

Physics Instruction Utilizing Culture-Based Pedagogy

Asia Pacific Journal of
Multidisciplinary Research
Vol. 3 No. 4, 50-58
November 2015 Part IV
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com

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Date Received: September 13, 2015; Date Revised: October 28, 2015

Abstract - *This research assessed topics in physics where culture-based pedagogy may be utilized and the applicability of Batangueño culture to these topics. It also determined the visual presentations which can be prepared by teachers to incorporate Batangueño culture in physics instruction. The end purpose of the study was to develop a teaching guide using culture-based pedagogy to reinforce the student's learning, and help them achieve high academic performance.*

Descriptive method was adopted with questionnaire as tool in gathering data. Interviews and focus group discussions were also conducted. Thirty physics teachers in public secondary schools of the Division of Batangas City served as respondents. Purposive sampling was applied in determining the respondents. Frequency, percentage, ranking and weighted mean were statistical tools applied.

Findings revealed that the culture-based pedagogy that could be utilized in teaching physics was on topics: Constant and Uniformly Acceleration; Work, Power and Energy; Laws of Motion; Projectile Motion; Heat and Light. Batangueño culture was found applicable in teaching physics. The visual presentations which could be used were pictures, powerpoint and video clips. Moreover, the proposed teaching guide utilizing culture-based pedagogy may be used by teachers to heighten students' interest and motivation and to attain active participation and high achievement. It may be a reference of employing Batangueño culture in teaching the topics.

It was recommended that the output be presented to the school heads and supervisors for their comments and suggestions for enrichment of content and application of culture-based pedagogy not only in science but in other learning areas.

Keywords: *Physics instruction, culture-based pedagogy, Batangueño culture*

INTRODUCTION

Culture plays a significant role in the teaching-learning process. It serves as the bases of the teacher's creativity and innovation in teaching approaches and methodologies. Culture dictates human behaviour. It is a complex whole formed from the history of the ancient civilizations and inherited to generations. It pertains to any system of shared beliefs and knowledge that shapes human perceptions and social interactions. Thus, culture must be a crucial factor in teaching to maximize the sensory connections of the students in a certain lesson. Optimizing this 'connection' is a great indicator of achieving success in imparting meaningful learning among the students. This creates a substantial link between culture and the teaching-learning process.

Villegas and Lucas [1] described culture based pedagogy as a teaching strategy that recognizes all students learn differently and that these differences

may be connected to background, language, family structure and social or cultural identity. Theorists and practitioners of culturally responsive pedagogy more than acknowledge the cultural uniqueness of each student; they intentionally nurture it in order to create and facilitate effective conditions for learning. They see student diversity in terms of student strengths; they orient to it as presenting opportunities for enhancing learning rather than as challenges and/or deficits of the student or particular community.

Salandanan[2] also stated that using community based resources as strategy involves familiarization and mentally close link with all the educational aspects in it, the people and their expertise, the places with rich instructional materials and the natural landscapes. Teachers can make advantage of those abundant sources of first-hand materials that can make teaching-learning process spontaneous and natural.

Good pedagogy requires a broad repertoire of

strategies and sustained attention to what produces student learning in a specific content domain. Teachers need to rely on quality educational research for different pedagogical models and strategies; at the same time they have to practice the art and science of teaching themselves, refining it as they go according to their own needs and resources and particularly those of their students in different learning areas. Culture can be a good basis of the pattern to restructure the learning activities served by the science teachers. Thus, culture-based pedagogy can be of great significance to establish meaningful connections between the students' prior experiences and Physics laws, principles and theories being imparted during the formal instruction for the realization of the national goal of science education.

Science education, as cited in the K12 Science Curriculum Guide [3], aims to develop scientific literacy among students that will prepare them to be informed and participative citizens who are able to make judgments and decisions regarding applications of scientific knowledge that may have social, health, or environmental impacts. The science curriculum recognizes the place of science and technology in everyday human affairs. It integrates science and technology in the civic, personal, social, economic, and the values and ethical aspects of life. The science curriculum promotes a strong link between science and technology, including indigenous technology, keeping the country's cultural uniqueness and peculiarities intact.

