A Case Study of Online, Project-Based Graduate Education for Working Professionals

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Abstract

This paper presents a case study of a codified design approach used to develop and deliver a portfolio of project-based, online graduate programs tailored to working professionals at a private technological research university in the Northeastern United States. These programs adopt a learner- and career-centered model, emphasizing engaging, practical, and fulfilling educational experiences. While prior research has explored learner perceptions of individual instructional strategies within specific courses or domains, this study examines holistic perceptions across an integrated portfolio spanning multiple disciplines. The programs were designed using a confluence of evidence-based instructional design models. The study begins by outlining the foundational design framework and highlighting the value of real-world, project-based learning, supported by dedicated faculty mentorship and a learning management system with a consistent navigational structure. The paper then presents a mixed-method analysis of learner survey data collected over two years. Results show that over 96% of learners expressed positive sentiments about their courses, faculty mentors, and projects. To deepen the analysis, a textual study of over 35,000 words from three open-ended survey questions was conducted using natural language processing and meta-theme analysis. This analysis found that supportive faculty mentorship, project-based coursework, and real-world application were key strengths of the learner experience. Areas for improvement centered on refining course pacing, ensuring clear alignment between materials and deliverables, and providing more timely feedback on project milestones. Ultimately, the results underscore the need for careful and intentional design of online programs with consideration for the learner's voice.

Keywords: PBL, natural language processing, text analysis, online education, professional education, graduate education, learning experience design, program design, andragogy

1. Introduction

The landscape of higher education is rapidly changing. Online education has had a profound impact on adult learners as it has enabled working professionals (WP) the flexibility to pursue advanced degrees without putting their career, family, and other commitments on hold. In 2017, the Hartford, Connecticut, campus of Rensselaer Polytechnic Institute (RPI), a Carnegie R1 research institution, also experienced a transformation. The delivery of education for WP that blended face-to-face instruction with asynchronous online modules was transformed into a fully online experience to best meet the needs of both WP and their employers. Collectively, the programs were offered through what would come to be known as “Rensselaer at Work.” In total, the portfolio of new programs includes three master’s degrees and nine graduate certificates—each consisting of three courses—spanning diverse domains such as business, management, leadership, engineering, and data analytics.

Given RPI’s 200-year history as an engineering-focused institution, the instructional design approach used in these programs synthesizes the well-established ADDIE model (Analyze, Design, Develop, Implement, Evaluate) with the engineering design process. This integrated framework is illustrated in Figure 1. While the "Exploration" and "Design" phases of this process have been detailed in earlier work by the authors, this paper focuses on the "Create" and "Test" phases. Specifically, we examine learner experiences in programs developed using this combined framework, drawing insights from learner survey data. Prior research has explored how individual design approaches are perceived by learners, specifically project-based learning (Miller & Krajcik, 2019), gamification features (Doney, 2019), mentorship in online courses (Hall & Liva, 2022; Lundsford et al., 2017; Pollard & Kumar, 2021), providing

feedback (Yee et al., 2021), and the use of synchronous sessions in online education (Semingson, 2020). However, there remains an opportunity to evaluate perceptions of programs intentionally developed using a confluence of multiple research-supported instructional design models, particularly for portfolio of programs that span diverse domains.

