

DEVELOPMENT AND VALIDATION OF CANVAS-BASED LEARNING PLAYLISTS AS INSTRUCTIONAL MATERIALS TO ENHANCE RESEARCH SKILLS (DEVELOPMENTAL STUDY)

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Abstract

In response to the educational shifts brought about by the COVID-19 pandemic, schools transitioned to digital learning through Learning Management Systems (LMS), prompting innovative approaches to instruction. This descriptive developmental study aimed to develop and validate a Canvas-based Learning Playlist in Research to enhance the research skills of senior high school students in a private institution during the school year 2024–2025, guided by the ADDIE model. Data were gathered using a validated school research skills assessment and the LRMDS Evaluation Rating Sheet for Non-Print Materials. Results show that both male and female students exhibit very high overall research skills, with females slightly outperforming males. However, both groups demonstrated the lowest proficiency in data analysis. Public school students outperformed their private school counterparts in most skill areas, particularly in evaluating and planning. Statistical analysis using the Mann-Whitney U Test revealed significant differences in specific research skills based on school type and sex. Females performed significantly better in planning, evaluating, and drawing conclusions, while public school students excelled in evaluating, data collection, and overall research performance. These findings suggest variability in student preparedness influenced by prior educational experiences. The playlist underwent rigorous validation by teacher-experts, with high ratings in Content Quality, Instructional Quality, Technical Quality, and Other Findings, all meeting the criteria for very satisfactory. Minor areas for improvement included fostering creativity, enriching concept mastery, and enhancing audiovisual integration. It is recommended that schools adopt Canvas-based Learning Playlists to personalize research instruction and address skill gaps, particularly in data analysis and concept mastery, to ensure equitable development of research competencies among diverse student populations.

Keywords: Learning Management System, Canvas, Learning Playlist, Research Skills, Learning Resource Management, Philippines

Introduction

In the wake of the COVID-19 pandemic, educational institutions around the world rapidly adapted to remote learning environments, leading to significant changes in instructional methodologies. One such adaptation was the increased use of the Learning Management System, which facilitated personalized learning experiences for students during a time when traditional classroom settings were not feasible. This approach allowed educators to curate a sequence of learning activities that students could navigate at their own pace, fostering autonomy and engagement in their educational journeys (Chue, 2023).

A learning playlist is defined as a structured collection of learning experiences and resources designed for students to work through independently (Learner-Centered Collaborative, 2024). This approach empowers learners by providing them with choices regarding the path, pace, and modality of their learning, thus promoting a more personalized educational experience (Gibbs, 2017). As students engage with a variety of tasks, ranging from videos and readings to interactive assessments, they can take ownership of their learning, which has been shown to enhance motivation and academic performance (Tucker, 2020).

Putman (2018) published a report on the effectiveness of learning playlists in developing critical thinking skills among high school students. The findings indicated that playlists not only improved student engagement but also enhanced their ability to conduct independent research. Zabiri & Kamaruddin (2024) explored the impact of self-directed learning through blended learning on undergraduate student achievement. His meta-analysis revealed that when students have control over their learning paths, they tend to perform better academically.

Leporati et al., (2019) examined the role of digital playlists specifically the use of flipped class activities and in-class instruction in developing critical thinking skills and research skills among undergraduate students. Their study found that flipped class activities and in-class instruction like learning playlists both improve students' ability to evaluate sources, with flipped content enhancing source quality, search strategy, and topic relevance. Mayer (2017) investigated the use of multimedia learning playlists in online courses and their effect on research competency. The results showed that students who utilized these playlists demonstrated higher levels of information literacy compared

to those who did not. Ješková et al., (2020) focused on the integration of playlist-based instruction in STEM education. When it comes to sex, female students tend to outperform their male peers in both science process skills and critical thinking, showing a strong link between the two (Darmaji et al., 2022).

In the Philippine context, a study at President Ramon Magsaysay State University (PRMSU) by Agatep and Villalobos (2020) showed that students generally rate their research skills at a moderate level, especially in tasks like writing research proposals and producing work that's ready for publication. Lacson and Dejos (2022) found that while developing students' research skills is a key goal in secondary education, the way these skills are defined and applied can often be unclear. This highlights the need for schools to better support teachers by equipping them with the right tools and training.