Achieving the goals of science education in the country is a great challenge to all Science teachers. The new curriculum requires new set of strategies and approaches that will effectively develop scientifically literate students. In the quest of attaining this national objective, teachers should be resourceful and creative to serve the demand of the 21st century learners. This can be done through creating a vast field of learning opportunities wherein students can make meaningful connections utilizing learning materials that are present in their community. Using culture-based pedagogy can lead to the one of the important goals of science education, the preservation of Philippine culture which has been diminishing in the ideals of the students as they face technological advancements. It can be employed in science lessons through using the native language that can be understood by all, cultural practices and traditions that have important scientific link, and strategies and approaches in parallel with the

customs and values of the community.

Along with the words of Demmert and Towner [4], culture-based science teaching may be defined as approaches that recognize and utilize native languages as a first or second language, it incorporates traditional cultural characteristics and involves strategies that are harmonious with the native cultural knowledge and contemporary ways of knowing and learning. It includes curricula based on native culture that incorporates legends, oral histories, songs and fundamental beliefs and values of the community.

According to Palamguwan[5], culture-based pedagogy and science teaching do not focus on translating scientific concepts and lessons; concepts are taught using both mother tongue and the culture. Culture based science teaching recognizes the importance of integrating the community's knowledge system and way of life in the school curriculum to sustain the culture and tradition of cultural groups in the area. This approach allows children to be supported in their learning by their parents, other members of the community, and by their surroundings.

Teachers play significant role in performing the responsibilities required for physics instruction under K to 12 Basic Education Curriculum. Marzano[6] explained that the persistent search for truth and new information is for most in every undertaking of a teacher. A conducive classroom atmosphere and daily classroom activities should always be geared in impressing the mind of the students the way a scientist thinks and reacts. When stimulating environment is provided, students will become imaginative and inventive in their own craft.

Batangas City in the Philippines is proud of its cultural heritage, particularly the Batangas literature, music, festivities and traditions, dance, arts, even food and drinks and values which reflects the unique characteristics of the Batangueños' way of life. Andal [7] mentioned that the cultural development of the people goes along with the development of Batangueno literature which places a tremendous emphasis especially in poetry songs, and folktales mostly drawn from real life.

Identifying the different communities in Batangas City, the most common among the existing forms of Batangueño culture are traditions during fiesta wherein music, arts, dance and the values reflect to unique traits. These contribute to the development of Batangas culture that is transmitted to the younger

Batangueños. It is manifested through different forms like folksongs. Folksongs are balanced rhyming lines dealing with subjects reflective of the people's way of life and community beliefs. These are usually accompanied by music, so they become more appealing when residents use them in social gatherings, merry-making, bayanihan projects, wedding, barrio fiesta and in other festivities. The common values of the municipality closely relate to the DepEd core values of human dignity and its related values of love, spirituality, social responsibility, nationalism and economic efficiency that are really evident in their folksongs. (Historical and Cultural Significance of Batangas City)[8].

The ideas presented above gave the researchers clear and definite perspective that pedagogy should be reflected to culture in the sense that it becomes the common denominator unifying the student connections to learning. Many would think that teaching would be more effective and learning can be maximized using the elements of culture that the learner used to practice and recognize in their living.

This endeavor can be an eye opener to all science teachers that culture can be an effective instrument to maximize the learning performance of the students towards the lesson that is being taught. It is primarily focused on utilizing culture relevant activities to increase the students' performance and achievement. Pedagogy that is based from culture and using these cultural aspects are keys to arouse students' interests and good motivation for they learn the major concepts realizing their day-to-day experiences in the community.

OBJECTIVES OF THE STUDY

The study assessed the topics in physics where culture-based pedagogy may be utilized and the level of applicability of aspects of Batangueño culture to these respective topics. It also determined the visual presentations which can be prepared by teachers to incorporate aspects of culture in physics instruction. The end purpose of the study was to develop a teaching guide using culture-based pedagogy in each grade level to reinforce the student's learning, and help them achieve high academic performance.

METHODS

The descriptive method of research was adopted with the aid of researcher's made questionnaire as the primary tool. Thirty fourth year science teachers

served as the respondents. They have been teaching Physics for years in the public secondary schools of the Division of Batangas City. Fifteen science teachers were sourced from Batangas National High School and the rest were individually come from the remaining 15 secondary nationalized high schools. Purposive sampling was applied in determining the respondents.

