



Enhanced Podcasts as Content Acquisition Tools

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Abstract: Podcasts are a cohesive instructional tool for professional development. When podcasts include enhancements such as resource links, transcripts, and learning resources, they can be described as *content acquisition podcasts* (CAP) grounded in the Cognitive Theory of Multimedia Learning. The author presents a logic model for podcast design that identifies the outcomes and impact of CAPs. As a method for professional development, podcasts are shown to be further enhanced by guidance documents that help learners identify and align content to their needs. A complete profile of a podcast is presented as a scenario to illustrate the design and methodology of the approach. As an extension, learner-created podcasts are highlighted as a method of promoting active engagement and collaborative learning.

Keywords: pedagogical methods, podcasts, podcasting, professional development, active learning
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Introduction

The future workplace will require technicians who can navigate complex environments in which existing jobs are constantly evolving and new jobs are being created. Likewise, educators are faced with a technical skills landscape that is constantly evolving and changes quickly. How does, how can an educator keep pace? For professional development, podcasts can provide a personalized, timely, and convenient approach.

This article reviews podcasts as a professional development tool and posits how podcasts can be enhanced to deliver content supported by the cognitive theory of multimedia learning. This approach is illustrated by scenarios in which podcasts catalyze content acquisition and increase accessibility through multimedia approaches, linked resources, and transcripts.

Leveraging Podcasts for Preparing Technicians for the Future of Work

The National Science Foundation-funded project *Preparing Technicians for the Future of Work* [1] faces challenges that include rapidly accelerating advancements in technology. This means resources for learning and professional development on these emerging topics may not yet be available. The project aims to:

- Develop recommendations and resources for updating STEM technical programs,
- Identify industry's perception of the future of work and implications for technician education, and
- Identify new technologies impacting technician education.

The project has developed numerous future-facing strategies and resources designed to help achieve its goals. These include creating a framework [2] and toolkit [3] for adopting a cross-disciplinary STEM core to provide essential foundational skills for students in technician preparation programs. The project has



also produced 44 podcasts that can support the development of the framework's foundational skills by identifying perceptions, implications, and technologies that will impact future workforce requirements in STEM fields.

Podcasts as Pedagogy

Podcasts are beginning to displace print media for people worldwide who seek to engage with information in novel ways. In addition, podcast creators increasingly prioritize accessibility by publishing transcripts alongside audio content and linking supplemental material [4]. There is growing evidence of the potential for enhanced podcasts to deliver content on demand for a variety of diverse audiences [5]. Podcasts offer the possibility of creating instructional materials that are both easy to use and grounded in validated instructional design principles [6].

Content acquisition podcasts (CAP) deliver a cohesive instructional product. CAPs differ from regular podcasts and other multimedia in that they are grounded in Mayer's Cognitive Theory of Multimedia Learning [7] (CTML). CTML grew out of cognitive load theory, which holds that all learners have limited cognitive processing capacity at any given time and that if that capacity is overloaded, new learning is unlikely. Instruction should therefore be designed and delivered to keep learners' limited cognitive levels from becoming overwhelmed [8].

Method: Podcast Design

Podcasts could be described as contextual interviews. CAPs utilize *structured* contextual interviews in which questions are designed to elicit not only responses but also the background behind the responses. This provides essential context that can enrich the learning experience. A CAP may include a call to action that challenges the listener to take that action as a step in their own professional development. Furthermore, the design of a CAP can utilize a storytelling approach. The value of stories as "a powerful structure for organizing and transmitting information" and as a learning tool is well recognized [9]. A CAP in which content is amplified via a story increases listener engagement.

Motivation and Outcomes of Podcast Listening

The literature supports the idea that "openness to experience, interest-based curiosity, and need for cognition positively predicted podcast listening" [10]. As an outcome, podcasts can create connections to subject matter experts and a larger community that shares and adopts podcast content. Additional outcomes and impacts are shown in the logic model in Figure 1. This is not a general logic model, but highlights the outcomes and impacts that relate specifically to advanced technological education.

