Instructional Learning Materials in Computer Systems Servicing (CSS) for SHS: Basis for Development and Evaluation

RICKY P. CARDANO, MAED[1], NOEL V. IBIS, PHD[2]
[1, 2] *Master of Arts in Education, Mabini Colleges, Inc*

Abstract- ***This study aimed to develop and evaluate instructional learning material in Computer Systems Servicing (CSS) for Senior High School. To determine the least competencies level of learners, the TESDA self-assessment guide was used to develop an appropriate model for instructional materials development. In the evaluation of developed instructional materials Learning Resource Management and Development System (LRMDS) by DepEd was used. After which a pre-test and post-test were conducted to determine the effectiveness of the developed instructional materials. The findings revealed that competency in setting up computer servers (93.37) was the least mastered skill. The materials met all factors (35.42) in the LRMDS evaluation tool for print materials. Employing a t-test a significant difference was obtained (8.96) between mastery performance levels after using the output which implied that the developed material has improved the performance rating of the respondent. Researchers recommended exploring other core competencies and integrating factors in the LRMDS tool before utilizing instructional materials. Further research should be conducted with other groups of respondents focusing on other core competencies based on the TESDA assessment tool.***

Indexed Terms- ***Instructional Learning Materials, Computer Systems Servicing, Development, Evaluation, Senior High School***

I. INTRODUCTION

The COVID-19 pandemic has significantly impacted the education landscape, but the Department of Education remains committed to providing quality education for learners. The Department of Education provides training and capacity building for teachers, ensuring they possess the necessary skills and competencies for the world of work. Republic Act 10647 provides clear guidelines for technical vocational education and training in higher education, focusing on real-world problems, well-defined problems, and collaborations.

Republic Act 10533 enhances basic education, strengthening students' opportunities and enhancing teachers' qualifications. The Technical Education and Skills Development Authority (TESDA) National Certificate (NC) is a national certificate that allows students to pursue work after Senior High School. The K to 12 curriculum includes Trabaho, Negosyo, Kolehiyo, and Middle Skills Development, with options for students to pursue after Junior High School. Senior High School offers TVL, which includes Home Economics, Agri-fishery Arts, Industrial Arts, and Information Communication Technology (ICT).

Learners must master skills related to ICT, such as programming, animation, and digital illustration, to develop their competencies for various industries. After completing the ICT strand, they can receive national certification aligned with the Philippine Qualification Framework, providing more options for career development in ICT. However, most business sectors face challenges in employing senior high school graduates. Ghaviferk et al. (2020) found key issues and challenges in ICT tools by teachers, such as limited accessibility, network connection, and competency in teaching subject matter. He found key issues and challenges along the used of ICT tools, application of the competencies in CSS due to lack of effective training and limited time given in the preparation of instructional materials. Adding to this is the limited instructional materials that would develop such competencies. In fact, based on the survey of the researchers, it was found that

instructional materials become one of the problems encountered by most SHS teachers. To date, no instructional materials are used by the SHS teachers in two senior high schools in Daet North district such as Moreno Integrated School and Vicente L. Basit Memorial High School offering Computer Systems Servicing. These motivated the researchers to conduct this study in order to close the gap and provided avenues for future research.

II. METHOD OF RESEARCH

Descriptive and parametric statistics were utilized in this study. The respondent was composed of the LRMDS evaluators, subject experts (9), and grade 12 learners (54). The gathering of data was done in adherence to the research ethics using the consent form. Paired t-test was employed to determine whether or not a significant difference exists between the performance rating of learners before and after using the developed instructional materials in accordance with the recommendation of the evaluators.

The developed material resources, in terms of content, format, presentation, organization, accuracy and up-to-datedness of information as the evaluating tool was considered.

- Population, Sample Size and Sampling Technique

The respondents involved in the present study are essential to achieve the reliability and validity of the data to be gathered. In this research, the respondents involved in the data gathering process are the Grade 12 Senior High School learners in Daet North such as Moreno Integrated School, and Vicente Basit Memorial High School. Total enumeration was used in the selection of the respondents.

- Description of the Respondents

There were 54 SHS learners involved in the study coming Moreno Integrated School and Vicente L. Basit Memorial High School. There are 34 males and 7 females SHS from Moreno Integrated Schools while 8 males and 5 females in Vicente L. Basit Memorial High School for a total of 54 SHS learners.

- Research Instrument

There were two instruments utilized in gathering the data needed in this study. The first instrument used is called TESDA Self-Assessment Guide. This determined the initial performance of the SHS learners involved in the study. Another is the LRMS tool for evaluating print materials. This is the prescribed tool for evaluating instructional materials in the Department of Education.

The TESDA Self-Assessment Guide was used to determine the performance level of the Grade 12 CSS learners. This was done to serve as the basis in determining what instructional learning material can be developed anchored on the competencies needed to be mastered by the learners.

