya and in the Philippines particularly in Region 2. Responses and insights were gathered from instructors or staff who hold administrative positions in their workplaces. There are six respondents in this Argumentative Discourse Analysis. Four of them are from the Philippines while the remaining two are from Libya. These respondents are Teachers, Laboratory Custodians, Laboratory Technicians and Department Heads in Schools that offer Science of physics and mathematics .

In this Argumentative Discourse Analysis, the profile of the school and respondents were taken. This is to give readers and students a glimpse about the participating schools and respondents.

**Table 1.** Profile of the School

Parameters	Frequency	%
TYPE OF OWNERSHIP		33.33
Government	2	
Private	4	66.67
NUMBER OF YEAR OF OPERATIONS		
1-5 Years	2	33.33
5 years and 1 day -10 Years	0	0
10 Years and 1 day to 20 years	0	0
More than 20 Years	4	66.67
TYPE OF ACCREDITATION		
PACUCOA	2	33.33
AACCUP	1	16.67
PAASCU	1	16.67
NCQAAETI	2	33.33
LEVEL OF ACCREDITATION		
Level 1	3	50.00
Level 2	2	33.33
Level 3	1	16.67
Level 4	1	16.67

As it is shown in Table 1.1, participating schools were profiled in terms of type of ownership, number of years of operation, type and level of accreditation considering that recent studies revealed that these factors have significant impact to the delivery of science education (Alenezi, 2023)

In terms of type of ownership, the data revealed that most of the respondents are employed in schools that are privately owned. These schools include the University of La Sallette and the Medical Colleges of Northern Philippines. Both of these Higher Education Institutions are situated in Cagayan Valley. The other school, Babel Elementary School, is in Libya. Two schools are also noted to be owned by the Government. One of which is the Cagayan State University which is a Higher Education Institution in Cagayan while the other is Omar Ben Alas School that is found in Libya.

When it comes to the number of years of operations, the data revealed that most of the participating schools are in operation already for more than 20 years. These include the University of La Sallette that was founded in 1950, the Medical Colleges of Northern Philippines which was established in 1994 and the Cagayan State University which was conceived in 1978. The remaining two institutions are in Libya and in operation in about four years.

As to the type of accreditation, the data shows that all of the schools have been accredited. The University of La Sallette and the Medical Colleges of Northern Philippines were noted to have undergone accreditation of the Philippine Association of Colleges and Universities- Commission on Accreditation (PACUCOA). Other than this, University of La Sallette was also accredited by the Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU). In addition, the table also reveals that Cagayan State University have been accredited by the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP). When it comes to the schools in Libya, these institutions are accredited by the The National Center for Quality Assurance and Accreditation of Educational and Training Institutions.

As to the level of accreditation, the schools in Libya have passed the level 3, Babel Elementary, and level 4, Omar Ben Alas School, of accreditation accordingly. While in terms of the Higher Education Institutions in the Philippines, the Medical Colleges of Northern Philippines was accredited level 2 by the PACUCOA. In addition, the University of La Sallette has passed the level 1 accreditation in both PACUCOA and PAASCCU while Cagayan State University was also recorded to have been passed the level 1 accreditation in AACCUP.

**Table 2:** Profile of the science educator in terms of

PROFILE	FREQUENCY	PERCENTAGE
AGE		16.67
18-24	1	
25-29	1	16.67
30-34	2	33.33
35-39	1	16.67
40-44	0	0
45-49	0	0
50-54	1	16.67
SEX		
Male	4	66.67
Female	2	33.33
HIGHEST EDUCATIONAL ATTAINMENT		33.33
Elementary Graduate	2	
High School Undergraduate	0	0
High School Graduate	0	0
College Undergraduate	0	0
College Graduate	2	33.33
Post Graduate Degree Holder	2	33.33
LENGTH OF SERVICE		33.33
2 years and 1 day to 5 years	2	
5 years and 1 day to 10 years	3	50.00
10 years and 1 day to 15 years	1	16.67
EMPLOYMENT STATUS		33.33
Contractual	2	
Permanent	4	66.67