To construct an ideal questionnaire, the researchers searched for books and other related resources. They also sought the ideas from the Science Education Supervisor, master teachers and their co-science teachers and social studies teachers for the enumeration and identification of the aspects of Batangueño culture and its scientific connection with Physics laws, principles and theories. After reading related resources and interviewing different persons with enough knowledge regarding practices of Batangueño, the researchers made the first draft. It was turned over to the practitioners and professionals including the division science supervisor who have enough knowledge for validation of the research tool for corrections, comments and suggestions. After the second revision, the researcher approached a grammarian for the appropriateness of grammar, clarity and enrichment of each item. The validated questionnaire was administered to the target teacher respondents. The responses of the respondents were tallied, scored and tabulated for statistical treatment. Options of 1 to 4 were used with the following ranges: 1.0-1.49; 1.5- 2.49; 2.5-3.49; and 3.50-4.00.

Focus group discussion was also conducted to substantiate the discussion and analysis of data gathered with the active participation of science supervisors and physics teachers. Frequency, percentage, ranking and weighted mean were the statistical tool used in quantifying the data gathered.

RESULTS AND DISCUSSION

Topics in Physics wherein Culture-based Pedagogy may be Used

The Physics topics from Grade 7 to 10 based on the K to 12 Science Curriculum Guide and their suitability to culture-based pedagogy are discussed. Table 1 shows the list of Physics topics take up in certain grading period as assessed by fourth year science teachers in relation to the application of culture-based pedagogy.

Results showed that all science teachers or 100

percent agreed that culture-based pedagogy can be used in teaching Physics topics on mechanics specifically constant and uniformly acceleration, which ranked first. The respondents have the same notion that culture can be easily employed on topics in mechanics because mechanics is really physical in nature involving the students with experiential activities that can provide better understanding about motion and force concepts. Culture practices like the activities done during fiesta are interesting to be used in the lesson.

Table 1. Physics Topics in Grade 7 wherein Culture – based Pedagogy may be Used(Multiple Responses)

Topics	f	%	Rank
1. Constant and Uniformly Acceleration	30	100	1
2. Laws of Motion	28	93	3
3. Projectile Motion	27	90	4
4. Center of Mass and Equilibrium	18	60	7
5. Characteristics of Fluids and Solid	11	37	10
6. Work, Power and Energy	29	97	2
7. Waves	19	63	6
8. Sound	16	53	8
9. Heat and Light	25	83	5
10. Electricity and Magnetism	15	50	9

This was followed by the topics on work, power and energy with 29 teachers or 97 percent of the respondents. Topics on laws of motion acquired 28

teachers or 93 percent. Moreover, topics on projectile motion and heat and light ranked fourth and fifth with 27 science teachers or 90 percent and 25 science teachers or 83 percent respectively. Out of ten major topics, only one got a mark below 50 percent, this was the topic characteristics of fluids and solid, 11 teachers or 37 percent and got the last rank.

In the FGD and interview with teacher respondents, they accentuated that work, energy and power principles are topics enjoyable to teach because their target is nurturing the students' capability of identifying work principles relating to power and energy and differentiating types of mechanical energy such as kinetic and potential. This competency dictates physical activities wherein students will be able to conceptualize what work and mechanical energy are. Thus, cultural activities like palaronglahi can be injected in realizing the lesson objectives as supported by Brodie[9] in his notion that students become interested to Physics when they are involved in the different learning activities relevant to their identity and life.

Aspects of Batangueño Culture Utilized in Teaching Physics Topics

Table 2 presents the aspects of Batangueño culture that can be utilized in teaching the six major areas of Physics as reflected to the set competencies needed to attain at the end of taking the lessons.

Table 2. Aspects of Batangueño's Culture that may be Utilized in Teaching Grade 7 Physics Lessons