The researcher-made test consisting of twenty items was developed by the researcher to determine the performance rating after using the instructional material. Education Program Supervisors in TLE, and LRMS served as the evaluators together with 7 key teachers in the Division. The SHS key teachers validated the researcher-made test.

The evaluation of the instructional materials was done in the study. The evaluation comprised of two phases. The first phase is the evaluation by the evaluators including one Education Program Supervisor for LRMS and one Education Program Supervisor for TLE, 1 Master Teacher, and 6 Key teachers teaching Computer Systems Servicing. The second phase was provided by the learners who used the developed instructional materials. The performance ratings of the respondents in Vicente L. Basit Memorial High School and Moreno Integrated School were considered as part of the second phase of the evaluation.

- Data Gathering Procedure

The researcher used different steps to develop and evaluate instructional learning materials in CSS for SHS. The TESDA Self-Assessment tool provided the data needed by the researcher in developing instructional material in the said subject focusing only on the least mastered competencies in two schools involved in the study. The developed materials' effectiveness and appropriateness were evaluated using the LRMS evaluation tool and the performance

ratings of the learners who used the said materials in Vicente L. Basit Memorial High School and Moreno Integrated School.

In addition, the researcher considered ethical aspects prior to or during the conduct of the study. First, the researcher sought permission from the SDO personnel before the conduct of the formal study. A letter to conduct the study was approved by the Schools Division Superintendent. After which the respondents were oriented on the importance of the confidentiality. Parental consent was required from the participants of this study prior to their participation in this study Confidentiality was observed to safeguard the respondents involved in this study. The confidentiality agreement was signed by the respondents involved in the present study.
Results were used for this research purpose only.

Upon approval, the researcher administered the test using the TESDA tool to find out the performance level of CSS learners in the schools involved in the study. From the result of this assessment, the researcher identified what competencies are to be integrated in the development of the supplementary materials in CSS. The TESDA Self-Assessment guided the researcher in developing the material.

After the development of the supplementary material, it was evaluated by the evaluators using the LRMDS tool for print. After this, the researcher gathered tabulated, interpreted, and analyzed the data to come up with a generalizable statement.

- Statistical Treatment of Data

Descriptive statistics were utilized in this study. All data gathered relevant to each sub-problem of this study were analyzed and interpreted using this statistical treatment. These include frequency count, summation, percentages, and mean. Frequency count was used to measure the number of times that an event or response occurs. In this study, frequency count and summation were used to determine the performance level of Grade 12 CSS learners in the schools involved in the study.

t-test for independent means was used to test the significant difference between the least mastered competencies and the performance ratings of the respondents.

Likewise, summation was used in determining the total points given by the evaluators in the developed supplementary material. Each factor in the LRMDS evaluation rating sheet and frequency count was considered to find out how many evaluators rated "Passed" or "Failed" in the developed supplementary material for CSS.

III. ANALYSIS AND INTERPRETATION OF DATA

This part provides the results of the TESDA assessment given to the respondents. It also discusses the effectiveness of the developed instructional material based on the least mastered skills as revealed in the assessment. The interpretation of the data gathered was presented in the tables.

Least Mastered Competencies in
Computer Systems Servicing

The least mastered competencies in the CSS of the respondents in this study are shown in Table 1. The assessment was done to determine the competencies that need further attention in the development of the proposed instructional material in this study.

Table 1 shows the assessment result per core competency specifically identifying the specific competencies in CSS.

Table 1
Assessment Result per Core Competency in CSS

Core Competencies	Least Mastered Competencies (%)
Install and Configure Computer Systems	0.19 %
Maintain and Repair Computer Systems and Networks	1.07 %
Set-up Computer Networks	3.38 %
Set-up Computer Servers	93.37%

From the assessment result, the least learned competencies were identified. This provided the

researchers the data on what to focus in developing the CSS material.

The researchers used the model below in the development and evaluation of CSS materials for SHS learners.

This model was adopted from the model used by the Regional Office Curriculum Learning and Management Division (CLMD, 2022) in the development of project numerals which is a numeracy assessment for learners' systems. The brainstorming phase involves planning the researcher on what to consider in this study. During this phase, the researcher concentrated on the generation of several ideas in terms of what to develop as an output of the present study.

- *Model used in the Development and Evaluation of CSS Instructional Material*

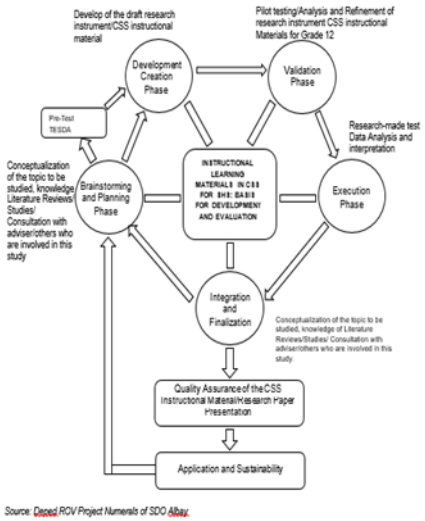

Fig. 1
The model used during the development and evaluation of the instructional material

Fig. 1 shows the model used in the development and evaluation of the CSS instructional materials as an output of the present study.