Yaparak (2022) found that using Canvas Learning Playlists in high school improved students' skills and use of digital platforms and podcasts had a significant role in boosting learners' confidence. According to Glans (2024), learning playlists is that a holistic, personalized approach to designing educational tools, such as learning playlists, empowers students by giving them control over the sequence and pace of their learning activities. Additionally, Learning playlists and LMS platforms also support teamwork, communication, and social presence, with effective collaboration influenced by teammate familiarity and thoughtful curriculum design (Xie et al., (2019). To support quality instructional materials, DepEd issued Memorandum No. 82, s. 2017, introducing the Learning Resource Management and Development System framework to standardize the evaluation and development of teaching resources across various regions, particularly in the Visayas.

The existing literature on learning playlists primarily addresses their general application in academic settings, often focusing on broad academic outcomes or specific subject areas. However, there is a notable gap in research concerning the specific use of learning playlists to enhance research skills among senior high school students, particularly in private institutions during post-pandemic recovery phases. This situational gap highlights the need for studies that explore how learning playlists can be tailored to improve research competencies among high school learners.

This study aimed to develop and validate a Canvas-based Learning Playlist in Research to enhance the research skills of senior high school students in a private institution during the school year 2024–2025. Furthermore, the research seeks to contribute valuable insights into effective instructional strategies that leverage technology for personalized learning experiences.

Methodology

This study employed descriptive developmental research design in developing and validating the Canvas-based learning playlists to enhance the research skills of Senior High school students. Developmental research was distinct from simple instructional development as it focuses on the systematic study of designing, developing, and evaluating educational interventions (Richey, 1994). This approach was crucial in instructional technology for creating effective learning tools.

The descriptive developmental research design is used for this study as it supports the systematic creation and evaluation of Canvas-based learning playlists tailored to improve senior high school students' research skills (Richey, 1994). Coupled with the ADDIE model, this approach ensures a structured process through analysis, design, development, implementation, and evaluation, resulting in effective and learner-centered instructional materials. This method promotes continuous refinement and responsiveness to student needs, enhancing both engagement and skill development. Such a design-based and learner-centered methodology aligns with contemporary educational technology research, which advocates for participatory and iterative development processes to produce meaningful and usable learning resources (Pillai, Lucas, & Mello, 2014; EDeR, 2021)

Instrument

This study employed two instruments for data collection: a school validated research skills assessment and a standardized Evaluation Rating Sheet for Non-Print Materials by LRMDs Assessment and Evaluation.

The research skills pre-test covered skills such as identifying the inquiry and stating the problem (planning skill), learning from others and reviewing the literature (evaluating skills), understanding data and ways to systematically collect data (data collection/finding and generating), finding answers through data collection (data analysis/analyzing and synthesizing), and analyzing the meaning of the data and drawing conclusions. Each skill was assessed with five questions to gauge the participants' research skill levels.

The second instrument, the Evaluation Rating Sheet for Non-Print Materials, was evaluated by 8 teacher-experts and edtech experts based on content quality, instructional quality, technical quality, and other findings.

The research instruments for all competencies underwent content validity assessment using the Content Validity Ratio (CVR), which yielded a Content Validity Index (CVI) of 0.96, demonstrating a highly acceptable level of content validity. The reliability of a questionnaire was a way of assessing the quality of the measurement procedure used to collect data. In order to consider a result valid, the measurement procedure must first be reliable. A survey instrument was said to have high reliability if it produces similar results under consistent conditions, and any change would be due to a true change in the attitude, as opposed to changing interpretation. The reliability test was given to thirty (30) senior high school students who were under the strands and track of ABM, HUMSS, TVL and Arts and Design. The Cronbach alpha scored by 0.89 as was deemed Good.

