

# Exploring Podcast Learning Design: A Study of Theory, Philosophy, and Evaluation in Thesis Proposal Learning in Science Education

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**Abstract:** Advances in digital technology, particularly the use of podcasts, open significant opportunities for innovation in learning design. This study explores podcast-based learning in the context of teaching thesis proposals for science education students, reviewed from theoretical, philosophical, and evaluative perspectives. Using a literature review and descriptive analysis, various models of podcast-based design were examined with attention to pedagogical and technological dimensions. The findings show that this approach is grounded in constructivist, cognitive, and connectivism learning theories. Philosophically, it reflects progressivism and social constructivism, emphasizing experiential learning, independence, and collaboration. Evaluation results highlight the potential of podcasts to strengthen cognitive abilities, including conceptual and analytical understanding, as well as 21st-century skills such as critical thinking, communication, creativity, and collaboration. The study concludes that podcast development in higher education must align with instructional design principles tailored to student needs and course characteristics. Further research is needed to develop flexible models and assess their long-term impact on students' academic performance. Importantly, the outcomes provide practical implications for integrating podcasts into science education curricula and for creating evaluation systems that measure higher-order learning outcomes.

**Keywords:** Evaluation; learning theory; philosophical perspective; podcast-based learning design

## Introduction

The current evolution of technology requires alignment in education. In the digital age, efforts to innovate learning design are important for adapting to changes in the times. One way to achieve this is by involving students in learning activities through the selection of appropriate learning design strategies to prepare them to adapt to change. In the digital age, innovation in learning design is a strategic element in improving the quality of the educational process by applying the principles of independence, flexibility,

relevance, mobility, and alignment with the level of need (Gampala, 2023; Khairany et al., 2024). Through technology integration, the learning process becomes more interactive and contextual, strengthening students' character and learning quality (Budiman et al., 2024). Additionally, this innovation fosters time management skills and the ethical and responsible use of technology, both of which are essential for addressing the challenges of 21st-century education (Alifa et al, 2023; Khaldi, 2024).

Innovation plays a crucial role in facilitating diverse learning styles and interests among students, ultimately leading to personalized, engaging learning experiences.

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By identifying students' learning preferences, educators can design and implement adaptive and innovative learning strategies. This fosters the creation of personalized, engaging learning environments that can more effectively accommodate each student's individual needs (Demski, 2012; Madhu & Bhattachryya, 2023).

In the digital age, innovation in learning design is necessary to enhance the relevance, engagement, effectiveness, and accessibility of education. These efforts prepare students to face future challenges. By integrating cutting-edge technology and innovative pedagogical approaches, educators can create dynamic, responsive learning environments that cater to students' diverse needs. This article will explore crucial aspects of instructional design innovation, such as applying design thinking approaches (Eamcharoen, 2024) and implementing effective learning strategies (Khairany et al., 2024), as well as the importance of strengthening digital literacy.

The rapid development of information and communication technology has significantly transformed education. One example is the integration of digital technology into the learning process. Podcasts, a popular form of digital audio media (Caldwell et al., 2024), have the potential to transform traditional teaching methods. This study is motivated by the urgent need to improve learning effectiveness in the Thesis Proposal course for science education students, especially in the digital era.

The Thesis Proposal course is an important stage at which students must be able to design and present their research ideas. However, students often have difficulty understanding basic research concepts, developing a strong proposal framework, and delivering effective presentations. Conventional teaching methods tend to be monotonous and lack interactivity, which can be one of the contributing factors. Therefore, there is a need for innovative instructional designs that enhance students' motivation to learn, conceptual understanding, and presentation skills.

Podcasts can serve as digital learning tools that improve student learning outcomes (Apritama et al., 2023; Artiles-Rodríguez et al., 2024; Fatihatussa'adah et al., 2024; Kurniasari, 2024). Previous research on using podcasts to learn English has concluded that podcasts significantly increase interest in learning, listening comprehension, and language skills (Bykonina, 2024; Costa, 2024; Efendi & Astuti, 2024; Habizar and Wijaya, 2024).

Although podcasts have great potential as an effective learning medium for students (Tarigan, 2022), they can also be used in combination with other methods of learning. Muffels and Weyenberg (2024) found that combining podcasts for online learning and classroom

discussions for in-person learning enhances the learning experience, improves student performance, and fosters in-depth discussions. The study recommends applying this approach at the university level as well.

Research on podcasts in higher education is dominated by health-related disciplines (Gast & Shifrin, 2024; Johnson et al., 2024; Wang et al., 2023). These studies indicate that podcasts effectively achieve learning objectives in postgraduate nursing education, enhance quality, and promote innovation in vascular health. The review article by Artiles-Rodríguez et al. (2024) suggests designing podcast-based learning for universities.