It fuels the researcher in developing a draft of the research output alongside the research instrument to be used in the evaluation of the said instructional material.

During the development and creation phase, the researcher developed the instructional materials based on the least learned skills of the learner-respondents involved in the study. The least learned skills were taken from the TESDA assessment administered to the respondents. The instructional material was evaluated by evaluators. In addition, pilot testing was likewise executed in this phase, to verify the appropriateness of the instructional materials before their actual administration to the respondents in the present study. The execution phase is the actual administration of the CSS instructional materials to the respondents. This is done to measure the effectiveness of the developed materials on the respondents from the two schools involved in the study.

The integration and finalization of the CSS instructional material were carried out by adding the recommendations and suggestions of the evaluators of the material. Quality assurance was made to ensure that the material is compliant with the LRMS evaluation tool used for print materials. Sustainability is desired by coordinating with the EPS of TLE for wide utilization of the CSS instructional material.

It can be deduced from the findings that teachers need to carefully plan the lesson well by clearly identifying the goals and specific objectives expected for the learners to accomplish. Further, the development assessment measures what has been measured to qualify and quantify what has been learned by the learners in CSS. In this way, refinement follows should the result of the assessment do not meet the target mastery performance level in class while at the same time developing the student's positive attitude and appreciation towards instructional activities.

- *Instructional Materials Developed in Computer Systems Servicing*

The developed material focused on the least learned skills as revealed during the administration of the TESDA assessment tool to the student-respondents in this study.

The said material has basic parts such as an introduction where the background of the competency to be developed is discussed. The general instructions are also stated in this part. In the module content, the unit competency is indicated. The core of the

instructional material discusses the detailed lessons to be undertaken by the learner. It has sub-parts namely: *Let Us Discover*, *What I Need to Know*, *Let Us Try This*, and *Let Us Apply*. *The Let Us Discover* part provides a detailed discussion on the specific topic/competency to be learned by the CSS students.

In *What I Need to Know*, in-depth discussion is provided to the learner. There are specific steps each learner needs to perform to carry out this phase. This guides the learners in accomplishing the tasks provided in this material. In the *Let Us Try This*, learners will answer some assessment questions to check whether they have learned something from the previous activity in the module.

Next is the *Let Us Apply* part, where the learners will apply what they gained in the previous discussions/readings provided in the module. Clear objectives are stated in this part that must be accomplished either alone or in pair. Further, the module has the *Let Us Remember* part wherein key concepts are stated for easy access of the user. All learning outcomes mentioned are likewise located in this part.

The whole module provides pedagogical and competency-based inputs to the users of the module based on what competency-based assessment of TESDA in consonance with the Most Essential Competencies (MELC) of the DepEd.

- *Evaluation of the Evaluators of the Developed Instructional Materials*

The developed instructional learning package in CSS was evaluated by the evaluators using the Learning Resource Management and Development System (LRMDS) evaluation rating sheet. There were 4 factors evaluated by the evaluators namely: content, format, presentation and organization, the accuracy and up-to-datedness of Information taken from the CSS material.

Interestingly, all the factors were met as evaluated by the Education Program Supervisor in charge of TLE, and EPS for LRMDS, 7 key teachers handling CSS in the senior high school.

Table 2
Evaluation of the Evaluators on the Developed Materials

Factors	Evaluators									Total	Mean Rating	
	A	B	C	D	E	F	G	H	I			
1	28	23	28	28	28	26	28	28	28	245	27.22	Passed
2	72	72	72	72	70	69	70	70	70	637	70.77	Passed
3	20	20	20	20	20	18	20	20	19	177	19.67	Passed
4	24	24	24	24	24	24	24	24	24	216	24.00	Passed
Total											35.42	Passed

Legend (factors)
1 – Content - resources must score 21 points out of a maximum of 28 points to pass this criterion
2 – Format - resources must score 54 points out of a maximum of 72 points to pass this criterion
3 – Presentation and Organization-resource must score 15 points out of a maximum of 20 points to pass this criterion
4 – Accuracy and up-to-datedness of information- resource must score 24 out of 24 maximum points to pass this criterion

LRMDS tool provided clear measures to be met by the developer of any print materials.

The quality of the output is measured using the *passed* or *failed* criterion. The printed materials must pass all criteria. For factor 1, to pass the LRMDS standards, print materials should have at least 21 points out of a maximum of 28 points. For factor 2, print materials should have at least 54 points out of a maximum of 72 points to pass this criterion. For Factor 3, the print resource material must score 15 out of a maximum of 20 points, and for Factor 4 the resource must score 24 out of 24 points to pass this criterion.