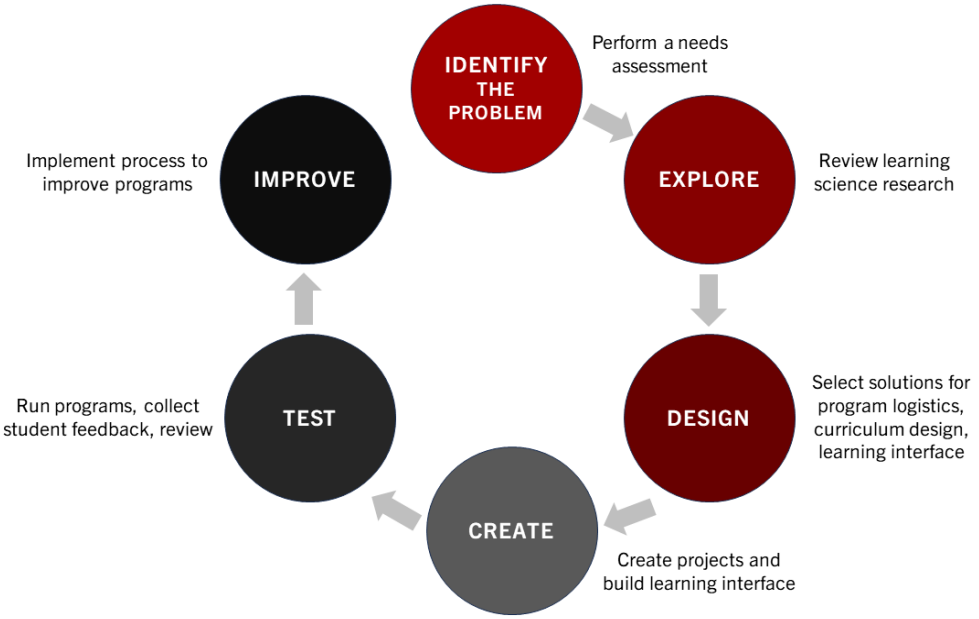

Figure 1. A six-step articulation of the design process and how it was used as a framework for developing online graduate programs for WP

2. Material Studied

A wealth of material was studied that provides guidance on how specific design choices support, or detract from, the learning experience and how learners tend to perceive these choices. The literature for these individual approaches is reviewed below, specifically focusing on topics relevant to online project-based learning (PBL) for WP.

2.1 Project-based Learning (PBL) for Working Professional Learners

PBL emphasizes engaging higher-order application and contextualization of crucial workplace-aligned abilities, offering opportunities to examine real-world problems and propose well-constructed solutions (Jurdak, 2016; Ahmed et al., 2024). To support WP learners in building these abilities, PBL experiences often leverage the principles of gamification. This does not necessarily involve playing a game but rather the incorporation of elements and mechanics from games, such as immersion in a workplace scenario, to foster learner engagement (Markopoulos et al., 2015).

In STEM-focused environments, engagement in gamified projects can foster an increase in learner motivation and interest, development of effective strategies to manage workload, and enhanced knowledge of the subject matter (Markopoulos et al., 2015). Effective gamified learning incorporates realistic scenarios, clear goals mapped to overarching learning outcomes, an appropriate challenge for the learner, formative feedback and progress tracking, opportunities to practice and improve, and time to reflect (Doney, 2019; Carenys et al., 2017).

These practices naturally map onto the design and delivery of PBL. A project can be equated to an evolving story, where the learner is placed in the "driver's seat" to write the next chapter or to resolve a conflict or problem. Learners are presented with a scenario and program-aligned goals to set the backdrop for the task that the learner will be asked to complete. Then, a well-crafted driving question (Miller & Krajcik, 2019) challenges them to leverage critical thinking and problem-solving within the learning context. These experiences result in the creation and delivery of an artifact that demonstrates the learner's proposed solution or response to the challenge.

In contrast with traditional learning delivery methods, PBL can foster motivation, self-direction, and a sense of ownership in learners (Ahmed et al., 2024). This intrinsic motivation is a crucial driver for WP learners to achieve success in their learning experiences and validate their investment (Yoo & Huang, 2013; Merriam & Caffarella,

1999). Further, the presence of a supportive instructor can help learners make clear connections between their project work and personal goals (Jo et al., 2020). Feedback from these instructors along the way, resubmission opportunities, and reflection points throughout a given project can also foster deeper engagement and longer-term knowledge retention (Doney, 2019).

2.2 The Learning Management System

PBL alone does not guarantee WP learner engagement or success in online learning - the use of a learning management system (LMS) is essential, as the LMS can create a hub for accessing all course materials in one place, creating learners' main point of connection to the experience, as well as the institution itself. However, how the LMS is designed and presented to learners significantly impacts learner perception of the overall success and relevance of their experience (Rubin et al., 2010).

Organizing content in an easily navigable, intuitively designed format helps to promote clarity and establish expectations throughout the learning experience (Casey et al., 2021). This can be accomplished by implementing standardized instructional design practices across a program, which has been proven to enhance learning retention, satisfaction, and engagement (Santelli et al., 2020). Consistent elements may include course navigation menus, the language used for key course features, the organization of weekly modules, and submission guidelines. Consistent elements also allow the learner to focus their time and energy on the content of the course rather than navigation.

Within the LMS, utilizing features like rubrics that clearly map to program learning goals and competencies, announcements, and multimedia integration can help foster learner engagement in the learning experience (Santelli et al., 2020). While most LMS products provide the ability to accommodate these practices, software like Instructure Canvas allows the ability to group multiple different content types for a given project under a single modular page (Jo et al., 2020). This immediate access to primary content and auxiliary learning resources within the LMS can help accommodate WP learners who seek to complete coursework at their own pace or according to their unique schedule (Casey et al., 2021). To further support flexibility in access to materials, access to LMS via mobile devices can be encouraged and enabled by instructors, program administrators, and technical support liaisons (Baldwin & Ching, 2019).

