

Effectiveness of an Infographic Guide in Creating a Bootable Device in Computer Systems Servicing

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Abstract. This study examined the Effectiveness of an Infographic Guide in Creating a Bootable Device in Computer Systems Servicing under the Technology and Livelihood Education (TLE) learning area. Specifically, it assessed learners' performance before and after the intervention and compared the performance of learners who used the infographic guide with those who received regular instruction. The study involved 26 Grade 10 CSS learners from Gregorio del Pilar National High School, Schools Division of Ilocos Sur, during School Year 2026–2027. A quantitative quasi-experimental pretest–posttest control-group design was employed. Learners were ranked according to their pretest scores and assigned alternately to the experimental and control groups, with 13 learners in each group. The experimental group used the developed infographic guide, while the control group received regular instruction. A validated performance rubric was used to assess learners' competency in creating a bootable device. Data were analyzed using appropriate statistical tools to determine performance levels and examine differences within and between the groups. The results showed that both groups obtained a mean pretest score of 10.62. After the intervention, the experimental group achieved a mean posttest score of 21.23, with a mean gain of 10.61 points, whereas the control group obtained a mean posttest score of 13.54, with a mean gain of 2.92 points. These descriptive results indicate greater improvement among learners who used the infographic guide than among those who received regular instruction. The findings suggest that the infographic guide may serve as a supplementary instructional material for supporting the development of practical competencies in Computer Systems Servicing. Further interpretation of its effectiveness should consider the results of the statistical tests comparing learners' performance.

Keywords: Bootable Device; Computer Systems Servicing; Infographic Guide; Grade 10 Students; Practical Competency

Introduction

Competency in Computer Systems Servicing (CSS) involved the knowledge, skills, and attitudes needed to perform computer-related tasks according to established standards. Under competency-based instruction, learners were expected not only to understand technical concepts but also to perform procedures accurately and efficiently in authentic or simulated settings. The revised K–10 Curriculum and its prescribed Budget of Work (BOW) emphasized prioritized competencies and meaningful instruction. The MATATAG Curriculum General Shaping Paper identified curriculum congestion and limited instructional time as concerns and recommended reducing and sequencing competencies to support deeper learning (Department of Education, 2023). An evaluation of the curriculum's first year of implementation likewise reported greater flexibility in lesson delivery, while identifying the need for updated teaching materials aligned with the revised curriculum (Philippine Institute for Development Studies [PIDS], 2025; Department of Economy, Planning, and Development, 2025). These reforms underscored the importance of aligning teaching strategies, materials, and assessments with the competencies and performance standards in the BOW.

Within Technology and Livelihood Education (TLE), CSS developed skills in installing and configuring computer systems, setting up networks and servers, and maintaining and repairing computer systems and networks (Department of Education, 2016). These competencies required practical instruction, adequate equipment, and opportunities for guided practice. DepEd policies addressed the provision of technical-vocational tools and learning resources through minimum laboratory equipment requirements (DepEd Order No. 73, s. 2009) and guidelines for procuring and distributing TVL learning tools and equipment (DepEd Order No. 20, s. 2022). Nevertheless, resource limitations remained a concern in technical-vocational education. A 2026 study on CSS instruction in public schools in Batangas highlighted the importance of hands-on activities

and noted that limited resources could constrain practical instruction (Bascuguin & Generoso, 2026). Although the Learning Resources Management and Development System (LRMDS) and DepEd Order No. 8, s. 2025 supported the provision and selection of learning resources, access to appropriate materials varied across schools. The Education Commission's study on DepEd procurement also identified challenges in providing textbooks and TVL resources.

These concerns were relevant to Gregorio del Pilar National High School, where the limited availability of dedicated CSS equipment, textbooks, and reference materials, alongside teachers' reliance on the BOW, indicated a need for supplementary instructional resources. Creating a bootable device required learners to follow technical steps accurately and in sequence. A clear, accessible guide could therefore help learners understand and carry out the procedure.

