# ABC-Teach Model in the 21<sup>st</sup> Century Skills of Secondary Biology Teachers

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Abstract: Twenty-first century skills are significant factors to consider and develop for the learners in the K to 12 curriculum. These twenty-first century skills include digital-age literacy, inventive thinking, effective communication and high productivity. This study is a descriptive, developmental and evaluative type of research. Survey study conducted among Secondary Biology teachers in private and public shools in urban and rural schools. The main objectives of the study are to determine the existing twenty first century skills of the Secondary Biology teachers in private and public secondary schools and to be able to develop a twenty first century module for the enhanced basic education. Based on the result, digital-age literacy is the domain with the least computed mean followed by effective communication while inventive thinking and high productivity have the highest computed mean value which are the common practices of private and public secondary schools. With the evaluation of the twenty-first century skills in teaching Biology for Grade 7 to 10 using ABC-TEACH Model. The developed twenty first century instructional modules for the development of twenty first century skills in teaching Biology would help the teachers to enhance and improve the quality of teaching Biology. Likewise, the learners would be engaged and would enhanced their twenty first century skills specifically digital-age literacy, inventive thinking, effective communication and high productivity. These skills would fully developed upon completion of the various activities, drills, worksheets, exercises and other tasks given in the instructional modules of Grade 7,8,9 and 10.

Keywords: digital-age literacy, inventive thinking, effective communication, high productivity, twenty first century

## 1. Introduction

Science is considered as one of the significant components for the country's success and in the global perspective. It is one of the constituents where individuals are being developed hollistically since they have taken up the foundation of education from Basic Education from Preschool, Elementary and Secondary Level. Schools in the country support the progress of scientific literacy to encourage the learners to pursue profession in the fields of science, technology and engineering. Science is essential for the country's achievement which may lead to researches and discoveries for the society. Inclusive to the advancement and breakthroughs which Science offers, Science incorporates the achievement of every Science educator to produce learners with skills and principles in scientific standards. Science provides the opportunity for the students to enhance their scientific inquiry skills which are needed for academic and practical ways of living. Learning Science is significant for the nation's cultural, industrial and technological development. Science is most useful to a nation when it is utilized to solve its own problems and challenges, keeping a nation's cultural uniqueness and pecularities intact as stressed by DOST, SEI (2011). According to UP NISMED as cited by SEI-DOST (2011), studies revealed that Filipino students have low retention of concepts, have limited reasoning and analytical thinking and poor communication skills. In 2005, UP NISMED in its study revealed that a large number of of Grade 6 and Fourth year students in selected schools cannot apply concepts to real-life problem solving situations nor design an investigation to solve a problem. Carballo (2013) mentioned that Science Education Institute study on Trends in Mathematics and Science Study(TIMSS) in 2003 noted that Philippines 8th grade (2nd Year High School) students' skills and competencies in Math ranked 42nd out of 46 participating countries while Philippines 4th grade students placed 23rd out of 25 participating schools.

Based on the given findings and studies given, this study focused on the present status of twenty first century skills of Science secondary teachers in the field of Biology and crafted a model which will be useful for enhancing the twenty first century skills of the Science secondary teachers.

## 2. Methodology

The method of research in the study employed mixed method wherein descriptive, evaluative and developmental research were used. Descriptive research is a systematic process in gathering information about the nature of situation and events that occur at the time of study. It ascertains the degree or extent of judgment variations caused by another variable or multiple variables involved in the study (Fraenkel, 2015). Developmental Research type I was used in this study. According to Richey and Klein (2005), developmental research type I focuses on the given instructional product, program, process and tool. There are three phases in developmental research type I. The first phase is the needs assessment. This procedure will be done by survey study. The second phase is the main development of the product or tool. The third phase is the evaluation of the tool or the product. Needs assessment was done among Biology teachers from selected private and public secondary schools. The second phase of the study is the development of the twenty first century skills modules in biology for K to 12 curriculum where in needed twenty first century skills based from the needs assessment done were included in the twenty first century modules development. The third phase is the face

to face validity and evaluation of three experts in the field of Science Education and four Biology teachers, two from private schools and two from public schools.

The study was conducted in selected schools from Bulacan and Manila. Biology teachers who served as respondents of the study came from the selected public and private Secondary schools. The study used two groups namely Biology teachers from Private Secondary Schools and Public Secondary Schools. A total of eighty two (82) Biology Teachers participated in the study. Sampling technique is considered purposive or deliberate due to the main purpose of the study. Survey instruments such as checklists were the main tools used to gather the data. Survey instruments and evaluators' checklists were selfmade and validated by three experts in the fields of Science Education.

To answer the research problems, percentage agreements of linear weights was used in the study. All statistical computations were accomplished by utilizing Percentage Agreement with Linear Weights.

## 3. Results and Discussion

Summary of validation of the experts(Doctorate) of the developed Twenty First Century Module for Grade 7 shows that the Content, Organization and Usability have the remarks of Outstanding and Format, Design, Language Style is Highly Satisfactory. This implies that the all domains are Highly Accepted. In relation to agreement, all domains are Marked Substantial except for usability which is Very High in agreement. Results of validation of the experts(In-Service Secondary Biology Teachers) shows that all domains of the developed Twenty First Module for Grade 7 Biology are Highly Accepted with Very High Agreement.