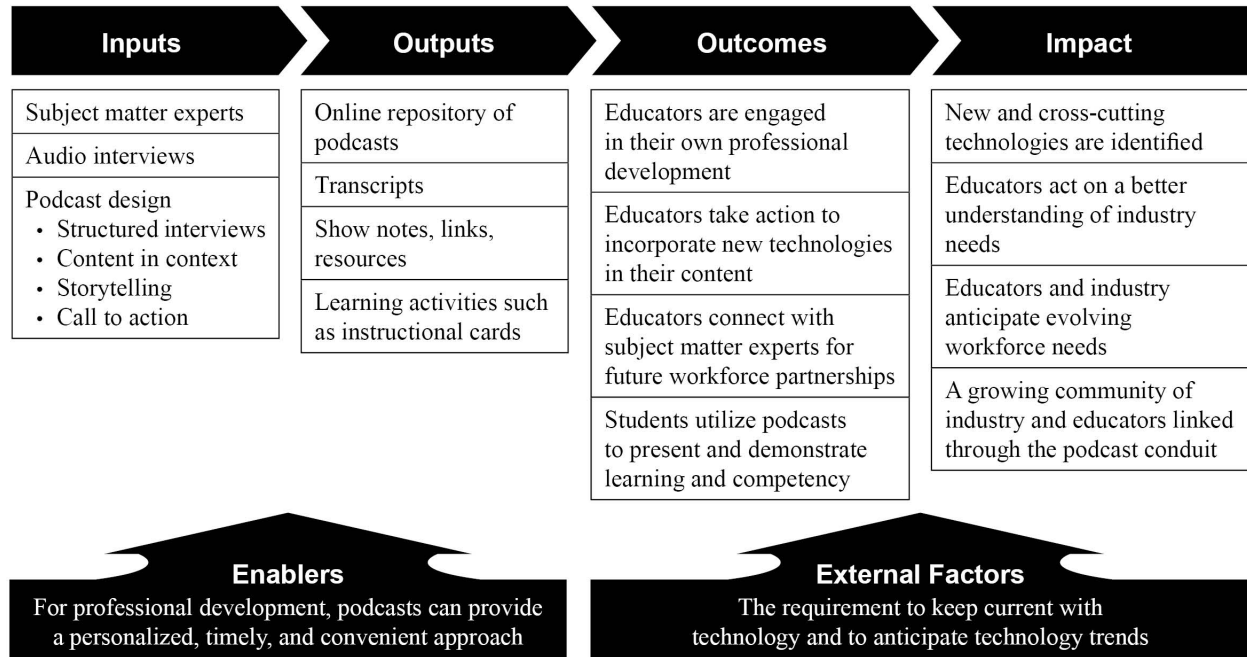


Fig. 1: Logic Model for Professional Development Through Enhanced Podcasts

Method: Podcasts for Professional Development

For those involved in preparing the skilled technical workforce [11], there is a need, demand, and requirement to keep current with technology and to anticipate technology trends. This currency must be reflected in classrooms and training environments. Traditional methods of professional development, such as attending workshops with slide presentations and (where possible) gaining hands-on skills with specific equipment, are often inadequate in today's educational environment. Today's technology educators are more likely to turn to multimedia platforms such as podcasts for self-directed professional development that is more personalized, timely, and convenient than the conventional approach.

Professional Guidance

For technology educators seeking professional development, assessing and choosing resources that align with their needs may be challenging. To address this challenge, the *Preparing Technicians for the Future of Work* project prepared a user-friendly reference guide [12] that shows essential takeaways from each podcast. Users can quickly find the technology or skill featured in an episode along with that podcast's key discoveries and suggested actions.

The reference guide is organized into four topical categories:

- Automation, Robotics, and Advanced Manufacturing
- Digital Skills, Digital Mastery, Digital Twins, and Simulation
- Industry, Factory, and Education Trends
- New Skills, New Generations of Students

Table 1 shows an excerpt from the guide. Users can quickly “discover” facts and trends and pursue professional development opportunities associated with those topics.