In addition to Factor 4, the evaluators checked whether there were conceptual, factual, grammatical, computational, obsolete, and typographical error in the print resources of the output. The results showed a favorable result as regards this criterion.

The findings of the study are affirming the study of Rogayan and Dollete (2019) who developed physical science workbook for SHS based on the students' least learned subjects. Expert validators rated the produced workbook as extremely satisfactory in terms of adequacy, coherence, appropriateness, and usefulness of the workbook were all satisfactory.

- *Performance Rating of the Respondents after Using the Instructional Material*

After using the developed instructional material in CSS, the respondents from two schools took the researcher-made test. The data of the performance

rating is shown in Table 2. The performance rating of the respondents is above the 75 % passing rate which means that the utilization of the instructional material improved the performance level after the respondents used the said materials.

In the table it showed the performance rating of the respondents after using the instructional material. The performance rating indicated that the students understood the concepts and principles and consequently, their performance opted for the better. They were able to grasp the principles of the lessons and apply them effectively.

Table 2
Paired Sample t-test for Mastery Performance Level

	Paired Differences							
	Mean	Standard Deviation	Standard Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig (2-tailed)
Pair 1 Mastery Performance Level (Before & After)	9.46500	3.65781	1.05592	7.14094	11.78906	8.964	11	0.000

Source: Computed values using SPSS version 20 (Paired Sample T-Test)
Legend: *t* = computed value
df = degrees of freedom
Sig= significance

The result of the statistics affirmed the least mastered competencies were learned by the students as shown in the improved performance rating of the respondents. It can be implied that utilization of the developed materials in Computer Systems Servicing significantly improved the performance of SHS learners from the two schools.

The CSS material provided a step-by-step process for SHS learners leading to a National Certificate II (NC II) given by TESDA. The competencies included in the material focused on setting-up computer servers which is the least mastered competency of the SHS learners of the two schools in the study. In this material, SHS learners can work either collaboratively or independently with the guidance of their CSS teachers.

The findings of this study concur with the findings of Kumar and Kaor (2019) that students taught with the learning package performed better than those who were taught using the traditional method. In the same way, Sawangsri's (2019) findings affirmed the results of this study that the learning package is effective to use in the teaching and learning process for it improves the student learning achievement thus, improving the performance in class.

IV. SUMMARY, CONLCUSIONS, AND RECOMMENDATIONS

This chapter presents the findings of the study entitled Instructional Learning Materials in Computer Systems Servicing (CSS) for SHS: Basis for Development and Evaluation. This chapter included the conclusions and recommendations of the study.

This study aimed to develop and evaluate instructional learning material in Computer Systems Servicing (CSS) for Senior High School. To determine the least competencies level of learners, the TESDA self-assessment guide was used to develop an appropriate model for instructional materials development. In the evaluation of developed instructional materials Learning Resource Management and Development System (LRMDS) by DepEd was used. After which a pre-test and post-test were conducted to determine the effectiveness of the developed instructional materials.

V. FINDINGS

The findings of the study were summarized as follows:

1. The least mastered competencies in the CSS of the respondents from Moreno Integrated School and Vicente L. Basit Memorial High School are related to setting-up computer servers. The competency in setting-up computer networks is applicable in the industry where most senior high school students, especially those taking CSS, can perform. While the new will only be better, most digital networking's current technologies are not cutting-edge but rather are protocols and standards conceived at the dawn of the digital networking age that has stood solid for over thirty years. However, competency in setting up computer servers is as the least mastered skill indicated by 93.37 percent. Most of the learners in the two schools involved in this study had difficulty in mastering the said skill above. This confirms the study of Ayuban (2020), that the majority of the issues why

learners have difficulties in this aspect is due to the fact that most of the computers being used in the schools do not possess high specifications for the server to perform a high-quality service such as the competencies indicated above.

Based on the TESDA assessment tool, the least mastered skills in Computer Systems Servicing were as follows: creating and initiating the user folder in line with the network systems features, configuring user access based on the standard features (NOS), and establishing network access policies and end-user requirements. Performing security checks in accordance with policies and end-user requirements is another least-learned skill by the learners from Moreno Integrated School and Vicente L. Basit Memorial High School.

Further, competency regarding maintaining and repairing computer systems and networks was mastered by the students as revealed in the assessment tool used by the researcher. The respondents can maintain and repair the Computer Systems and Networks. Relative to this, De Jesus (2019) studied this variable and he found that students with an idea of computer systems servicing can help them in troubleshooting, system configuration interfacing techniques, and computer assembling.

2. The model used in the development and evaluation of the CSS instructional materials as an output of the study is based on the Project Numerals of ROV. Focused on the figure are the five (5) key processes undertaken in this study. This model was adopted from the model used by the Regional Office Curriculum Learning and Management Division (CLMD, 2022) in the development of project numerals which is a numeracy assessment for learners' system. The phases which were retained in the old model are the brainstorming and planning phase, creation, validation, and execution. The added phases in the model used by the researcher were development and creation, integration and finalization, quality assurance and application, and sustainability.