Aspect	WM	VI	Rank
1. Parade of floats during Batangas City Foundation and Fiesta in teaching motion	3.60	VA	4.5
2. Subli Street Dance during Sublian Festival in teaching motion	3.60	VA	4.5
3. Karerang Bangka during fiesta in teaching motion	3.70	VA	1
4. Famous Batangas City sites like Calumpang River in teaching waves	3.00	MA	11.5
5. Popular industries like fishing commonly known as pamamante and pamamana in teaching waves	2.97	MA	13
6. Pamamaraw, a common leisure of Batangueños near coastal areas in teaching waves	2.87	MA	14
7. Singing of folks songs like Prinsesang Kumintang in teaching sound	3.00	MA	11.5
8. Rhythm or beat created by Tugtugan, a traditional drum used in Subli in teaching sound	3.23	MA	7
9. Traditional songs during Flores De Mayo in teaching sound	3.13	MA	8.5
10. Traditional colourful costumes worn in dancing Subli in teaching light	3.13	MA	8.5
11. The use of lampara in pangingilaw or fishing in teaching light	2.77	MA	15
12. Famous paintings and murals in Basilica Church in teaching light	2.70	MA	16
13. Process of cooking traditional kakanin like butsi-butsi, kalamay, suman, etc. in teaching heat	3.67	VA	2.5
14. Process of making daing or tuyo and tinapa in teaching heat	3.67	VA	2.5
15. The tradition of panliligaw through serving the family of Batangueña being courted in teaching Electricity	3.53	VA	6
16. Batangueños' extended family type wherein Lolo and Lola are living in the house in teaching electricity	3.03	MA	10
Composite Mean	3.23	MA	

Results show that among the aspects of Batangueño culture, the teacher respondents assessed the six items as very applicable to use in teaching Grade 7 Physics topics. Ranked first was *Karerang Bangka* during fiesta obtained weighted mean of 3.70. Using this cultural aspects shows linear motion. The application of the concepts such as distance, displacement and velocity can be observed and conceptualized in the said traditional game.

Assessed very applicable by the respondents were process of cooking traditional *kakanin* like *butsi-butsi*, *kalamay*, *suman*, etc. and process of making *daing* or *tuyo* and *tinapa*, parade of floats during Batangas City Foundation and Fiesta and Subli Street Dancing during Sublian Festival, panliligaw through serving the family of Batangueña being courted which obtained weighted means within the scale from 3.53 to 3.67. These practices give a clear application of scientific principles to the preparations of food which typically Batangueño. When students are engaged with the locality's own culture activities like cooking certain Batangueño delicacies, they will really enjoy Physics as they engaged themselves to meaningful learning experiences. Moreover, cultural festivities can really be used in teaching basic principles of motion specifically in incorporating the concepts of motion in one dimension.

Other aspects of Batangueño's culture were assessed by the respondents as moderately applicable such as: popular industries like fishing commonly known as *pamamante* and *pamamana*, *pamamaraw* as common leisure of Batangueños near coastal areas, and the use of *lampara* in *pangingilaw* or fishing were within the weighted mean scale from 2.77 to 2.97. The results clearly manifest the moderate applicability of Batangueño culture as some activities are unfamiliar to the respondents who did not experience these age-old fishing practices.

The last rank was marked in the item expressing that famous paintings and murals in Basilica Church was moderately applicable in teaching light colors and intensity, 2.70. In general, the aspects of Batangueño culture were moderately applicable to utilize in teaching Grade 7 Physics topics obtaining composite mean of 3.23. This means that all the enumerated aspects of Batangueño's culture can be used in teaching the mentioned topics employing culture-based pedagogy but with careful assessment on the cultural aspects suitable to use in certain topic.

Table 3 shows the different aspects of Batangueño's culture that can be integrated in teaching Physics topics in Grade 8 to create a lesson ambience relevant to what is used to experience by the students.

Table 3. Aspects of Batangueño Culture that may be Utilized in Teaching Grade 8 Physics Lessons

Aspect	WM	VI	Rank
1. Riding in paraw or small banca mobilized by the use of sagwan during leisure time and fishing near coastal areas in teaching laws of motion	3.30	MA	7.5
2. Fluvial parade at Calumpang River during town fiesta in teaching laws of motion	3.27	MA	9
3. Traditional fiesta games like palo-sebo, dinuron, touch ball sabong, shato, etc. in teaching work, power and energy	3.73	VA	1
4. Respect to elders through pagmamano in teaching work, power and energy	3.57	VA	4
5. Famous old building structure like the Basilica Church, City Hall, Capitolio, etc. in teaching work, power and energy	2.90	MA	14
6. Singing of Batangas City Hymn in teaching propagation of sound	3.30	MA	7.5
7. Playing of Batangas native instrument like Tugtugan, and the castanet during sublian festival in teaching propagation of sound	3.37	MA	5
8. Ringing of Basilica bell every religious hours. in teaching propagation of sound	3.00	MA	12
9. Sayawan during fiesta and baylehan at pahapunan during wedding using disco lights in teaching properties and characteristics of visible light	3.33	MA	6
10. Procession as part of the activity of town fiesta wherein the participants use lighted candle and incandescent bulbs in teaching properties and characteristics of visible light	2.97	MA	13
11. Preparation of kapengbarako to welcome visitors in teaching heat	3.60	VA	3
12. Eating and process of cooking Batangueño's slomi, champorado, arozcaldo, goto, etc. especially during rainy days in teaching heat	3.63	VA	2
13. Religiosity or strong faith in God as equates to life's blessing in teaching Ohm's Law	3.23	MA	10.5
14. Positive attitude towards life in teaching Ohm's law	3.23	MA	10.5
Composite Mean	3.32	MA	