Summary of the validation of the experts(Doctorate) on the given domains are highly accepted with the remark of Outstanding. In terms of agreement, content is noted with Very High Agreement. Organization and usability are High in agreement while format, design, language and style is Marked Substantial.

Summary validation of the experts(In-Service Secondary Biology Teachers on the developed Twenty First Module in Biology for Grade 8 in all domains are Highly Accepted with Very High Agreement.

Summary of the validation of the experts(Doctorate) on the developed Twenty First Century Module in Biology for Grade 9 in all domains are Highly Accepted. In terms of agreement, content, organization and usability have very High Agreement while format, design, language and style has a High Agreement.

Summary of the validation of the experts(In-Service Secondary Biology Teachers) on the developed Twenty First Century Module in Biology for Grade 9 in all domains are Highly Accepted with Very High Agreement. Summary of the validation of the experts(Doctorate) on the developed Twenty First Century Module in Biology for Grade 10 in all domains are Highly Accepted. In relation to agreement, content, organization and usability have very high agreement while format, design, language and style has a High Agreement.

In summary, experts in Biology and teachers in Biology who were asked to validate the instructional modules were in agreement that the modules for Grades 7,8,9 and 10 were judge to satisfy the content, organization, format, design, language, style and usability for assessing the developed instructional modules focused on the 21<sup>st</sup> century skills using ABC-TEACH Model.



## 4. Conclusions

Based on the findings, the study revealed that secondary biology teachers have current and least mastered twenty first century skills in Digital Age Literacy, Inventive Effective Communication Thinking, and High Productivity. Twenty first century skills are very significant for the teaching-learning process of Biology. Some of the twenty first century skills are practiced regularly by the Biology teachers however other twenty first century skills must be developed and enhanced more for the teaching of Biology. Four quadrants of twenty first century skills were identified as Digital-Age Literacy, Inventive Thinking, Effective Communication and High Productivity are essential in teaching Biology. Secondary Biology teachers should focus on the improvement of Digital-Age Literacy and Effective Communication with the lowest mean score as the result of the study. In addition, technology-based activities and skills should be given priority for the enrichment of K to 12 curriculum program particularly in the field of Biology. ABC-TEACH Model can be used to design and develop instructional modules in Biology and other academic discipline.

The developed twenty first century module for Grade 7 has the following results in the validation from experts: For Biology experts, in terms of Content, Organization and Usability, it was claimed as outstanding while Format, Design, Language and Style is claimed by experts as highly satisfactory. This implies that all domains are highly accepted. In relation to agreement of experts ratings, all domains are marked substantial except for Usability which is very high in agreement. Biology teachers who validated shows that the Grade 7 module claimed that all items were highly accepted and all raters have very high agreement in the factors for validations.

The developed twenty first century module for Grade 8 has the following results in the validation from experts: For Biology experts in the field of Biology, in terms of agreement, Content is very high Organization and Usability, were claimed as high in agreement while Format, Design, Language and Style is claimed by experts as marked substantial. This implies that all domains are highly accepted. In relation to agreement of experts ratings, all domains are marked substantial except for Usability which is very high in agreement. Biology teachers who validated shows that the Grade 8 module claimed that all items were highly accepted and all raters have very high agreement in the factors for validations.

The developed twenty first century module for Grade 9 has the following results in the validation from experts: For Biology experts, Content, Organization, Format, Design, Language, Style and Usability are highly accepted. Experts claimed high agreement for all domains. Biology teachers who validated shows that the Grade 8 module claimed that all items were highly accepted and all raters have very high agreement in the factors for validations.

The developed twenty first century module for Grade 10 has the following results in the validation from experts: For the experts in the field of Biology, Content, Organization, Format, Design, Language, Style and Usability are highly accepted. Experts claimed high agreement for all domains. Biology teachers who validated shows that the Grade 10 module claimed that all items were highly accepted and all raters have very high agreement in the factors for validations.

The conclusion of the study shows that the developed twenty first century modules in Biology for Grades 7,8,9 and 10 using ABC-TEACH Model can be useful for the Secondary Biology teachers for both private and public schools.

## 5. Future Scope

Based on the findings of the study, the researcher recommends the following:

- 1. Current twenty first century skills of secondary biology teachers should be sustained for the successful transfer of knowledge and ideas to the learners.
- 2. Training and seminars should be given to the teachers for the enhancement of the least mastered twenty first century skills.
- 3. The developed Grade 7, Grade 8, Grade 9 and Grade 10 modules should be subjected for pilot testing for further evaluation and to test its effectiveness.

- 4. ABC-TEACH Model used in developing the twenty first century modules in Biology can be also used to other fields of Sciences and Non-Science subjects.
- 5. Encourage Biology and other Science educators to design and create modules and other educational tools and instruments for enhancing learning in Biology.
- 6. Further studies should be given priority in some twenty first century skills such as the use of debate, undertake researches, use of graphic organizer and visual mapping tools, problem-based learning, use of scientific inquiry, creating visual and graphic images and videos, use of arithmetic and mathematical reasoning for teaching Biology.
- 7. Further researchers may create other instructional tools and materials for the improvement of four quadrants of twenty first century skills such as Digital-Age Literacy, Inventive Thinking, Effective Communication and High Productivity.

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