2.3 Mentoring the Working Professional Learner

PBL and a well-designed, easily accessible LMS are essential foundations for WPs to engage in meaningful, digitally delivered learning experiences. Equally important is a supportive instructor throughout the learning process, who can help the learner contextualize and integrate new learning with existing abilities and experience. In traditional graduate learning environments, the faculty member may be viewed as a gatekeeper to information, withholding conclusions that learners are required to arrive at on their own (Waldron, 2021). This practice creates a power imbalance, where the faculty member dominates the relationship and minimizes the agency of the learner (Tuma et al., 2021).

Unlike traditional methods, mentorship can be defined as a dynamic learning relationship where mentors share career-related knowledge and provide psychosocial support to learners in their professional or academic endeavors (Lundsford et al., 2017). Many instructors may naturally find themselves in a mentorship role as they interact with learners. However, instructors facilitating WP learning experiences take on the mentor role with intentionality. They recognize and value the WP learner's professional experiences, anticipating what the learner will need to know based on the Mentor's expertise and experience. In this way, effective instructor-mentorship brings focus to the learner's experience while respecting each learner's multiple identities beyond their academic persona (Waldron, 2021).

The instructor-mentor also brings accumulated professional knowledge to the industry-aligned classroom (Waldron, 2021). They function as scholar-practitioners by maintaining a connection to the field through their professional positions, which informs current, real-world knowledge that they share with learners. When an instructor-mentor holds a role within their field in addition to their position in the classroom, it creates an inherent shared understanding with the WP learner related to the balance between academic life and professional life. This relationship leverages the professional, personal, and academic experiences of both the mentor and mentee with a foundation of bilateral trust, patience, and emotional support (Yob & Crawford, 2012).

2.4 The Effects of Mentorship on Learners

When a dedicated, caring mentor is present throughout the learning experience, learners feel emotionally supported and connected (Hall & Liva, 2022). They also feel that their time and energy commitment are valued, especially when they perceive their faculty mentor to be actively invested in their coursework and success (Hall & Liva, 2022). These positive feelings lead to increased performance, engagement, and retention, which can result in positive

outcomes for both the learner and the institution (Young et al., 2019). With these factors in their favor, WP learners are more likely to feel that they belong in both their selected program of study and the field (Janssen et al., 2013; Waldron, 2021). This sense of belonging promotes an emotional investment, a key indicator of learner satisfaction and retention in graduate programs (Jiang & Koo, 2020).

2.5 Mentorship in Digital Settings

In digitally delivered environments, successful mentorship takes shape through frequent, timely communication, as well as personal engagement with each learner's individual needs and goals (Pollard & Kumar, 2021). The availability and presence of the instructor-mentor play a crucial role in lessening feelings of isolation in learners, which can occur due to the lack of physical proximity to their instructor and peers (Lee, 2014; Casey & Kroth, 2013). This connection is especially important for the WP learner, as they may be working through course content around their full schedules and need to request impromptu instructor assistance.

The success of digital instructor mentorship also hinges upon the quality and timeliness of feedback (Sun et al., 2008). Graduate learners in digital settings respond positively to contextualized, formative feedback at regular intervals throughout a larger project, paired with opportunities for revision and resubmission along the way (Yee et al., 2021; Garner & Shank, 2018). The opportunity to revise and resubmit relieves pressure on the WP learner to "get it right" the first time; it allows for nuanced, personalized learning guided by the experienced instructor-mentor. This iterative approach to learning mirrors the principles of agile project management—an approach that many WPs in the STEM field may encounter in their professional work.

2.6 Faculty-led Synchronous Sessions

While digital learning can be successful in both asynchronous and synchronous formats, engaging in instructor-led synchronous sessions can enhance the learning experience. Synchronous digital meetings can be used as strategic learning contexts, supporting learners' connection to the content, instructor, and peers (Semingson, 2020). Instructors leading these sessions can reinforce learning by providing advice, modeling course concepts, and anecdotally sharing relevant professional experiences (Semingson, 2020). This format creates an instructor-led learning community (Moore, 2004), which establishes a consistent connection point as learners engage in more individualized project work.