The brainstorming phase involves planning the researcher on what to consider in this study. It fuels the researcher in developing a draft of the research output alongside the research instrument to be used in the evaluation of the said instructional material.

During the development and creation phase, the researcher developed the instructional materials based on the least learned skills of the learner-respondents involved in the study from Moreno Integrated School and Vicente L. Basit Memorial High School. The execution phase is the actual administration of the CSS instructional materials to the respondents. The integration and finalization of the CSS instructional material were carried out by adding the recommendations and suggestions of the evaluators of the material. Quality assurance was made to ensure that the material is compliant to the LRMS evaluation tool used both for print and non-print materials. The results of the utilization of the output of this study were investigated by the researcher for further application to other schools in the division offering the same track in the senior high school. Thus, sustainability is desired by coordinating with the EPS of TLE for wide utilization of the CSS instructional material.

The feature of the design organizes the content and format of the materials making it easier to be understood by the users. The steps need to be carefully followed so that each activity is helping towards the development of the competencies. With the instruction and guidance of the teacher in the classroom, students acquired the needed knowledge, skills, and attitude needed for the world of work. With effective instructions, students are driven to accomplish the expected output and perform such tasks with ease and sophistication. Both the minds-on and hands-on activities were given to the learners as they developed the competencies.

Further, the development assessment measures what has been measured to qualify and quantify what has been learned by the learners in CSS. In this way, refinement follows should the result of the assessment not meet the target mastery performance level in class while at the same time developing to the student's attitude towards instructional activities.

3. The researcher developed instructional material in Computer Systems Servicing as the output of the study. The developed material focused on the least learned skills as revealed during the administration of

TESDA assessment tool to the student-respondents from Moreno Integrated Schools and Vicente L. Basit Memorial High School. The said material has basic parts such as introduction where the background of the competency to be developed is discussed. The general instructions are also stated in this part. This is followed by the table of contents.

In the module content, the unit competency is indicated. There is also a module descriptor which basically provides information to the user on what to do and perform in this module. Both the learning outcome and assessment criteria are in this part of the material.

The whole module provides pedagogical and competency-based inputs to the users of the module based on what competency-based assessment of TESDA in consonance with the most essential competencies of the DepEd.

4.The developed instructional learning package in CSS was evaluated by the evaluators using the Learning Resource Management and Development System (LRMDS) evaluation rating sheet for print materials/resources. The evaluators were 2 Education Program Supervisors, in-charge of TLE and LRMDS, 1 Master teacher and 6 senior high school teachers handling CSS in the different schools in the SDO Camarines Norte.

In the evaluation rating sheet for print materials, there were 4 factors evaluated by the evaluators namely: content, format, presentation and organization, the accuracy and up-to-datedness of information taken from the CSS material. In each factor, there were several indicators. In Factor 1: Content, there are 7 indicators, in Factor 2: Format, there are 4 several sub-indicators, in Factor 3: Presentation and organization, there are sub-factor 5; and lastly in Factor 4: Accuracy and up-to-datedness of Information, there are 6 indicators. There are only two expected results that a resource can get from each factor either Passed or Failed. The evaluation of the evaluators met all the criteria using the LRMDS tool.

5.After using the developed instructional material in CSS, the respondents from two schools took the researcher-made test. The instructional materials developed the students' higher order of competency skills as revealed on the performance test given to the respondents about setting-up computer server. Statistics revealed that the computed value of ($t = 8.964$) is greater than the t-value (two-tailed) with a degree of freedom (df=11) and significant level (α) of 0.05. Therefore, the null hypothesis is rejected. Thus, it was hypothesized that there is a statistically significant difference between the mastery performance level before and after the utilization of the output.

The result of the statistics affirmed the least mastered competencies were learned by the students involved in the study as shown in the improved performance rating of the respondents. It can be implied that utilization of the developed materials in computer systems servicing significantly improved the performance of SHS learners from the two schools.

CONCLUSION

Based on the results of the study, the researcher arrived at the following conclusions:

1) The least mastered competency of the respondents from Moreno Integrated School and Vicente L. Basit Memorial High School was related to the competency for setting-up computer servers. Most of the specific competencies directly relates how computer server is being set-up like determining and planning the cable routes according to network design, identifying and obtaining network materials necessary to complete the work according to established procedures and checks against system requirements, obtaining tools, equipment and testing devices needed to carry out the installation work in accordance with established procedures and check for correct operation and safety, using appropriate personal protective equipment, and performing copper cable splicing in accordance with the standards such as the 568A and 568B color coding cabling standards, installing network cables and cable raceway in accordance with established procedures and installation requirements, performing and checking and checking network connectivity of each terminal in accordance with network design

to name a few as stated in the TESDA assessment evaluation tool.