Research on CSS instruction supported the use of competency-aligned learning materials. Coronado and Andal (2025) reported improved academic performance following the use of DepEd–TESDA competency-based learning materials, while Pineda and Rabut (2025) found higher post-test scores among Grade 10 learners using CSS NC II e-learning materials than among those receiving conventional instruction. Abarca (2026) identified gaps in learners' readiness for CSS core competencies, and Bascuguin and Generoso (2026) emphasized the importance of repeated hands-on activities, guided troubleshooting, and timely feedback. Regañon (2022) likewise identified inadequate facilities and limited hands-on opportunities as challenges to practical CSS skill development. Arrabaca and Habil (2025) reported differences in learners' performance across technical areas, including server setup, advanced troubleshooting, documentation, and responses to unexpected situations. Collectively, these findings pointed to the need for targeted learning support that could help learners translate technical knowledge into practical performance.

Studies in other TLE specializations also suggested that visual instructional resources could support practical learning. Arida (2023) found a positive relationship between visualization techniques and learners' skills performance in Bread and Pastry Production. Managbanag and Andal (2024) examined learners' perceptions of video tutorials in relation to baking performance, while Bartolome (2026) reported improved pastry-making skills following the use of step-by-step instructional videos. Although these studies concerned other TLE competencies and formats, they provided relevant evidence for investigating visual guidance in skills-based instruction.

Despite the recognized value of instructional materials, further empirical evidence was needed to determine whether a specific resource could improve learners' performance in a particular CSS competency. Studies describing learners' readiness, skill gaps, or instructional conditions did not necessarily establish the effectiveness of an intervention. In particular, it was important to examine whether an infographic guide could improve Grade 10 learners' ability to create a bootable device compared with regular instruction. By presenting the procedure in a clear, organized, and visual format, the guide was intended to support learners' understanding and performance of the required steps.

The study aligned with Sustainable Development Goal 4 (SDG 4), which promotes inclusive and equitable quality education and lifelong learning opportunities. By examining an infographic guide as supplementary instructional material, the study sought to contribute evidence on supporting practical competency development and strengthening competency-based instruction in technical-vocational education. Its findings were expected to inform CSS teachers' selection and development of learning resources, help learners follow technical procedures, and support the creation of localized materials aligned with curriculum competencies.

Accordingly, this study examined the Effectiveness of an Infographic Guide in Creating a Bootable Device in Computer Systems Servicing under the Technology and Livelihood Education (TLE) learning area at Gregorio del Pilar National High School, Ilocos Sur. It involved 26 Grade 10 learners, with 13 assigned to the experimental group and 13 to the control group. The experimental group used the infographic guide as supplementary instructional material, while the control group received instruction through the regular teaching approach. The study focused on learners' competency in performing the procedures involved in creating a bootable device, as assessed using the study's competency assessment.

The study was delimited to one CSS competency and one group of Grade 10 learners in a single public secondary school. It did not investigate learners' performance in other CSS competencies, the overall effectiveness of the CSS curriculum, or the use of infographic guides in other TLE specializations. The findings were specific to the participants, school, instructional conditions, and assessment used in the study; therefore, they may not be generalizable to learners in other grade levels or schools. The study's conclusions were also limited by its quasi-experimental design, the relatively small sample, and the duration of the instructional intervention. The study did not establish whether the effects of the infographic guide would persist over time or transfer to other CSS tasks.

Research Questions

This study aimed to determine the Effectiveness of an Infographic Guide in Creating a Bootable Device in Computer Systems Servicing (CSS) under the Technology and Livelihood Education (TLE) learning area at Gregorio del Pilar National High School, Schools Division of Ilocos Sur, during School Year 2026–2027.

Specifically, it sought to answer the following questions;

1. What is the level of competency of the experimental and control groups in creating a bootable device before and after the intervention?
2. Is there a significant difference between the pretest and posttest performance of the experimental group exposed to the infographic guide?
3. Is there a significant difference between the pretest and posttest performance of the control group exposed to regular instruction?
4. Is there a significant difference in the posttest performance between the experimental group and the control group?