VA= Very Applicable; MA = Moderately Applicable

Interpreted as very applicable gaining the highest weighted mean, 3.73, pertained to traditional fiesta games like *palo-sebo*, *dinuron*, touch ball, *sabong*, *shato*, etc. Eating and process of cooking Batangueño's *slomi*, *chamorado*, *arozcaldo*, *goto*, etc. especially during rainy days and preparation of *kapengbarako* to welcome visitors marked the weighted mean of 3.63 and 3.60 respectively. The data infer that traditional fiesta games are very applicable in illustrating and making the students experience the laws and principles on work, power and energy, while the processing of Batangueño delicacies were very applicable to use in teaching the effects of heat on human body and in differentiating heat and temperature.

Weighted means ranging from 3.00 to 3.27, aspects of Batangueño culture perceived as moderately applicable were: playing of Batangas native instrument like *Tugtugan*, and the castanet during *Sublian* festival; *sayawan* during fiesta and *baylehan* and *pahapunan* during wedding using disco lights; riding in *paraw* or small banca mobilized by the use of *sagwan* during leisure time and fishing near

coastal areas and singing of Batangas City Hymn; fluvial parade at Calumpang River during town fiesta; religiosity or strong faith in God. An interview with the division science supervisor revealed that Physics is one of the difficult subjects in the Restructured Basic Education and even in the K to 12 Basic Education in the sense that it requires both competencies in language and mathematics. Thus, she suggested that teachers must be resourceful and innovative to make the Physics instruction fun and exciting. She agreed that culture-based pedagogy can be of great help to tickle students' interest but the teacher should choose the best topic where it can be incorporated.

Assessed by the respondents as moderately applicable were: procession as part of the activity of town fiesta wherein the participants use lighted candle and incandescent bulbs, and famous old building structure like the Basilica Church, City Hall, Capitolio, etc. got low weighted means of 2.97 and 2.90 respectively. In general view, the aspects of Batangueño culture were moderately applicable in teaching Grade 8 topics attaining a composite mean of 3.32.

Table 4. Aspects of Batangueño's Culture that may be Utilized in Teaching Grade 9 Physics Lessons

Aspect	WM	VI	Rank
1. Playing traditional games like tumbangpreso, piko, tisod, holen and jackstone, etc. in teaching impulse and momentum	3.73	VA	2
2. Basaganngpalayok during fiesta and other special occasions in teaching impulse and momentum	3.70	VA	3
3. Paliga during summer wherein teams play the popular ball games in teaching projectile motion	3.80	VA	1
4. Flower bouquet throwing during wedding in teaching projectile motion	3.63	VA	4
5. Showering of rice grain, flowers and coins to the new couple in teaching projectile motion	3.33	MA	12
6. Using native duyan made of bamboo in teaching conservation of mechanical energy	3.60	VA	5
7. Lupakan, a form of socialization for teenagers in teaching conservation of mechanical energy	3.53	VA	6
8. The majorette of the band as she does exhibition during town fiesta in teaching conservation of mechanical energy	3.33	MA	12
9. Musical band as part of the fiesta parade in teaching sound resonance	3.37	MA	9
10. Different historical architectural building like Basilica Church in teaching sound interference	2.63	MA	17
11. Singing of religious songs like luwa and pasyon in duet or chorus with blending of voices in teaching sound interference	2.67	MA	16
12. Parol contest in the different barangayas preparation for Christmas in teaching propagation of light	3.37	MA	9
13. Use of lampara or gasera of those who participate in pangingilaw in teaching propagation of light	3.03	MA	15
14. Process of making balisong in teaching heat	3.37	MA	9
15. Going to beaches and resorts showing strong family ties in teaching heat	3.47	MA	7
16. Values of pakikisama and the like developing good interpersonal relationship in teaching electromagnetic field	3.27	MA	14
17. Respect to women or pagkamaginoo and being sweet lover (malambing) of Batangueños in teaching electromagnetic field	3.33	MA	12
Composite Mean	3.36	MA	