Data Gathering Procedure

The researchers distributed the questionnaires to the STEM students after the approval of the University Academic Principal in a letter of permission submitted by the researchers. The researchers asked permission from the Basic Education Unit Research Department, and coordinated with the Research Office in getting the data of the respondents.

The respondents guaranteed the utmost confidentiality of their responses. Before the administration of the questionnaire, the respondents were oriented about the purpose and scope of the study, the nature, and parts of the questionnaire and most especially, the affirmation of their willingness to participate in the study. After all the data were collected, they will be tabulated and analyzed using appropriate statistical tools. An informed consent form was ensured by the researchers and was made part of the questionnaire to be given to the identified respondents of the study.

Additionally, the ADDIE model provided a systematic framework for developing and validating Canvas-based learning playlists designed to enhance research skills.

Analysis Phase

Beginning with the Analysis phase, the instructional problem regarding research skill gaps were clarified, instructional goals and objectives are established, and the learners' existing knowledge and skills are assessed to determine the necessary content scope and available resources. Level of research skills were assessed in the phase.

Design Phase

The Design phase then focused on defining specific learning objectives for each module, creating assessment instruments, planning interactive exercises, developing accurate and relevant content, selecting appropriate media, and determining the logical sequencing of content and activities.

Development Phase

During the Development phase, content assets were created and assembled, the Canvas structure is organized, various media types were integrated, and effective teaching methods are chosen for each research skill

Implementation Phase.

The implementation phase involves introducing the playlists to teacher-experts for review and validation, with the important note that students was not used the playlists during this initial validation stage.

Evaluation Phase

Finally, the Evaluation phase assessed the playlists' impact on learners' research skills by gathering feedback from both teacher-experts and educational technologists, analyzing collected data, and evaluating content quality, instructional design, technical aspects, student engagement, and teacher feedback for continuous improvement.

Data Analyses

The data were analyzed using both descriptive and inferential statistical methods. Descriptive analysis, specifically frequency counts and percentages, was employed to identify the demographic profile of Senior High School students according to sex and previous school attended. To determine the level of research skills among students, the mean and standard deviation were calculated. For comparative analysis, the Mann-Whitney U-test was used to assess significant differences in research skills when students were grouped by sex and previous school attended.

In evaluating the validity of the developed Canvas-based Learning Playlist in Research, as assessed by eight (8) teacher-experts and educational technologist in terms of Content Quality, Instructional Quality, Technical Quality,

and Other Findings, descriptive statistics. Particularly, mean and standard deviation, were again utilized. Furthermore, specific passing criteria were established: Content Quality and Instructional Quality required at least 30 out of 40 points, Technical Quality required at least 39 out of 52 points, and Other Findings required at least 10 out of 16 points.

Results and Discussion

Demographic Profile of senior high school students and Research Skills

Table 1

Demographic Profile of senior high school students by sex and previous school attended.

Variables		Frequency	Percentage
Sex	Male	189	51.2%
	Female	180	48.8%
Previous School Attended	Public	59	16.0%
	Private	310	84%
Total		369	100%

Table 1 presents the Demographic of senior high school students by sex and previous school attended. In terms of sex, the table shows a total of 369 participants divided into two sex categories. Females account for 180 individuals (48.8% of the total), while males make up 189 individuals (51.2%). The data reveals a stark contrast in school type representation: 84.0% of participants (310 individuals) attended private schools, while only 16.0% (59 individuals) attended public schools.

Table 2

Level of research skills of Senior High School students when grouped according to sex

Research Skills	Group	n	Mean	SD	Interpretation
Planning	Female	180	6.58	1.58	Very high research skills
	Male	189	6.28	1.64	Strong research skills
Evaluating	Female	180	6.97	1.54	Very high research skills
	Male	189	6.56	1.86	Very high research skills
Data Collection	Female	180	4.23	1.74	Strong research skills
	Male	189	4.05	1.75	Moderate research skills

Research Skills	Group	n	Mean	SD	Interpretation
Data Analysis	Female	180	2.72	1.29	Moderate research skills
	Male	189	2.47	1.24	Low research skills
Conclusion	Female	180	4.18	1.15	Very high research skills
	Male	189	3.65	1.46	Strong research skills
Overall	Female	180	24.67	5.86	Very high research skills
	Male	189	23.01	6.25	Very high research skills

Shown in Table 2 is the level of research skills of Senior High School students when grouped according to sex.