Scope and Delimitation of the Study

This study focused on the Effectiveness of an Infographic Guide in Creating a Bootable Device in Computer Systems Servicing (CSS) under the Technology and Livelihood Education (TLE) learning area. The respondents of the study were limited to the 26 Grade 10 learners enrolled in CSS during School Year 2026–2027 at Gregorio del Pilar National High School, Schools Division of Ilocos Sur. Through total enumeration, all 26 learners were ranked according to their pretest scores and assigned alternately to the experimental and control groups. Each group consisted of 13 learners. The experimental group received instruction using the infographic guide, while the control group received regular instruction. The experimental group was exposed to the Infographic Guide in Developing Grade 10 Students' Competency in Creating a Bootable Device, while the control group received the regular instructional approach.

Literature Review

Instructional materials play an important role in helping learners understand concepts and develop practical skills. In Computer Systems Servicing (CSS), creating a bootable device requires learners to follow technical procedures accurately and sequentially. When instructions rely solely on text, some learners may experience difficulty understanding and performing the required steps, particularly when studying independently without adequate instructional support. An infographic guide may address this concern by combining illustrations, screenshots, and concise instructions to present technical information in an organized and accessible format.

This study was anchored in Mayer's Cognitive Theory of Multimedia Learning (2021), which explains how learners process verbal and visual information during learning. The theory provides a basis for combining written instructions with screenshots and illustrations in an infographic guide. Sweller's Cognitive Load Theory (1988) further supports the organized presentation of information by emphasizing the importance of managing the mental effort required to learn complex material. In the context of creating a bootable device, presenting procedures in clearly arranged steps may help learners focus on essential information and follow the required sequence.

Kolb's Experiential Learning Theory (1984) also emphasizes the importance of experience and the application of knowledge in developing practical skills. Creating a bootable device requires learners to perform the procedures using appropriate tools and software rather than merely memorize the instructions. Similarly, Bandura's Social Cognitive Theory (1986) recognizes the role of observation, behavior, and environmental influences in learning. An infographic guide may complement teacher demonstrations and guided practice by providing a visual reference that learners can consult while performing the task. Collectively, these theories support the use of an infographic guide as supplementary instructional material, although its effectiveness must be established through empirical assessment.

Infographics as Instructional Materials

An infographic is a visual instructional material that combines images, symbols, diagrams, and brief explanations to communicate information clearly. Its educational value lies in organizing information into a format that may help learners understand relationships, recognize sequences, and recall essential details.

Elaldi and Cifei (2021) examined the effectiveness of infographics on academic achievement through a meta-analysis of 12 empirical studies. They reported a positive overall effect, with an effect size of 1.599. This finding supports the potential of infographics to improve learning outcomes. However, the reported effect

concerned academic achievement across the studies reviewed and does not directly establish their effectiveness in developing practical computer servicing competencies.

Jaleniauskiene and Kasperuniene (2023) reviewed the use of infographics in higher education and discussed their potential to support understanding and communication of subject content. Similarly, Hasyim, Hidayat, and Indihadi (2024) reviewed infographic media in elementary education, including interactive, animated, and digital formats. Their review reported positive contributions to learning, motivation, and interest. Although these studies covered educational contexts different from secondary CSS instruction, they provide supporting evidence for examining visual materials as tools for presenting information in accessible formats.

Taken together, these studies suggest that infographics may support learning by organizing and presenting information visually. Nevertheless, differences in educational level, subject matter, and learning outcomes limit the direct application of their findings to technical performance tasks. The effectiveness of an infographic guide for teaching a specific CSS procedure therefore requires separate investigation.

Competency Development in Computer Systems Servicing

Competency refers to the ability to apply knowledge and skills in performing a particular task according to established requirements. In CSS, learners are expected to demonstrate practical abilities in computer maintenance, configuration, troubleshooting, and other technical procedures. Creating a bootable device is one such task because it requires learners to prepare a USB device, select an appropriate operating system image, configure the necessary software, follow the correct procedures, and verify the resulting device.