Table 1: Sample of *What Educators Should Know and Do about Preparing Technicians for the Future of Work*

AUTOMATION, ROBOTICS, and ADVANCED MANUFACTURING

Topic and Episode(s)	Discovery	Recommended Action
1. The Emerging Workforce of Advanced Manufacturing PC35	As in so many things, as in Advanced Manufacturing, Adopt AI or Fall Behind.	Realize the importance of artificial intelligence and machine learning in technician training. Review this article and this podcast on the subject.
2. A Robot for Every Technician? PC13 and PC22	A robot for every technician is an emerging trend in the workplace.	Ask yourself if it is possible for you to consider something similar in your education and training space? A robot (or an automated system) for every student, in every learning situation?
3. Robotics Skills, Robotics Careers PC25	There is a particularly large gap between the number of robotics technicians available and the number needed. To begin addressing the gap, the Institute has outlined three promising career pathways: Robotics Technician, Robotics Specialist, and Robotics Integrator.	Explore roboticscareer . If you have an education and training program, consider, at the minimum, submitting your program for inclusion in their database. It is free to do so. In addition, there may be real value in your program becoming endorsed.

Method: Profile of An Enhanced Podcast

The *Preparing Technicians for the Future of Work* podcast series (44 episodes) [13] is a clear example of enhanced podcasts as content acquisition tools. The target audience consists of educators and industry personnel involved in preparing the skilled technical workforce — individuals who use science and engineering skills in their jobs but may not have bachelor's degrees. The podcasts are designed to give educators a deeper understanding of coming changes, the availability of resources, and the strategies necessary to stay up to date. In this way, the podcast series constitutes a cohesive instructional product.

The following represents a scenario that illustrates the design, content discovery, augmentation/enhancement, and additional resources that create the enhanced podcast.

Scenario: Here Come the Cobots [14]

This episode considers the topic of collaborative robots (cobots) as part of the rapid growth in automation that is now occurring throughout the technology industry sector. Cobots are robots that can safely work alongside humans and are intended for direct human-robot interaction. The podcast host establishes the



credentials of the guest (an industry expert), who describes the tremendous growth in cobots over the past three to five years. These statistics grab listeners' attention and engage them in a topic that may not be familiar to educators. Skills and competencies identified in the episode prompt listeners to contemplate changes in courses and curricula. A "key learning" is highlighted: *for technicians, knowing how to integrate automation technology is more important than understanding the technology itself*. This can cause fundamental shifts in workforce preparation programs.

The podcast moves into a storytelling stage that illustrates how people without prior knowledge can learn about cobots. The podcast concludes with a call to action: *gain more familiarity with cobots*. Downloadable shownotes identify additional resources and resource links [15], and the transcript provides an alternate means of access. The guide provides a link to instructional cards [16]—scenario-based microlessons for introducing new technology skills in existing courses. As a result, this enhanced podcast provides motivation, a call to action, and resources for self-directed professional development.

Podcast Creation in the Classroom as a Learning Activity

The concept that “you don’t really know something until you can explain it to someone else” can be used to encourage students to create their own enhanced podcasts as a method of demonstrating their understanding and competency (i.e., a performance assessment). This approach is a variation of the Feynman technique [17], which involves being able to teach a given topic to someone else. Students can create podcasts using readily available technology for recording, editing, and transcribing. By adding their own resource links, they create an enhanced learning experience for themselves and demonstrate their knowledge. As a teaching tool and strategy [18], learner-created podcasts have been shown to promote active engagement and collaborative learning [19].

Conclusion

Enhanced podcasts increase accessibility and engagement by providing additional resources to help listeners better understand and retain information. In addition, these enhancements reframe podcasts as *content acquisition podcasts* that can be used as a self-directed professional development approach or employed as a student learning activity. Podcast design, the approach to content discovery, and the nature of the enhancements all contribute to the viability of enhanced podcasts as content acquisition tools for professional development.

Acknowledgements. This work was funded by the National Science Foundation under DUE ATE #1839567.

Disclosures. The author declares no conflicts of interest.

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