The results show female students have the highest skill in evaluating with a mean of 6.97 (SD= 1.14), interpreted as very high research skills, while their lowest skill is in data analysis with a mean of 2.72 (SD= 1.29), which is classified as moderate research skills. For males, the highest skill is also in evaluating and, with a mean of 6.56 (SD= 1.86), interpreted as very high research skills, and their lowest skill is in data analysis, with a mean of 2.47 (SD= 1.24), categorized as low research skills.

In terms of overall research skills, female students with a mean score of 24.67 and a standard deviation (SD) of 5.86, females exhibit very high research skills overall. Meanwhile, males have a mean score of 23.01 with an SD of 6.25, also indicating very high research skills. However, the slightly lower mean score compared to females suggests that, on average, males perform slightly less well overall.

The results imply that both sexes excel in evaluating, suggesting a strong ability to critically assess information. Planning skills are also strong for both males and females, indicating effective strategies for initiating research. However, data analysis emerges as a significant area of weakness for both sexes, with males showing particularly low skills.

In accordance with the results of Bahtiar et al., (2022), female students have higher scientific literacy skills (80) than male students (77.95) in using scientific data and evidence, explaining phenomena scientifically, and interpreting data and evidence scientifically. Another study to support the findings conducted by Sukri et. al (2023), students' research abilities on all research indicators did not significantly differ between males and females, but there were differences in the scores for each indicator regarding sexes. One study conducted in Sumbawa, Indonesia senior high school students by Supratman et al (2023), critical thinking abilities significantly improve learning outcomes for female students, while science process skills have a low impact on learning results based on gender differences.

Table 3
Level of research skills of Senior High School students, when grouped according to previous school attended

Research Skills	Group	n	Mean	SD	Interpretation
Planning	Public	59	6.73	1.61	Very high research skills
	Private	310	6.37	1.61	High research skills

Research Skills	Group	n	Mean	SD	Interpretation
Evaluating	Public	59	7.15	1.39	Very high research skills
	Private	310	6.68	1.77	Very high research skills
Data Collection	Public	59	4.66	1.67	High research skills
	Private	310	4.04	1.74	Moderate research skills
Data Analysis	Public	59	2.68	1.42	Moderate research skills
	Private	310	2.57	1.24	Low research skills
Conclusion	Public	59	4.10	1.32	High research skills
	Private	310	3.87	1.34	High research skills
Overall	Public	59	25.32	6.03	Very high research skills
	Private	310	23.53	6.09	Very high research skills

Presented in Table 3 is the level of research skills of Senior High School students when grouped according to previous school attended.

The data show that students from public schools generally exhibit higher research skills compared to those from private schools. For instance, in planning, public school students have a mean of 6.73 (SD= 1.61), interpreted as very high skills, while private school students have a mean of 6.37 (SD= 1.61), classified as high skills. The results are consistent across most skills, with public school students showing very high skills in evaluating (mean of 7.15, SD= 1.39) and very high overall research skills (mean of 25.32, SD= 6.03), whereas private school students demonstrate very high skills in evaluating (mean of 6.68, SD=1.77) and very high overall skills (mean of 23.53, SD= 6.09).

The highest skill for public school students is in evaluating, with a mean of 7.15 and an SD of 1.39, indicating very high research skills. Their lowest skill is in data analysis, with a mean of 2.68 and an SD of 1.42, classified as moderate. For private school students, the highest skill is also in evaluating, with a mean of 6.68 and an SD of 1.77, indicating very high skills. Their lowest skill is in data analysis as well, with a mean of 2.57 and an SD of 1.24, categorized as low. The results imply that public school students tend to outperform private school students in most research skills, possibly due to differences in educational approaches or resources. However, both groups demonstrate very high overall research skills, indicating a strong foundation in research competencies.