The development of this competency depends not only on understanding instructions but also on performing the procedures correctly. Kolb's Experiential Learning Theory (1984) supports the importance of practical experience, while Bandura's Social Cognitive Theory (1986) highlights the contribution of observation and environmental support to learning. These perspectives indicate that instructional materials should complement, rather than replace, demonstrations, guided practice, and actual performance.

In the Philippine educational context, Computer Systems Servicing is part of the Technology and Livelihood Education (TLE) learning area, which emphasizes the development of practical and work-related competencies. However, access to equipment, teacher guidance, prior knowledge, computer literacy, and opportunities for hands-on practice may influence learners' performance. An infographic guide may provide additional procedural support, but its contribution must be evaluated alongside the instruction and practice provided to learners.

The reviewed literature presents complementary explanations for how an infographic guide may support competency development. Mayer's Cognitive Theory of Multimedia Learning (2021) provides a basis for combining visual and verbal information, while Sweller's Cognitive Load Theory (1988) explains the importance of organizing information to manage the mental effort involved in learning complex procedures. Kolb's Experiential Learning Theory (1984) and Bandura's Social Cognitive Theory (1986) further emphasize the importance of practical experience, observation, and instructional support.

Empirical studies provide additional support for the use of infographics. Elaldi and Cifci (2021) reported a positive effect on academic achievement, while Jaleniauskiene and Kasperuniene (2023) and Hasyim, Hidayat, and Indihadi (2024) examined infographic use in higher education and elementary education, respectively. Although these studies support the potential of visual instructional materials, they differ from the present study in terms of educational context, subject area, and the outcomes examined. In particular, evidence of improved academic achievement or learning engagement does not necessarily demonstrate improved performance in a hands-on technical task.

The principal research gap identified in the literature reviewed is the limited direct evidence concerning the effectiveness of an infographic guide in developing Grade 10 learners' competency in creating a bootable device in CSS. The reviewed studies support the theoretical and instructional value of visual materials, but they do not directly establish whether this specific intervention produces better practical performance than regular instruction in the identified school context.

To address this gap, the present study examined the effectiveness of a developed infographic guide among Grade 10 CSS learners at Gregorio del Pilar National High School, Schools Division of Ilocos Sur, during School Year 2026–2027. Using a quantitative quasi-experimental pretest–posttest control-group design, the study compared learners who used the infographic guide with those who received regular instruction. The findings were intended to provide localized evidence on the usefulness of the guide as supplementary instructional material for developing competency in creating a bootable device.

Methodology

Research Design

This study employed a quantitative quasi-experimental research design, specifically a pretest–posttest control-group design, to determine the effectiveness of an infographic guide in developing Grade 10 learners' competency in creating a bootable device in Computer Systems Servicing (CSS). This design enabled the researcher to assess learners' performance before and after the intervention and compare the results of the experimental and control groups. The experimental group used the developed infographic guide, while the control group received the regular instructional approach. The learners' performance was assessed using a validated performance rubric. The design was appropriate for determining whether the infographic guide was associated with greater improvement in learners' practical competency.

Research Locale

The study was conducted at Gregorio del Pilar National High School, under the Schools Division of Ilocos Sur, during School Year 2026–2027. The school served as the research locale for examining the use of an infographic guide in teaching a specific CSS competency. The study focused on Grade 10 learners who were involved in learning the procedures for creating a bootable device under the Technology and Livelihood Education (TLE) learning area.

Research Participants

The participants were 26 Grade 10 CSS learners from Gregorio del Pilar National High School. They were divided into two groups, with 13 learners in the experimental group and 13 learners in the control group. The experimental group used the infographic guide as supplementary instructional material, whereas the control group received regular instruction. Both groups completed the pretest and posttest to measure their competency before and after the instructional period.