SUBJECTS TAUGHT		
With Laboratory	4	66.67
With No Laboratory	2	33.33

Respondents in this Argumentative Discourse Analysis was profiled in terms of age, sex, highest educational attainment, length of service, employment status and subjects taught since it was considered as predisposing factors that affect the delivery of science education (Abad, 2019)

In terms of age, the data showed that most of the respondents are young adults with an age range of 18-39 while one of the respondent belongs to a middle age group with an age range of 40-54. A study that was conducted in Spain shows that age has a crucial role in the challenges encountered in teaching science. The researched showed that as a teacher or administrator has more advance aged, it is believed that they get more trainings and experiences in delivering their lessons making them capable to adapt to challenges. They can also make challenges less impactful to learners (Mena, 2020). This findings was supported by a study that was held in India in 2018 wherein other than age, sex could also be a factor to consider.

As to sex is in concern, the respondents were predominated by male academicians. In fact, only two out of six respondent are female. According to the study conducted by Shah in 2018, female teachers have more challenges in teaching science cnsidering that they tend to have more factors to consider including biological phenomenon they used to encounter. This include menstruations, hormonal imbalances leading to mood swings and the like,

In terms of highest educational attainment, all respondents from Libya were not able to reach the high school level considering the challenges they encounter in education. On the other hand, all respondents from academic institutions in the Philippines are college graduates though two of them are able to hold post graduate degrees. A study conducted by Pilo in 2012 has shown that trainings and advance education of teachers are factors that significantly affect the delivery of science education. This means that the more advance or higher the studies or academic attainment and training of a teacher is, the better would be the delivery of their lessons in class. Furthermore, it follows that they tend to become more resourceful when challenges arise.

When it comes to length of service, the respondents from Libya are connected in the academe in about two to five years while all respondents from the Philippines were in teaching service for 5 years and above although one of them is already in the academe for 10 years to 15 years. The length of service reflect the degree of experiences gained by each academicians, This means that the longer a teacher's length of service, the more experienced he or she is, making them capable to adapt in any challenges in teaching science in class (Pilo, 2012)

As for the employment status, the respondents from Libya are both contractual while all respondents from the Philippines are tenured faculty members.

Finally, as to the subjects they teach, the data revealed that respondents from Libya are teaching Mathematics. These subjects have no laboratory components. On the other hand, respondents from the Philippines are teaching subjects with laboratory components since they teach in professional courses that include Medical Technology and Public Health.

When it comes to the issues and challenges encountered by the teachers or educators, it appeared that respondents have common concerns that include are assoaicted in the curriculum, teaching experience, teaching and learning materials and facilities they use in teaching

Area	Issues and Challeneges	Recommendations
A. Curriculum	<ul style="list-style-type: none"> <li>✓ There are some programs that are used to change their curriculum from time to time. In this case, program tend to have lots of curricula implemented in each year level of student in one fiscal year.</li> <li>✓ Furthermore, one respondent also reiterated that their major issue is that they do not have a CHED Memorandum Order for their program</li> </ul>	<ul style="list-style-type: none"> <li>✓ There should be a stable learning plan</li> <li>✓ Revise and enhance the contents of curricular course to properly equip the students with competitive background before facing the professional subjects of Level III and IV.</li> <li>✓ Reducing academic curricula while merging some of them if possible</li> <li>✓ Open elective subjects for the student Teaching Experience</li> <li>✓ There must be CMO in all programs</li> </ul>
B. Teaching Experience	<ul style="list-style-type: none"> <li>✓ It shows that all teachers are teaching outside their subject specialism, meaning that one has</li> </ul>	<ul style="list-style-type: none"> <li>✓ There must be trainings and seminar on advancement of technology in Teaching science</li> </ul>