In alignment with the results of Gong, & Mohlhenrich, (2020), where Chinese and American schools were compared and the secondary schools STEM research programs significantly improve students' thinking, working like a scientist, personal gains, skills, attitudes, and career aspirations. In contrast to the findings of Snir et al (2017), instilling 21st century skills in public and private high school graduates shows no significant difference, but individual backgrounds can influence their command of these skills.

Table 4

Mann-Whitney U Test Result Significant Difference in the level of research skills when grouped according to previous school attended

Research Skills	p	Interpretation	Decision
Planning	0.060	Not significant	Failed to reject the null hypothesis
Evaluating	0.024	Significant	Reject the null hypothesis
Data Collection	0.010	Significant	Reject the null hypothesis
Data Analysis	0.444	Not significant	Failed to reject the null hypothesis
Conclusion	0.130	Not significant	Failed to reject the null hypothesis
Overall	0.014	Significant	Reject the null hypothesis

Reflected in Table 4 is the significant difference in the level of research skills when grouped according to previous school attended.

The results show that based on participants' previous schools reveals a complex picture of differences in skill levels. Statistically significant differences were found in data collection ($p = 0.010$), evaluating ($p = 0.024$) and overall research skills ($p = 0.014$), indicating that certain schools better prepare students in these areas. In contrast, planning ($p = 0.060$), data analysis ($p = 0.444$), and conclusion skills ($p = 0.130$) showed no significant differences across schools. This suggests that foundational aspects of research are similarly taught across institutions, or the sample lacked power to detect subtle differences.

The results imply that curriculum design in some schools prioritizes hands-on data collection and holistic research training, potentially due to institutional resources (e.g., lab access, mentorship) that enhance these skills. Hence, it implies foundational research skills like planning and data analysis may be more standardized across educational systems, reducing variability in how these skills are taught or assessed.

Snir et al., (2017) conducted a study in evaluating the effectiveness of instilling 21st century skills in graduates of public versus private high schools. Their results found out that instilling 21st century skills in public and private high school graduates shows no significant average difference, but individual backgrounds can influence their command of these skills, it aligns to the study. Graduates of private schools showed an advantage in information literacy and ICT skills, while male graduates of private schools had an edge in critical thinking (Snir et al., 2017). In contrast to the study of Bernal et al (2020), private school graduates show a significant difference in academic performance compared to public school graduates. Both public and private schools have unique strengths in developing different aspects of student competencies, suggesting that collaboration between these sectors could enhance overall educational outcomes

Table 5

Mann-Whitney U Test Results in the level of research skills when grouped according to sex

Research Skills	p	Significance	Decision
Planning	0.049	Significant	Reject the null hypothesis
Evaluating	0.034	Significant	Reject the null hypothesis
Data Collection	0.277	Not Significant	Failed to reject the null hypothesis
Data Analysis	0.050	Significant	Reject the null hypothesis
Conclusion	< .001	Significant	Reject the null hypothesis
Overall	0.007	Significant	Reject the null hypothesis

Table 5 presents the significant difference in the level of research skills when grouped according to sex.

Using Mann-Whitney U- Test, the results show that Planning ($p = 0.049$), Evaluating ($p = 0.034$) and Conclusion ($p < 0.001$) show statistically significant differences between genders, with females outperforming males in both areas (based on prior mean comparisons). In contrast, Data Collection ($p = 0.277$), Data Analysis ($p = 0.050$), and the overall research skills ($p = 0.007$) demonstrate no significant differences. Notably, while the overall p-value (0.009)

suggests significance, the table labels it as "Not Significant," which may indicate a discrepancy or stricter significance thresholds (e.g., $\alpha < 0.01$).

It implies that institutions should prioritize training in data analysis for all students, as both sexes underperform here. For males, focused support in planning, evaluating and conclusion skills could help bridge gaps. Despite minor mean differences in data collection, and data analysis, these gaps are not statistically meaningful, suggesting comparable foundational skills.