Research Instrument

The study used a performance-based assessment to measure learners' competency in preparing and creating a bootable USB device. Learners completed the task by following the required procedures. Their performance was evaluated using a validated rubric consisting of five criteria, with a maximum score of 25 points. The criteria were preparation of tools and files; correct configuration; procedure and technical accuracy; successful creation and verification; and safety, care, and workstation management. The same task, rubric, and scoring procedure were used for the pretest and posttest. Higher scores indicated better performance in creating a bootable USB device.

Data Gathering Procedure

The researcher secured permission from the school head before conducting the study. After approval was obtained, the participants were ranked according to their initial performance and alternately assigned to the experimental and control groups. Both groups completed the bootable USB performance task as a pretest to determine their initial competency. Their performance was scored using the validated 25-point rubric. The experimental group then received instruction using the infographic guide, while the control group received the regular instructional approach. After the instructional period, both groups completed the same performance task as a posttest and were evaluated using the same rubric and scoring procedure.

Results and Discussions

The research questions and hypotheses formulated in this study were answered and tested in this section. The results were presented in tables, followed by their corresponding analysis and interpretation.

Research Question 1: What is the level of competency of the experimental and control groups in creating a bootable device before and after the intervention?

Table 1. Mean and Standard Deviation of the Pretest and Posttest Competency Scores of the Experimental and Control Groups in Creating a Bootable Device

Group	n	Pretest Mean	Pretest SD	Post Test Mean	Post Test SD	Mean Gain
1. Experimental	13	10.62	1.04	21.23	1.24	10.61
2. Control	13	10.62	1.04	13.54	0.97	2.92

The results in Table 1 show that both groups obtained the same pretest mean score of 10.62, indicating comparable initial performance in creating a bootable device. After the instructional period, the experimental

group obtained a posttest mean score of 21.23 (SD = 1.24), while the control group obtained a mean score of 13.54 (SD = 0.97). The experimental group recorded a mean gain of 10.61 points, compared with 2.92 points for the control group. Although both groups improved, the experimental group demonstrated a greater increase in performance and a higher posttest mean score.

This finding is consistent with Basco (2020), who reported significantly higher posttest performance among sixth-grade pupils who used science infographics as instructional materials. The study suggested that infographics can help learners understand and organize information, thereby supporting academic achievement. Although Basco's research focused on Science rather than practical Computer Systems Servicing skills, it provides related evidence for the potential of infographic-based instruction to improve learning outcomes. In the present study, the higher posttest mean and greater mean gain of the experimental group suggest that the infographic guide may have supported learners in following the procedures for creating a bootable device more effectively than regular instruction.

Research Question 2: Is there a significant difference between the pretest and posttest performance of the experimental group exposed to the infographic guide?

Table 2. Results of Test of Significant Difference Between the Pretest and Posttest Competency Scores of the Experimental Group

Test	n	Mean	SD	Mean Difference	t-value	df	p-value	Decision
1. Pre-Test	13	10.62	1.04					
2. Post-Test	13	21.23	1.24	10.61	75.61	12	< .001	Reject Ho

The significant improvement in the experimental group's competency in creating a bootable device is supported by previous research on infographic-based instruction. Basco (2020) reported significantly higher academic performance among pupils who used science infographics, while Elaldı and Cıfci (2021), through a meta-analysis of empirical studies, found a positive overall effect of infographics on academic achievement. Similarly, Cordero (2024) reported higher posttest performance among Grade 10 learners exposed to competency-based infographic materials in Science. These findings suggest that visually organized instructional materials may help learners understand and process information, supporting the improvement observed in the present study.

However, the findings of these studies should be interpreted in relation to their educational contexts and measured outcomes. Jaleniauskiene and Kasperuniene (2023) examined infographic use in higher education, while Hasyim et al. (2024) focused on elementary education. Their findings do not directly establish the effectiveness of infographics in developing practical Computer Systems Servicing competencies among Grade 10 learners. Moreover, Kolb's Experiential Learning Theory (1984) emphasizes the importance of actual experience, while Bandura's Social Cognitive Theory (1986) highlights observation and instructional support in learning. These perspectives suggest that an infographic guide should complement, rather than replace, teacher demonstrations and hands-on practice.