2) With the least mastered competency, the researcher used a model in the development and evaluation of CSS instructional material. It was adopted from the model used by the Regional Office Curriculum Learning and Management Division (CLMD, 2022) in the development of Project Numerals from SDO Albay which is a numeracy assessment for learners. The model has major phases such as brainstorming or planning, development and creation, validation, execution, and integration or finalization. There are added features in this model which are quality assurance, application, and sustainability.
3) The output of the study is an instructional material entitled Computer Systems Servicing. It focuses on the least mastered competency encountered by the SHS learners involved in this study. The material has parts such as *Let Us Discover*, *What I Need to Know*, *Let Us Try This*, and *Let Us Apply*. There is also the evaluation part of the module, let us cross-check the part and the reference section. The whole module provided pedagogical and competency skills based on the TESDA assessment tool checklist of the core competencies. Sample materials is seen in fig. 2.

The developed material was evaluated by the identified evaluators using the LRMDS evaluation tool for print materials. All indicators in the evaluation tool were met in the CSS material as stated in the discussion above. The material is compliant with the standards set in the LRMDS evaluation tool.

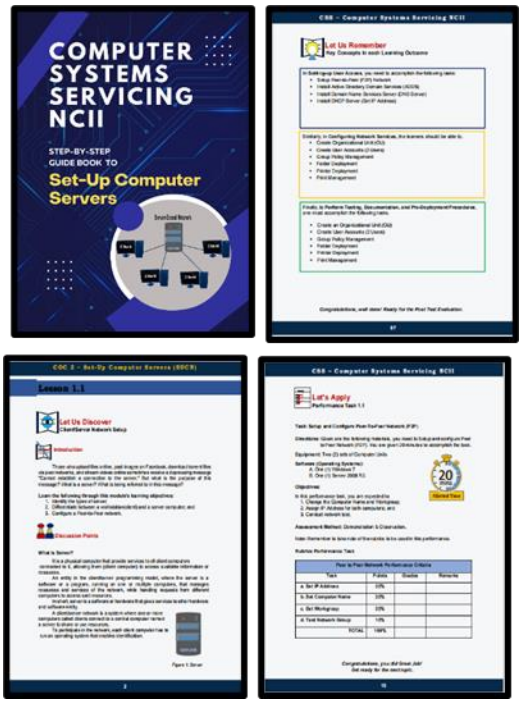

Fig. 2 *Developed Instructional Learning Material*

Overall, the results of the study implied that the materials developed can be used to fill up the gap in the learning difficulties of the learners in CSS.

4) As to the performance of the respondents, both Moreno Integrated School and Vicente L. Basit Memorial High School attained a 75 % passing rate which shows an improvement in their performance ratings. The effectiveness of the CSS material was statistically tested using the sample-paired t-test. Based on the t-test, it can be concluded that there is a significant difference in the performance of the respondents using the developed computer systems servicing material for senior high school learners.

Overall, the results of the study implied that the materials developed in this study can be used to close the learning difficulties of the learners in CSS. It must be shared with other schools to see to it that its sustainability measures were given a premium. At all costs, the quality of the developed materials must be compliant with the standards and requirements stated in the LRMDS evaluation tool for print materials. In this way, senior high school learners are given the needed skills and competencies as they engage in the world of work.

RECOMMENDATIONS

Based on the conclusion, the following recommendations are given:

1. Other core competencies in CSS can be explored in the TESDA assessment to come up with complete learning materials for the remaining core competency assessment.
2. Other standard assessments can be used to identify the least mastered skills in CSS Grade 12 for senior high school.
3. The instructional design model used in the study can be utilized as a guide in developing instructional materials upon approval of the LRMDS.
4. The researchers also recommended this material should be used by other CSS teachers handling the subject in the division to measure its effectiveness and applicability. Other instructional designs can be used by other developers and researchers as guides in the development and evaluation of such material.

The quality of the developed materials must be compliant with the standards and requirements stated in the LRMDS evaluation tool for print materials. In this way, the users of this material are confident that it is aligned with the TESDA assessment and MELC of the DepEd. In this way, senior high school learners are provided with the needed skills and competencies as they engage in the world of work.

ACKNOWLEDGMENT

I would like to express my deep and sincere gratitude to the special people who have extended their assistance for the success of this study. First and foremost, praises and thanks to God, the Almighty, who is the ultimate source of life and strength of knowledge and wisdom; To my family, for their moral support, love, and understanding which serve as my inspiration and motivation to pursue this study; My sincere gratitude goes to my committee for their guidance headed by Sonia S. Carbonell, PhD, the Dean of the Graduate School, Anicia S. Madarang, EdD, Merle C. Fontanilla, EdD, Erlinda J. Porcincula, EdD, and Alexy Gene B. Castillo, DIT, for the constructive feedback extended during the whole process of this research; To my adviser Noel V. Ibis, PhD, for his encouragement, mentorship, patience, and guidance and whose expertise and knowledge were generously shared; To my statistician, Blesilda Necio, EdD, for her guidance with my research analyses. Because of her, I was able to interpret the data and analyze it with more ease; To Mrs. Leny S. Abrera, for her guidance, and pieces of advice, and for helping me edit this manuscript; To the CSS teachers who shared their effort and time in evaluating my instructional materials; Finally, to all who have supported me to complete this research.