VA= Very Applicable; MA = Moderately Applicable

The result reflects on the ideas how culture-based pedagogy develops meaningful connections with Physics topics. They created the idea that cultural aspects can be one of the alternatives in discussing physics topics uniquely, helping students to maximize their understanding towards the lesson developing point of interest and motivation to perform well in class. Culture-based pedagogy may be adopted in teaching Physics to establish meaningful link between the students' experiences and the Physics law, principles and theories in parallel with the set learning competencies that are enumerated in the curriculum guide.

Table 4 reveals the different aspects of Batangueño culture and the corresponding Physics topics it can be utilized as assessed by fourth year science teachers.

In the Grade 9 level, as perceived by the respondents, *paliga* during summer wherein teams play the popular ball games was very applicable. This ranked first obtaining weighted mean of 3.80. This aspect got the highest mark because ball games like volleyball and basketball are known to all. Thus, the injection of this aspect in teaching projectile motion notes high application. The introduction of this aspect in teaching projectile can create active learners who are fun of games.

Also very applicable were: aspects of Batangueño's culture on playing traditional games like *tumbangpreso*, *piko*, *tisod*, *holen* and jackstone, etc. and *basaganngpalayok* during fiesta and other special occasions with weighted means of 3.80 and 3.73. These games are old but very familiar to the

students as they used to play the said games during their childhood days. Science teachers analyzed the meeting point of the said aspect to the physics topics. They ended up with an idea that the enumerated games can be used in explaining concepts of mass, velocity, force and collision.

Nine items scored by the teacher with the weighted mean scale of 3.03 to 3.47 were all moderately applicable. This signifies that in Grade 9 Physics topics, culture-based pedagogy can be utilized using the cited aspects of Batangueño culture depending upon the personal assessment of the teacher on the topics. It is important for the teacher to include local phenomena and student lived experiences embedded in the community and culture to facilitate better teaching learning process.

Table 5 shows the different aspects of Batangueño's culture that can be utilized in teaching Physics topics in Grade 10 level.

All the items were assessed by the respondents within the scale from 2.62- 3.40 which signifies that they are moderately applicable in teaching the Grade 10 Physics topics. Ranked first having weighted mean of 3.40 is the most applicable aspect of Batangueño's culture in teaching electricity and magnetism focusing on power generation that can be associated to values on taking good care of the environment. As cited by Menez[10], Batangueños are loving and caring to the environment based on the fact the city has lived up to the expectation in becoming role model in the preservation and protection of the environment. This shows that students really relate to the aspect for they are practicing the caring for the environment.

Table 5. Aspects of Batangueño's Culture that may be Utilized in Teaching Grade 10 Physics Lessons

Aspect	WM	VI	Rank
1. Religiosity or strong faith in God in teaching balance, stability and strength	3.27	MA	3
2. The structural design of the Basilica Church , Calumpang Bridge, Bridge of Promise, etc. in teaching balance, stability and strength	3.33	MA	2
3. Different native drinks like tuba and lambanog in teaching differences between solids and fluids	2.80	MA	8
4. Use of sankaka as native sugar in teaching differences between solids and fluids	2.67	MA	9
5. Pakaskas as popular sweet product of Isla Verde in teaching differences between solids and fluids	2.83	MA	6.5
6. Kundiman songs being sung during harana in teaching Doppler effect	2.90	MA	5
7. Pangangaluluwa during All Saint's Day and pangangaroling during Christmas seasons in teaching Doppler effect	2.97	MA	4
8. Strong believer of the image of Sto. Niño as their patron saint in teaching mirror and lenses	2.83	MA	6.5
9. Being thrifty of the Batangueños in teaching transmission of energy	2.62	MA	10
10. Being concern with the environment in teaching power generation and power loses	3.40	MA	1
Composite Mean	2.96	MA	

The result reflects on the ideas that among the four levels of Physics topics, Grade 10 level contains deeper Physics principles that are uneasy to incorporate culture and requiring pure scientific investigation and method. Eventhough culture-based pedagogy can be used in teaching those topics but it cannot be fully maximized due to the nature of the subject matter.