Taken together, the literature supports the potential of infographic-based instruction to improve learning, while indicating that its effectiveness may depend on the subject matter, learner characteristics, and type of competency assessed. In the present study, the experimental group's mean score increased from 10.62 in the pretest to 21.23 in the posttest, with a mean gain of 10.61 points. The paired-samples t-test also indicated a statistically significant difference, $t(12) = 75.61, p < .001$. These results are consistent with the positive findings of previous infographic studies and suggest that the guide may have supported learners in following the procedures for creating a bootable device. Nevertheless, because the intervention included instruction and practical activities, the improvement cannot be attributed exclusively to the infographic guide. The findings demonstrate improvement following the intervention and provide evidence of the guide's potential as supplementary.

Research Question 3: Is there a significant difference between the pretest and posttest performance of the control group exposed to regular instruction?

Table 3. Results of Test of Significant Difference Between the Pretest and Posttest Competency Scores of the Control Group

Test	n	Mean	SD	Mean Difference	t-value	df	p-value	Decision
1. Pre-Test	13	10.62	1.04					
2. Post-Test	13	13.54	0.97	2.92	38.00	12	< .001	Reject Ho

The significant improvement observed in the control group is consistent with Diestro (2023), who found a significant increase in the Science performance of Grade 10 learners receiving English-based instruction. Similarly, Sanditan and Roble (2026) reported that learners taught through traditional lecture-

based instruction improved from pretest to posttest, although those exposed to the Math Workshop Model achieved greater gains. These findings suggest that regular instruction can contribute to learning, while additional instructional strategies may provide further support. In the present study, the control group's increase from a pretest mean of 10.62 to a posttest mean of 13.54 indicates that learners improved their competency in creating a bootable device following regular instruction. However, the greater gain observed in the experimental group suggests that the infographic guide may have offered additional learning support.

Research Question 4: Is there a significant difference in the posttest performance scores of Grade 10 CSS learners in creating a bootable device between the experimental group exposed to the infographic guide and the control group exposed to regular instruction?

Table 4. Results of Test of Significant Difference Between the Posttest Competency Scores of the Experimental and Control Groups

Group	n	Mean	SD	Mean Difference	t-value	df	p-value	Decision
1. Experimental	13	21.23	1.24					
2. Control	13	13.54	0.97	7.69	17.68	24	< .001	Reject Ho

The results in Table 4 revealed a significant difference between the posttest competency scores of the experimental and control groups, with the experimental group obtaining a higher mean score of 21.23 compared with 13.54 for the control group. This finding is consistent with Cordero (2024), who reported significantly higher posttest performance among Grade 10 students exposed to competency-based infographic materials in Science than among students in the unexposed group. Similarly, a study examining infographics in Filipino literature instruction found that learners in the experimental group achieved higher posttest scores than those in the control group. Related evidence from multimedia-based Biology instruction also showed significantly higher posttest achievement among learners exposed to the enhanced instructional approach than among those taught conventionally. Collectively, these studies support the potential of visual and structured instructional materials to improve learning outcomes. In the present study, the higher posttest mean of the experimental group suggests that the infographic guide may have helped learners follow the procedures for creating a bootable device more effectively than regular instruction.

Ethical Considerations

This study observed ethical standards in educational research to protect the rights, privacy, and welfare of the participants. Permission to conduct the study was obtained from the school head of Gregorio del Pilar National High School before data collection. Informed consent was secured from the participants and, when required, their parents or legal guardians after explaining the purpose of the study, the procedures involved, and their right to participate voluntarily or withdraw without consequences. Confidentiality and anonymity were maintained by using codes to identify participants and ensuring that personal information was not disclosed in the research report. All data collected were used solely for research purposes, stored securely, and handled in accordance with the Data Privacy Act of 2012 (Republic Act No. 10173). The study also ensured that participants were treated fairly and were not exposed to unnecessary physical, psychological, or emotional harm during the instructional intervention and performance assessments. Participation did not affect learners' academic standing, and all participants were treated with respect and fairness. Ethical principles of objectivity, voluntary participation, confidentiality, and academic integrity were observed throughout the conduct of the study.