REFERENCES

BOOKS

[1] Baraceros, E. (2016). *Practical Research 1*. Manila: Rex Book Store.

[2] Chen, L. (2013) Exploring and Thinking of the “Guidance Study Case” Teaching Model in Secondary Vocational English Class. Qizhi Weekly, (08):27-28. Cooker, L. (2008). A history of the SALC in the ELI handbook 2008-2009. Makuhari: KUIS. Feng, S.,

[3] Dick, W., & Carey, L. M. (1996). The systematic design of instruction. (4. edition) New York: HarperCollins.

[4] Garcia. (2013). *Statistics and Research*. Manila: National Bookstore.

[5] Whelan, R. (2015). Instructional technology and theory: A look at past, present and future trends. New York: Prentice Hall, Inc.

[6] Zulueta, F. (2004). Methods of Research and Applied Statistics. Mandaluyong City: National Bookstore.

JOURNAL

[7] Aguilar, E. S., De Guzman, A. B., & De Castro, B. (2016). The Use of Art in the Development and Validation of a Prototype Constructivist-Oriented Learning Package in Secondary Mathematics. *Asia Pacific Journal of Contemporary Education and Communication Technology*, 22-38.

[8] Alaba, S. O., & Tayo, O. K. (2014). A Study of the Effectiveness of Socio-Drama Learning Package in Promoting Environmental

Knowledge and Behaviour of Secondary Schools Students in Osun State, Nigeria. *Mediterranean Journal of Social Sciences*, 1325-1330.

[9] Chandra, A.F., Cruz, C.S.L., & Sánchez, S.P. (2019). Analysis of the Digital Teaching Competence in ICT: Key Factor in the Performance of Active Pedagogies Revised Version. Iberoam. Sobre Calid. Efic. Cambio Educ., 17, 27–42

[10] Chuthapisith, J., diMambro, B., & Doody, G. (2009). Effectiveness of computer assisted learning (CAL) package to raise awareness of autism. *BioMed Central*, 1-6.

[11] Cornel, E.V. (2019). Information Literacy technology, the management challenge. Addison Wesley, Reading MA, p67

[12] Dulan, I. & Balon, F. (2020). The Digital Impact: Investigating the Use of ICTs in the Teaching of English Language in Some Secondary Schools in Cameroon, *International Journal of Innovative Research in Science Engineering and Technology*, 11(11):21-24

[13] Gotschall, M. (2020). E-learning strategies for executive education and corporate training. Fortune, 141 (10) S5 – S59

[14] Gunn, A., & Pitt, S. J. (2003). The effectiveness of computer-based teaching packages in supporting student learning of parasitology. *Bioscience Education*, 225-232.

[15] Gunn, A., & Pitt, S. J. (2015). The effectiveness of computer-based teaching packages in supporting student learning of parasitology. DOI, 50-62.

[16] Hiran, W. K., Onkasem, T., Sethakomkun, P., Chanajanasak, S., & Athipanapong, P. (2019). Development of Learning Packages, Innovation and Local Wisdom of Sao Chok Sub-district For Grade 6 Students by using Participatory Learning and Metacognitive Experiences integrated with Community-Based Learning. *Journal of Education* Thanksin University, 18-29.

[17] Kaur, R., Sharma, K., & Singh, S. (2015). Effectiveness of Multimedia Approach on the Academic Achievement of class 8th students in English. *International Journal of Applied Research*, 467-471.

[18] Kumar, R., & Kaur, G. (2016). Influence of Metacognition Integrated Learning Package on the Academic Achievement of B.Ed. trainee teachers. *International Journal of Education and Psychological Research* (IJEPR), 120-123.

[19] Liu, Y. & Wang, H. (2019). A comparative study on e-learning technologies and products: from the East to the West. Systems Research & Behavioural Science, 26(2), 191–209. doi: 10.1002/sres.959

[20] Love, N. & Fry, N. (2019). Accounting Students' Perceptions of a Virtual Learning Environment: Springboard or Safety Net?. *Accounting Education: An International Journal*, 15 (2), 151-166.

[21] Lubian, R.C. (2019). ICT Adoption Impact on Students' Academic Performance., p 250-280.

[22] Magulod, G. C. (2017). Evaluation of Multisensory Instructional Material Package for Elementary Learners. *Asia Pacific Journal of Multidisciplinary Research*, 83-93.

[23] Maltz, L., & Deblois, P. (2019). The EDUCAUSE Current Issues Committee. Top Ten IT Issues. *EDUCAUSE Review*, 40(1), 15-28.

[24] Maneschijn (2019). Evolving Pedagogy. Electronic Journal and Online Learning p. 200-205.