In this era of technological developments, innovative learning is needed to adapt and support learning opportunities for students. However, limitations in the use of podcasts as a learning strategy still exist. The Thesis Proposal Course is believed to have characteristics suitable for a podcast-based design that would enhance learning effectiveness. The initial steps in developing this design include identifying its potential in learning theory, philosophical foundations, and evaluation aspects.

Based on this, the objective of this study is to identify aspects of learning theory, philosophy, and evaluation with potential applications in podcast-based learning for the Thesis Proposal course in the Science Education program. This study will provide a theoretical and philosophical foundation for the development of learning innovations in the Thesis Proposal course at the master's level.

This study contributes novelty by positioning podcasts not only as digital tools but also as pedagogical designs grounded in progressivism and social constructivism. Unlike prior studies that mainly highlight technical or disciplinary applications, this research addresses the theoretical, philosophical, and evaluative dimensions of podcast-based learning. The guiding question is: How can podcast-based learning be conceptualized through learning theories, educational philosophies, and effectiveness evaluation in the Thesis Proposal course in science education?

## Method

This study is positioned as an initial stage within an R&D framework, emphasizing a conceptual exploration through literature review and descriptive analysis. The outcomes of this phase provide theoretical, philosophical, and evaluative foundations that establish the groundwork for further development of podcast-based learning innovations. More specifically, these insights are intended to guide the creation of practical educational products, such as student worksheets

(LKPD), instructional modules, and semester learning plans (RPS). By aligning digital learning designs with curricular demands in higher education, this study contributes to bridging conceptual inquiry and practical curriculum innovation.

The research will be conducted from February to July of 2025. The study will be conducted at Kampus 3 of Metro Muhammadiyah University. Data will be collected through a literature review related to learning theory, philosophical foundations, and the evaluation of podcast-based learning. Literature sources can come from scientific journals, books, articles, and other reliable sources. Research flowchart as presented in Figure 1. A preliminary study was also conducted on relevant research to identify gaps and potential for further development.

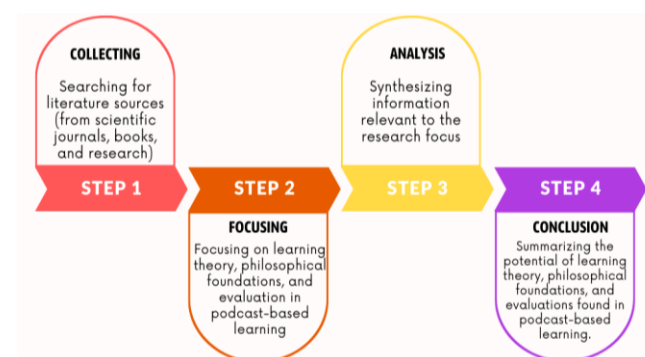


Figure 1. Research flowchart

The main instrument used in this study is a systematically designed literature analysis sheet. This sheet will be used to classify and synthesize information obtained from various sources. Software for managing references will also be used to efficiently manage and analyze data.

A qualitative data analysis will be conducted using content analysis techniques. The data will be organized, categorized, and summarized based on predetermined themes. This analysis aims to identify relevant learning theories, establish a strong philosophical foundation, and design a comprehensive evaluation framework for future research and development.

## Result and Discussion

Podcasts have been used in education to disseminate information to students, who can access them anytime, anywhere (Costa, 2024; Gatewood, 2008; Nikolou & Darra, 2018; Wolpaw & Harvey, 2020). However, another aspect of using podcasts as a learning medium is that students are passive recipients when they listen to information on podcast platforms (Besser et al., 2021; Efendi & Astuti, 2024; Habizar and Wijaya, 2024; Meden et al., 2024).

In science education, several studies have highlighted the potential of podcasts to improve conceptual understanding and scientific reasoning. For instance, Fatihatussa'adah et al. (2024) demonstrated that integrating ethnoscience with podcasts fostered collaboration and enhanced achievement in chemistry learning. Similarly, Apritama et al. (2023) found that video podcasts supported students' comprehension of buffer solutions, while Kurniasari (2024) reported significant learning gains in biology through podcast-based instruction. These findings align with the current study, underscoring the relevance of podcast-based designs for supporting complex cognitive and collaborative processes in science education.

Another alternative that can be utilized from podcasts in the field of education, besides as a learning medium, is to use it as a strategy in learning that can provide positive results in learning outcomes (McGarr, 2009). In other words, it involves designing a learning process that adopts the steps of producing a podcast into the educational realm. In general, the main steps in creating a podcast are planning, recording, editing, and publishing (Colombo & Franklin, 2005; Huntsberger & Stavitsky, 2006; Sullivan, 2019; Wolpaw & Harvey, 2020).