Conclusion

Based on the findings of the study, the following conclusions were drawn. The experimental and control groups had comparable levels of initial competency in creating a bootable device, as both obtained a pretest mean score of 10.62. However, their posttest results showed a notable difference. The experimental group, which used the infographic guide, achieved a higher posttest mean score of 21.23 and a mean gain of 10.61, while the control group obtained a posttest mean score of 13.54 and a mean gain of 2.92. These results indicate that both instructional approaches contributed to learners' improvement, although the experimental group demonstrated greater progress. A significant improvement was observed in the experimental group's performance from pretest to posttest, suggesting that the infographic guide contributed to the development of learners' competency in creating a bootable device. The control group also showed a significant improvement following regular instruction, highlighting the importance of teacher explanations, demonstrations, and guided practical activities in developing technical skills. Moreover, the posttest results revealed a significant difference between the performance of the two groups, with the experimental group achieving a higher mean score. This indicates that learners who used the infographic guide performed significantly better than those

who received regular instruction. Thus, the study concludes that the infographic guide served as an effective instructional support in developing the bootable device creation competency of the participating Grade 10 CSS learners. Its organized presentation of procedures, illustrations, and step-by-step instructions may have helped learners better understand and perform the required tasks., and step-by-step instructions may have helped learners better understand and perform the required tasks.

Recommendations

In light of the findings and conclusions, the following recommendations are proposed. For CSS Teachers, during the next CSS instructional cycle, teachers may integrate the developed infographic guide into lessons on creating a bootable device. They may use it during demonstrations, guided practice, and independent performance activities. At the end of each lesson, teachers may assess learners' performance and identify procedures that require additional explanation or practice. For School Heads and Instructional Leaders, within the next school year, school administrators may support the development, validation, and classroom use of infographic-based learning materials in CSS and other technical-vocational subjects. They may allocate time during Learning Action Cell (LAC) sessions for teachers to share and improve localized instructional resources. They may also assess available equipment and identify resource needs that could support practical learning. For Learners, throughout the CSS learning period, learners may use the infographic guide as a reference during classroom activities and supervised independent practice. They may review the procedures before performing the task, follow the steps carefully, and repeat the activity when appropriate. Teachers may provide feedback after each practice session to help learners correct errors and improve their performance. For Learning Resource Developers, during the preparation and revision of CSS learning materials, teachers and resource developers may create similar infographic guides for other competencies, such as operating system installation, computer system configuration, device driver installation, and preventive maintenance. Each guide should undergo technical review and validation before classroom use to ensure accuracy, clarity, and alignment with prescribed learning competencies. For Future Researchers, in subsequent research projects, researchers may replicate the study with larger groups of learners from different schools to examine whether similar results are obtained in other settings. They may also investigate the effectiveness of infographic guides in other CSS competencies, compare different instructional approaches, and conduct follow-up assessments after an appropriate period to determine skill retention and transfer. These investigations may help establish the broader applicability of infographic-based instruction. For the School, before the next school year, the school may review the developed infographic guide for possible inclusion in its supplementary CSS learning resources. Teachers may pilot the guide in subsequent classes, gather learner and teacher feedback, and revise it when necessary. Its continued use should be guided by periodic assessment of learners' performance and the availability of appropriate equipment for practical activities. Overall, the infographic guide may be incorporated as a supplementary resource alongside regular instruction, teacher demonstrations, and hands-on practice. Its continued implementation and evaluation may help determine how visual instructional materials can support the development of practical CSS competencies.

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