[25] Murtafia, Masrura, S., Indrawati, N., Arsyad, N., & Awi. (2018). The Practically and Effectiveness of Learning Package That Based on Metacognitive To Build the Students Character. *International Journal of Education and Research*, 339-348.

[26] Nuestro, S. A. (2018). Computer Systems Servicing Android-Based Simulation: A Strategic Mobile Learning Model for Students With Learning Disabilities. *International Journal of Scientific & Engineering Research*, 547-551.

[27] Sawangsri, B. (2016). Learning Package by Means of the Inductive Teaching with Group Process. *Universal Journal of Educational Research*, 618-621.

[28] Shelly, G. B. & Cashman, T. J. Teachers Discovering Computers: Integrating Technology

and Digital Media in the Classroom, *Thomson Course Technology*, United States of America, 2007, pp.128-132.

[29] Taurista, K., Sari, M. S., & Rohman, F. (2017). Developing a Learning Package Covering a Topic on Cells and Tissues Based on Guided-Inquiry Model and Integration of Local Knowledge. *Journal Pendidikan Sains*, 32-37.

[30] Wentling T.L., Waight C., Gallagher J., La Fleur J., Wang C., Kanfer A. (2019). E-learning - a review of literature. Knowle. Learn. Sys. Group NCSA. 2019:1–73.

[31] Yang, N. & Arjomand, L. H. (2019). *Opportunities and Challenges in Computer-Mediated Business Education: An Exploratory Investigation of Online Programs.*

UNPUBLISHED THESIS

[32] Abarca, D. (2020). The Core: An Instructional Learning Package for Core Competencies in Computer Systems Servicing. Unpublished Master's Thesis, Mabini Colleges Incorporated.

[33] Algahtani, A.F. (2021). Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students' Perceptions, Durham theses, Durham University.

[34] Ardinez, D. G. (2001). Development and evaluation of the student module discovering the rudiments of magnetism. Project Paper - De La Salle University, 192-204.

[35] Bongala, L. A. (2017). ASPIRE: A Learning Module in Teaching Junior Entrepreneurship. Unpublished Master's Thesis, Mabini Colleges, Daet, Camarines Norte.

[36] Morelos, R. L. (2021). Development and Validation of Learning Resource Materials in Upgrading Comprehension Skills of Senior High School students. *International Journal of Multidisciplinary: Applied Business and Education Research*, 2(2),153-161 https://doi.org/10.11594 /ijmaber.02.02.10

[37] Ramirez, M. G. (2001). Research-Based Self-Learning Packages on Ecological Concepts. Unpublished Master's Thesis-Mariano Marcos State University.

[38] Tinio V. (2020). A Survey of Information & Communication Technology Utilization in Philippine Public High Schools

[39] Ventayen, R. M. (2018). Level of Competency in Computer Systems Servicing of Teachers in one Town in Northern Luzon: A Needs Assessment and Analysis. Unpublish Master's Thesis, Pangasinan State University.

[40] Villanueva, G. & Mendoza, G. (2019). Bridging The Gap Between Modular and Online Distance Learning: Basis for An Intervention. https://www.depedbinan.com/media/research/IMRD

DOCUMENTS

[41] Official Gazette. (2013). Republic Act 10533. Implementing Rules and Regulations of the Enhanced Basic Education Act of 2013. https://www.officialgazette.gov.ph/2013/09/04/irr-republic-act-no-10533/

[42] RA 10647 (1994). Ladderized Education Act of 2014.http://republicact.com/widget/provision/185501

[43] Republic Act No. 7796 (1994). Technical education and skills development act of 1994, sec. 22. Establishment and administration of the national trade skills standards.

OTHER SOURCES

[44] Allifianto. (2004). Definition and technology committee document. http: Indiana du/molpage/Meaning s% 20of%20ET _4.0.pdf. June1, 2004

[45] ICT Solutions Australia. (n.d.). Why should schools invest in ICT. https://www.ictesolutions.com.au/blog/why-schools-should-invest-in-ict/

[46] Llego, M. (2018). A Guide to Choosing the Right Senior High School Strand. https://www.teacherph .com/right-senior-high-school-track/

[47] PBED. (2018). The future of work, are we ready forit? https://pbed.ph/blogs/1/Justine%20 Raagas

[48] Richey, R. C. (2017, September 2). Descriptive Development Evaluation Approach. Retrieved from https://eric.ed.gov/id=ID373353

[49] Senior Highs School TVL Information Communications Technology. (2020). https://www.edukasyon.ph/courses/senior-high-tracks/tvl/ict-information-and communications-technology-strand.

[50] The LRMDS Evaluation tool for Print Materials. www.DepEd,gov.ph.

[51] What is ICT Strand: Your Guide in Understanding ICT Curriculum. (n.d.) https://www.ciit.edu.ph/ict-strand/

[52] World Bank. (2022). *Digital Technologies in Education.* https://www.worldbank. org/en/topic/ edutech#3/