Table 6. Visual Presentations Integrating Culture-based Pedagogy in Teaching Physics Topics (Multiple Responses)

Visual Presentation	f	%	Rank
1. Printed Pictures	29	96.67	1
2. Powerpoint Presentations	25	83.33	2
3. Comics Strips	12	40.00	6.5
4. Video Clips	24	80.00	3
5. Realia or real objects	19	63.33	4
6. Drawings and sketches	16	53.33	5
7. Printed Literature	12	40.00	6.5
8. Antique objects	5	16.67	8

Table 6 expresses the perception of the fourth year science respondents on the best visual presentations that can be prepared by the teacher incorporating culture-based pedagogy. Six out of eight visual presentations got within percentage range from 50 percent to 100 percent. Printed pictures ranked first obtaining frequency of 29 respondents or 96.67 percent. There are a number of benefits in using visual aids like printed picture in teaching science. These benefits are of paramount importance in maintaining a good momentum of science interest among students. Using visual aids in teaching science creates strong engagement between students and the science concepts. The use of printed pictures encourages students to read texts with interest, which make it easier for them to understand the abstract ideas.

Powerpoint presentations garnered 25 respondents or 83.33 percent. These visual presentations can really help in presenting the Physics lessons for students can visualize the laws and principles being imparted with the use of culture-based pedagogy. These visual presentations are easy to prepare for not all teachers have access to printed pictures and have the great knowledge in making powerpoint presentation.

Having the least number of respondents, antique objects got a tally of 5 teachers or 16.67 percent. Antiques are very hard to find and prepare for the class. Teacher may find it difficult to use in the classroom because of its availability.

The result is substantiated by the impressions

stated by Rosario[11] and Velarde[12]. They generalize that teachers should use effective instructional materials for them to be able to increase the connection of the learners to the lesson.

Proposed Teaching Guide in Physics Integrating Culture-based Pedagogy

The findings of the study revealed that culture-based pedagogy can be utilized in teaching Physics topics from Grade 7 to Grade 10. Results in all the grade levels suggested that Batangueño culture can be utilized in teaching the listed topics in the K to 12 curriculum guide.

Teaching guide in Physics, in tabular form, utilizing culture-based pedagogy has some parts similar to a learning plan being used by the teacher in the public school. The only difference is the employment of Batangueño culture in each part such as recall, motivation, activity and analysis, abstraction and application and the brief conceptualization on the connection of different aspects to the given topics. This was devised to serve new strategy teaching Physics to help improve the performance of the students in attaining the competencies and increase the academic achievement in taking national assessment tests.

CONCLUSION AND RECOMMENDATION

Based from the findings of the study, the culture-based pedagogy that could be utilized in teaching physics was on topics such as, Constant and Uniformly Acceleration, Work, Power and Energy, Laws of Motion, Projectile Motion, Heat and Light.

Batangueño cultures were found moderately applicable in teaching physics. The visual presentations perceived by the respondents to be utilized suitably to the majority of the topics in Physics include pictures, powerpoint presentations and video clips. Moreover, the proposed teaching guide may help curriculum planner directing teachers of devising a pedagogy that enhances student motivation and performances. In this way, level of the NAT result in science will increase because the set learning competencies were achieved meaningfully by the students through culture-based pedagogy practices that would lead in the realization of one of the aims of education that is preserving Filipino culture and traditions.

The study can benefit teachers through adopting unique ways of teaching the topics which can serve as catalyst to open new teaching pedagogy practices through the use of the Batangueño culture. This will

serve as new flavor that can elevate student's connections towards the subject matter. Moreover, this can lead students to a strong connection between their way of life and classroom learning experiences. They may be also driven their strong sense of belongingness to the community and developed spirit of nationalism and patriotism creating optimistic change to the nation as responsible citizens.

It was recommended that the output of this study be presented to school heads and supervisors for comments and suggestions for enrichment of content. Moreover, seminars and trainings integrating culture-based pedagogy in teaching sciences such as Earth Science, Biology, Chemistry and Physics may be conducted to reinforce its utilization and thereby awaken students' interests using the locality's culture.

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