The planning stage is the first activity. It involves determining the topics and material to be discussed in the podcast, as well as the target audience. After determining the podcast topic, the next step in planning is to write a script that will guide the podcast activity so that it does not stray from the topic of discussion (Wolpaw & Harvey, 2020). Script writing includes the flow of conversation, sentence intonation to help listeners grasp the discussion material, language style appropriate for the target audience, and the ability to incorporate elements that provide positive motivation to the audience (Cochrane, 2005).

In the recording stage, the prepared script is implemented with appropriate intonation, clear pronunciation, and vocal expression to support the delivery of the discussion topic (Colombo & Franklin, 2005). In the editing stage, scenes suitable for display are selected, and appropriate background music and sound effects are added to align with the discussion activity. The quality of the audio is also ensured (Cochrane, 2005; Huntsberger & Stavitsky, 2006). In the publication stage, the edited recording is uploaded, an engaging description of the activity is provided, and the link is shared via social media or an LMS (Sullivan, 2019a).

Based on the general steps of the podcast, it can be adopted as part of learning activities designed as podcast-based learning. In other words, science education students can carry out the steps of the podcast to gain knowledge about thesis proposal writing

concepts by participating in podcasts that align with the lecture material topics of the Thesis Proposal course. This begins, of course, with the lecturer designing podcast-based learning.

Similar to the first step of creating a podcast, the design of podcast-based learning also begins with the planning stage. At this stage, students are assigned to write a podcast script based on a topic chosen by the instructor. After creating the script, students submit it to the instructor for review to ensure its alignment with the assigned topic. Students then revise the script according to the instructor's suggestions and submit it for approval before recording.

The second stage of podcast-based learning design is recording. During this activity, students perform their roles according to the script while the lecturer supervises the recording process. In the third stage, the recordings are edited by selecting and arranging suitable scenes, as well as adding embellishments, such as background music or sound effects, where necessary.

The results of the editing process are shown to the lecturer before the work is ready for publication. Students take the lecturer's suggestions into consideration when making improvements. The final stage of the podcast-based learning design process is publication, which involves uploading the approved recordings to the LMS page or social media to disseminate information to a wider audience.

The identification of learning theory aspects in podcast-based learning design is explained by the fact that learning activities carried out using podcasts incorporate several of these aspects. The data in this study is presented in Table 1. The first learning theory identified in podcast-based learning design is constructivism. According to this theory, learners actively construct new knowledge based on their experiences and interactions with their social environment and it's called student-centered learning (Hadi, 2024; Pulla & Carter, 2018; Tanlaka & Aryal, 2025).

**Table 1.** Results of the Identification of the Potential of Podcast-Based Learning Design

Potential Aspect	Results
Learning Theory	<ul style="list-style-type: none"> <li>a. Constructivism Learning Theory</li> <li>b. Connectivism Theory</li> <li>c. Cognitivism Theory</li> </ul>
Philosophical Foundations	<ul style="list-style-type: none"> <li>a. Humanism</li> <li>b. Social Constructivism</li> </ul>
Learning Outcome Assessment	Learning Outcome Evaluation 21st century skills grouped into: <ul style="list-style-type: none"> <li>a. Cognitive aspects (podcast script assessment instrument, material mastery test instrument in essay form, project assessment instrument)</li> <li>b. Affective Aspects (Cooperation Questionnaire Instrument, Reflection Instrument, Interview Guide)</li> <li>c. Psychomotor Aspects (Observation checklist for performance in script writing, recording, editing)</li> </ul>

When students write scripts for podcasts, they read and explore information about the topics that will be covered and its shown their critical ability needs like analysis, evaluate an identify resource (Rahman et al., 2021), then rewrite it in a structured manner based on their understanding to fit the format of a podcast script. Through learning activities designed based on podcasts, lecturers facilitate students' efforts to build their knowledge. Research by Besser et al., (2021) and Huntsberger & Stavitsky (2006) on using podcasts in education concluded that podcasts improve students' reading, writing, and collaboration skills, as well as their literacy. Similar research by Najafipour et al. (2011), Weinstock et al. (2020), and Meden et al. (2024), states that students have a more effective learning experience through podcasts.

Podcast script writing is not the only activity that facilitates students building their knowledge through experiences during podcast-based learning design. Other activities, such as question-and-answer

discussions between speakers and the audience during recording sessions, as well as experiences in evaluating and editing the podcast for publication on social media or the study program website, also facilitate this learning. This series of activities provides students with the opportunity to gain or improve knowledge by actively contributing to podcast-based learning activities (Hartono & Syafrudin, 2024; Muffels & Weyenberg, 2024).

The next learning theory related to podcast-based learning design is cognitive learning theory. According to this theory, learning is a mental process that occurs in humans and is characterized by complex thinking. Piaget proposed this theory. This theory implies that individuals can develop their own knowledge by interacting with their environment and by learning individually (Khoiruzzadi & Prasetya, 2021; Nainggolan & Daeli, 2021; Sudianto & Ismayanti, 2023; Wandani et al., 2023).