In consistent with the findings conducted by Sukri et. al (2023), students' research abilities on all research indicators did not significantly differ between males and females, but there were differences in the scores for each indicator regarding sexes. Their result implies that educational programs should focus on developing research skills without bias towards gender, ensuring equal opportunities for all students to enhance their research competencies. A study conducted by Lin & Wong (2024) on gender differences in computational thinking skills, the findings showed that there is imbalance across regions and age groups, and a clearer definition and assessment instrument are needed for more specific identification of these differences. It manifests that targeted interventions should address broader socio-cultural factors influencing gender disparities in academic performance and research skills.

Table 6

Validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Content Quality

Factor A. Content Quality	n	Mean	SD	Interpretation
1. Content is consistent with topics/skills found in the DepEd Learning Competencies	8	3.88	0.353	Very Satisfactory
2. Concepts developed contribute to enrichment, reinforcement, or mastery of the identified learning objectives.	8	3.63	0.517	Very Satisfactory
3. Content is accurate.	8	4.00	0.000	Very Satisfactory
4. Content is up-to-date.	8	4.00	0.000	Very Satisfactory
5. Content is logically developed and organized.	8	3.88	0.353	Very Satisfactory
6. Content is free from cultural, gender, racial, or ethnic bias.	8	4.00	0.000	Very Satisfactory
7. Content stimulates and promotes critical thinking.	8	3.63	0.517	Very Satisfactory
8. Content is relevant to real-life situations.	8	3.88	0.353	Very Satisfactory
9. Language (including vocabulary) is appropriate to the target user level.	8	4.00	0.000	Very Satisfactory
10. Content promotes positive values that support formative growth.	8	3.88	0.353	Very Satisfactory
Total Score	8	38.75	1.832	Passed

Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion.

Illustrated in Table 6 presents the validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Content Quality.

The data showed consistently high ratings across all assessed indicators. The highest mean scores were observed in the areas of content accuracy, content being up-to-date, freedom from cultural, gender, racial, or ethnic bias, and

the appropriateness of language for the target user level, all of which received perfect ratings (Mean = 4.00, SD = 0.000) and were interpreted as "Very Satisfactory." On the other hand, the lowest mean scores were found in the indicators related to the contribution of concepts to enrichment, reinforcement, or mastery of learning objectives, and the stimulation and promotion of critical thinking, both with a mean of 3.63 (SD = 0.517). Although these areas received slightly lower ratings, they are still considered "Very Satisfactory." This suggests that the playlist is effective in these aspects, but there is still some room for improvement to further enhance its impact on student learning.

Overall, the total mean score for content quality was 38.75 (SD = 1.832), which meets the criteria for passing the expert evaluation. This consistent pattern of high ratings across all indicators strongly supports the validity of the Canvas-based Learning Playlist in enhancing research skills. The findings affirm that the playlist is well-aligned with DepEd competencies, logically organized, relevant to real-life situations, and supportive of positive values, making it a robust tool for research instruction as validated by expert educators. Santiana et al. (2024) reported that students view CANVAS in the Virtual Learning Environment as both useful and easy to use, which enhances their engagement, learning effectiveness, and communication in English as a Foreign Language (EFL) courses. Consistent with the findings of Wazeer (2024) at Nawaloka College of Higher Studies, Sri Lanka, the Canvas application enhances English language teaching and learning due to its ease of use, increased motivation, and accessibility. These benefits outweigh challenges such as poor network connectivity and limited technology skills among users.

Table 7

Validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Instructional Quality

Instructional Quality	n	Mean	SD	Interpretation
1. Purpose of the material is well defined.	8	4.00	0.000	Very Satisfactory
2. Material achieves its defined purpose.	8	3.75	0.462	Very Satisfactory
3. Learning objectives are clearly stated and measurable.	8	4.00	0.000	Very Satisfactory
4. Level of difficulty is appropriate for the intended target user.	8	3.75	0.462	Very Satisfactory
5. Graphics / colors / sounds are used for appropriate instructional reasons.	8	4.00	0.000	Very Satisfactory
6. Material is enjoyable, stimulating, challenging, and engaging.	8	4.00	0.000	Very Satisfactory
7. Material effectively stimulates creativity of target user.	8	3.75	0.462	Very Satisfactory
8. Feedback on target user's responses is effectively employed.	8	3.63	0.517	Very Satisfactory
9. Target user can control the rate and sequence of presentation and review.	8	4.00	0.000	Very Satisfactory
10. Instruction is integrated with target user's previous experience.	8	4.00	0.000	Very Satisfactory
Total Points	8	38.88	1.642	Passed

Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion.