	<p>either not studied this subject at degree or at pre-university advanced level or lack trainings and skills to teach certain subjects.</p> <ul style="list-style-type: none"> <li>✓ Teaching outside area of expertise offers considerable challenges and teachers express concern and apprehension when dealing on this situation. More than this, it also appeared that students have a difficult time in grasping information thought in English as the language of instruction. Aside from this, the students also have a hard time correlating information needed in their course</li> <li>✓ Teachers' lack of confidence when teaching topics outside their area of expertise is manifested in different ways such as when preparing lesson plans, choosing, or devising activities and analogies to aid students' learning, answering students' questions, setting up laboratory experiments,</li> <li>✓ Linking and applying various concepts and principles to everyday life situations, generating students' Interest and passion for the science area. Science is the most fundamental of all the sciences, but it is also the most difficult to teach.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Encourage inquiry-based learning by posing questions and problems that require students to investigate, analyze data, and draw conclusions. This approach promotes critical thinking, problem-solving skills, and a deeper understanding of scientific principles.</li> </ul>
C. Teaching and Learning Materials	<ul style="list-style-type: none"> <li>✓ The respondents highlighted that there is a need to have an advancement of technological materials to be used in instruction because these are somehow a challenge for them due to abrupt changes in the modalities of teaching.</li> <li>✓ It was also noted that there are lack of recalibrated materials that will be helpful in approaching the generation of students that they teach</li> </ul>	<ul style="list-style-type: none"> <li>✓ Faculty retooling and recalibration of learning materials that can be suitable at the emergence of new breed of learners of this generation.</li> <li>✓ There is a need to provide permanent classrooms or faculty room for teachers</li> <li>✓ There is a need to develop the material and its sources</li> </ul>
D. Facilities (Classroom and Laboratory)	<ul style="list-style-type: none"> <li>✓ For subjects with laboratory components, there is lack of usable reagents that can be used for demonstration and competency laboratory activities that can test the students capabilities in laboratory manipulations and techniques.</li> <li>✓ Furthermore, diagnostic and Molecular Biology laboratories are not available.</li> <li>✓ There are also issues as to shortage of classrooms and poor scheduling of classes</li> </ul>	<ul style="list-style-type: none"> <li>✓ Schools must provide necessary laboratory equipment and reagents that can be used to teach basic laboratory skills and techniques to students</li> <li>✓ Adding the classrooms and the laboratories room numbers and providing the latest learning devices and equipment</li> </ul>

## V. CONCLUSION

Teachers are lucky to live in this era of technology. We have so many resources at our finger tips. In order to create lessons/ activities that will capture student interest, we must first base them on science standards and the scientific process skills, then use students' prior knowledge and experiences to come up with hands-on activities. We must have students work together and let their interest drive the learning experience. We must use their questions to lead the experiments. This means looking for or developing activities that work for a class. Every year this may change.

As teachers, it can be difficult to act only as a facilitator but truly, students will learn skills for life when they have a part in their learning process. We as teachers must learn to be creative with our learning materials, lessons and in developing new activities that are appropriate for the type of our students. Lastly, we must remember to show interests in the whole concepts we are professing. Students look up to us when learning new things for students to be fully engaged in the learning process. If students see that learning about science is fun, they will learn and apply that in their daily lives too. Science is everywhere, which means that they can learn anytime about science use their critical thinking about something that is intriguing them.

We strongly argue that many of issues/ challenges associated with the learning of science in schools can be avoided if science teachers/ educators are cognizant of both the cognitive abilities and the type of learners they have.

## REFERENCES

- [1]. Abad, B.D. and Laguatana, R.P. (2019) Science Teacher's Qualities: The Basis for a Faculty Sustainability Program, San Marcelino San Marcelino, Zambales, Philippines
- [2]. Alenezi, S. (2023), Impact of external accreditation on students' performance: Insights from a full accreditation cycle
- [3]. Mena, A.S. (2020) The Effect of Age on Teachers' Intention to Use Educational Video Games: A TAM Approach, Universidad

Europea de Valencia, Valencia, Spain, Universidad Europea de Canarias, Tenerife, Spain Universitat de València, Valencia, Spain

- [4]. Pilo, M. (2013) Science Education and Teachers' Training: Research in Partnership Miranda Pilo University of Genoa, Genoa, Italy
- [5]. Shah, S.R. and Usha, S.U. (2019) Influence of Gender and Age of Teachers on Teaching: Students Perspective, University Medical College and Hospital, Maharashtra, India