The third learning theory related to the design of podcast-based learning is connective learning theory. George Siemens published this theory in 2005. According to this theory, knowledge and learning are obtained through collaboration among individuals (Harahap et al., 2023). According to a study by Wu & Cui (2022), this connectivist theory aligns with current societal conditions in which access to information is easily obtained through technology. Thus, access to information becomes an integral part of learning. This theory also emphasizes the interconnectedness of knowledge, learning, curriculum, and the roles of teachers and students.

The connection between connectivist theory and podcasting is that students must cooperate well to create and present podcasts using technology to expand the information in their podcasts. When this cooperation occurs, each individual learns, which is where connectivist theory comes into play. A study by Mampota et al. (2023) supports this, stating that connectivism is a learning theory emphasizing the role of technology and networks in learning. It indicates that knowledge is distributed throughout a network of connections and that learning occurs through the ability to navigate and utilize these connections.

The first philosophical aspect of podcast-based learning design is progressivism. This approach places learners as active subjects in the learning process rather than passive objects. This approach emphasizes flexible, independent learning based on authentic experiences. It aligns with John Dewey's idea that education should encourage active engagement, open communication, and the development of creativity and critical thinking skills (Synytsia, 2020). Through podcast-based learning design, learners can learn in a personalized, contextual manner, at their own pace, and according to their potential (Sulistyaningsih, 2023). This approach reinforces the principles of reflective and experiential learning (Khairani, 2023).

In addition to progressivism, this learning design is rooted in social constructivism. Social constructivism views knowledge as the result of learners' active construction through social interaction and individual reflection (Saleem et al., 2021). According to the theories of Piaget and Vygotsky, knowledge is formed through observation, experimentation, and dialogue within a social context. Podcast-based learning design enables learners to interact through peer discussions and self-reflection (Ghaedi et al., 2020). This allows learners to critically construct and test knowledge through podcast activities they design. This concept requires educators to create learning situations that support meaningful information processing and social interaction, in which podcasts become highly effective tools.

The potential evaluation aspects of podcast-based learning design can focus on achieving learning outcomes in three main domains: cognitive, affective, and psychomotor (Nelson & Lee, 2016). In the cognitive domain, students' abilities are analyzed in terms of conceptual understanding, research issue analysis, and academic reflection (Sullivan, 2019; Wolpaw & Harvey, 2020). These abilities are reflected in the podcast's script and content. According to a study by Artilles-Rodríguez et al. (2024), student involvement in collaborative podcast production enhances critical thinking skills and academic independence.

Furthermore, effectiveness evaluations demonstrate that podcasts strengthen students' conceptual and analytical understanding and contribute significantly to the development of 21st-century skills (Farhan, 2022). These skills include critical thinking, effective communication, creativity in presenting material, and collaboration among team members during the production of audio content. Thus, podcast-based learning enhances cognitive development and equips students with competencies relevant to the modern professional and academic world.

In the affective domain, written reflections and group discussions provide an opportunity to observe students' attitudes, enthusiasm, and scientific values regarding the material and the learning process. These methods align with the findings of Enríquez et al. (2023), who reported increased learning motivation and positive perceptions among students involved in creating educational podcasts.

Meanwhile, evaluation in the psychomotor domain emphasizes technical skills such as scientific articulation, audio software mastery, and teamwork in content production. Assessment is carried out using observation sheets and project rubrics. A study by Gast & Shiffrin (2024) emphasizes the importance of integrating technical skills in audio-based learning innovation.

## Conclusion

Designing learning experiences that align with current trends demonstrates that education is dynamic and keeps up with changes. As educators, we should provide different learning designs according to the needs and developments that occur. Podcast-based learning design is believed to be an effective alternative for designing learning for students in thesis proposal courses. Based on the discussions presented, it can be concluded that podcast-based learning design has potential in thesis proposal courses from the perspectives of constructivist, cognitive, and connectivist learning theories. From a philosophical perspective, this approach aligns with progressivism

and social constructivism. From an evaluative perspective, podcast-based learning designs can assess 21st-century skills. Furthermore, podcast-based learning design can be adapted to learning tools such as semester learning plans, assessment instruments, learning resources, and other media required for effective podcast-based learning in thesis proposal courses. This conceptual foundation can serve as a reference for educators in developing podcast-based learning modules that align with science education outcomes.

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### Author Contributions

D conceptualized the podcast-based learning design. F developed research methodology and instruments. F and A also contributed to the writing of this manuscript. All authors contributed to the writing of this article according to their areas of expertise. We have read and agreed to the publication of this manuscript.

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### Conflicts of Interest

The authors declare no conflict of interest

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