Reflected in Table 7 presents the validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Instructional Quality.

The results showed consistently very satisfactory results across all criteria. The highest mean scores ($M = 4.00$, $SD = 0.000$) were given to items such as the clear definition of the material's purpose, clearly stated and measurable learning objectives, appropriate use of graphics and multimedia, engagement and stimulation of learners, control over the pace and sequence of learning, and integration with learners' prior experience. These high scores imply strong agreement that the playlist is well-designed, engaging, and learner-centered.

The lowest mean scores, though still very satisfactory, were found in the material's achievement of its defined purpose, appropriateness of difficulty level, stimulation of creativity, and effectiveness of feedback on user responses, with means ranging from 3.63 to 3.75 and slightly higher standard deviations ($SD = 0.462$ to 0.517). This implies that while the playlist performs well in these areas, there is some room for improvement to further enhance its instructional effectiveness.

Overall, the total mean score of 38.88 ($SD = 1.642$), interpreted as "Passed", confirms that the instructional quality of the learning playlist meets expert standards and passes the evaluation. The results imply that the playlist is well-structured, engaging, and appropriately challenging, with minor opportunities to improve feedback mechanisms and creativity stimulation to maximize its impact on enhancing research skills.

In terms of instructional quality, according to the study by Ulyani et al. (2025), using Canva within a Project-Based Learning approach effectively improves students' learning process and writing skills, particularly in exposition texts, by helping them better understand the material, explore ideas, and maintain focus throughout the writing process. Idleman (2022) reported that asynchronous learning modules delivered through Canvas effectively improve students' information literacy skills, which are essential for developing research skills. Their findings stated that Canvas enables embedding information literacy instruction beyond traditional classroom settings, supporting continuous skill development.

Table 8

Validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Technical Quality

Technical Quality	n	Mean	SD	Interpretation
1. Audiovisual enhances understanding of the concept.	8	3.86	0.353	Very Satisfactory
2. Speech/ text narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	8	4.00	0.000	Very Satisfactory
3. There is complete synchronization of audio with the visuals, if any.	8	3.86	0.353	Very Satisfactory
4. Music and sound effects are appropriate and effective for instructional purposes.	8	4.00	0.000	Very Satisfactory
5. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.	8	4.00	0.000	Very Satisfactory
6. Visual presentations (non-text) are clear and easy to interpret.	8	4.00	0.000	Very Satisfactory
7. Visuals sustain interest and do not distract user's attention.	8	4.00	0.000	Very Satisfactory
8. Visuals provide accurate representation of the concept discussed.	8	4.00	0.000	Very Satisfactory
9. The user support materials (if any) are effective.	8	4.00	0.000	Very Satisfactory
10. The design allows the target user to navigate freely through the material.	8	4.00	0.000	Very Satisfactory

11. The material can easily and independently be used.	8	4.00	0.000	Very Satisfactory
12. The material will run using minimum system requirements.	8	3.86	0.353	Very Satisfactory
13. The program is free from technical problems.	8	3.75	0.462	Very Satisfactory
Total Points	8	51.38	1.060	Passed

Note: Resource must score at least 39 points out of a maximum 52 points to pass this criterion.

Presented in Table 8 is the validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Technical Quality.

The data showed that the highest mean scores (4.00) with zero standard deviation were given for clarity and understandability of speech/text narration, appropriateness of music and sound effects, readability and aesthetic quality of screen displays, clarity and interpretability of visuals, ability of visuals to sustain interest without distraction, accuracy of visuals in representing concepts, effectiveness of user support materials, freedom of navigation, and ease of independent use. This implies strong consensus that the playlist is technically well-designed, user-friendly, and engaging.

Additionally, the findings presented slightly lower mean scores were noted for audiovisual enhancement of concept understanding, synchronization of audio and visuals, minimum system requirements, and freedom from technical problems, with means ranging from 3.75 to 3.86 and small standard deviations (0.353 to 0.462), interpreted as Very satisfactory.

Overall, the total mean score of 51.38 (SD = 1.060) presents that the playlist meets expert standards for technical quality and passes the evaluation. This implies that Canvas-based Learning Playlist is technically sound, visually clear, and easy to navigate, with minor opportunities to enhance audiovisual integration and technical reliability to further support the enhancement of research skills.

According to Santiana et al., (2021), the results stated that students believe that using Canvas is an easy-to-use LMS and effective for interactive online learning, making the learning process more interesting. Nalyvaiko and Vakulenko (2021) found that Canvas supports multimedia features, enabling clear audiovisual content, simple and readable text displays, and visually engaging presentations that keep users interested and accurately explain concepts. Similarly, Parveen et al. (2023) reported that both students and instructors find Canvas easy to use, allowing free navigation and independent use with minimal technical difficulties.

Table 9

Validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Other Findings

<i>Other Findings</i>	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Interpretation</i>
1. Conceptual errors.	8	3.88	0.353	Not present
2. Factual errors.	8	4.00	0.000	Not present
3. Grammatical and / or typographical errors.	8	4.00	0.000	Not present
4. Other errors (i.e., computational errors, obsolete information, errors in the visuals, etc.).	8	3.50	0.534	Not present
Total Points	8	15.38	0.744	Passed

Note: Resource must score at least 10 points out of a maximum 16 points to pass this criterion.

Illustrated in Table 9 is the validity of the developed Canvas-based Learning Playlist in Research in enhancing the research skills, as evaluated by the teacher-experts based on Other Findings.

The results showed that on other findings, as assessed by teacher-experts, presents that the material is free from significant errors. The highest mean scores of 4.00 with no variation were given for factual errors and grammatical or typographical errors, meaning these types of errors are not present at all. Conceptual errors also received a very satisfactory rating (Mean = 3.88, SD = 0.353), indicating no issues were found. Other errors, such as computational mistakes, outdated information, or visual errors, had a slightly lower mean of 3.50 (SD = 0.534), under the interpretation of "Not present," suggesting these errors are minimal or nonexistent.

With a total score of 15.38 (SD = 0.744), the playlist clearly passed this evaluation criterion. Overall, the findings confirm that the learning playlist is accurate, well-edited, and free from errors, supporting its validity and reliability as a resource for enhancing research skills. In line to the study of Santiana et al., (2021), the process of creating and using study playlists can help establish rapport and trust among learners, which is important for the perceived reliability of the resource.

Conclusion

Female students showed the highest overall research skills, especially in evaluating, while their weakest skill was data analysis, though still at a moderate level. Male students also excelled in evaluating but had lower skills in data analysis, with their overall research skills slightly below those of females. Students from public schools generally had better research skills than those from private schools, particularly in planning and evaluating. Both groups performed best in evaluating and struggled most with data analysis, with public school students having higher overall research skills.

The Canvas-based Learning Playlist received very high ratings for content quality, especially in accuracy, being up-to-date, inclusiveness, and appropriate language. While it could improve slightly in encouraging critical thinking and reinforcing objectives, it is overall a strong and effective research learning tool. Experts rated the instructional quality of the playlist as very satisfactory, noting its clear goals, engaging design, and focus on learners. There is some room to improve feedback and creativity support, but it meets expert standards and helps develop research skills well.

The playlist's technical quality was also rated very satisfactory, with perfect scores for clarity, ease of navigation, and user-friendliness. Minor improvements could be made in audiovisual syncing and technical reliability, but it remains a well-designed and accessible tool. The playlist was free from major errors, with no factual, grammatical, or typographical mistakes found. This confirms it is accurate, reliable, and suitable for enhancing research skills.

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