Digital synchronous sessions can also get more "mileage" than traditional face-to-face discussions with instructors, as they can be recorded to aid in further clarification or reference later (Pollard & Kumar, 2021). Adult learners appreciate the ability to access recordings and associated transcripts of synchronous sessions directly through the LMS (Chen et al., 2022). This allows them to review the content of sessions they may have missed or wish to review at their leisure. This also allows for flexibility in representation and access, as learners can choose how to interact with the content, aurally, visually, or by reviewing transcripts.

3. Methods

3.1 Program Creation and Delivery

The portfolio of programs was built around learning goals and competencies (LG&C), defining what learners must know and be able to do to complete a program. Nine graduate certificates and three master's degrees were developed, encompassing twelve sets of LG&C, over fifty projects (ranging from one to five per course), and more than four hundred curated learning resources. Certificates were offered in: (i) supply chain and logistics, (ii) business intelligence, (iii) production analytics, (iv) machine learning and AI, (v) management in technology-based organizations, (vi) change management, leadership, and innovation, (vii) systems engineering, (viii) lean and Six Sigma, and (ix) program management. Existing courses were reengineered, and new courses were added in project management (waterfall and agile), business issues for engineers, and a culminating master's experience. Certificates, combined with core courses, allow learners to pursue three master's degrees in engineering or an AACSB-accredited, STEM-designated MBA.

Synchronous sessions allow for intentional interaction, collaboration, and engagement, scheduled to fit the needs of WP. To honor their shifting time commitments, synchronous sessions were not for new content delivery, but were instead for experimentation, application, and deepening activities. Given the project focus of courses, the cadence of synchronous sessions organically aligns with project milestones in courses.

Faculty roles can sometimes create a power imbalance and may minimize the agency and engagement of the learner. In such roles where lectures, quizzes, tests, midterms, and finals are relied upon for assessing mastery, one might describe the instructor as a "sage on a stage" tasked with the delivery of information. Instead, a "guide on the side"

type was intentionally fostered where close, success-oriented relationships are built between learners and faculty. Consistent with the engineering design process, the goal was to, by design, create a more supportive instructor role, which was called the "instructor mentor" role.

3.2 Surveying Learner Perceptions

Following the six-step framework (Figure 1), the portfolio of programs was delivered to learners across various industries and locations ("Test" step). Assessing satisfaction with the learning experience was established as a foundational requirement for all programs as part of an ongoing review and revision process. Such measurement ensured that program delivery aligned with WP work-life balance so that relevance and retention were maximized. Surveys were designed and built to be conducted three times per semester, at a cadence of every three weeks. Table 1 outlines the survey questions, which included three multiple-choice and three free-response questions administered to learners at least three times throughout the semester, approximately four weeks apart. The latter had no character limits, and responses were optional.

Table 1. Administered survey questions

Survey Question	Response Type
1. The course thus far is meeting my expectations.	Strongly Agree, Agree, Disagree, Strongly Disagree
2. My faculty mentor is responding to my needs in a timely fashion.	
3. The projects and learning resources are meeting my learning needs.	
4. Which aspect of the course did you and to be most valuable in the past few weeks?	Free response. No character limit
5. Given your answers above and your reasons for enrolling in your program, share your reflections on what is working well in the course so far.	
6. Given your answers above and your reasons for enrolling in your program, please share areas for improvement to better meet your needs. Feel free to use this space to also share other comments or concerns.	

Over eight semesters, 25 surveys were administered across 47 course-instructor combinations spanning 35 courses, yielding 975 learner responses. Surveys were administered digitally via Qualtrics to all learners enrolled in graduate courses within this portfolio of programs. Learners were not required to provide their name to protect anonymity and elicit candid responses, though there was an optional field to disclose their name if desired. Free-response questions generated over 2,000 sentences and 35,000 words, with individual question corpora containing 735, 649, and 835 sentences, respectively.

Python was used to analyze the survey data and individual survey data was merged into one primary dataframe. For questions one through three, descriptive statistics were generated showing the percentage of responses for each choice (Strongly Agree, Agree, Disagree, Strongly Disagree).

For questions four through six, a mixed methods approach was taken. First, the responses were grouped by question number. Then, for each question, a text corpus was created and analyzed using the Natural Language Processing (NLP) library Stanza and supported by a qualitative meta-theme analysis to extract thematic similarities in responses (Qi et al., 2020). The sentiment analysis done using Stanza was performed sentence-by-sentence, where some responses were made up of multiple sentences.

For meta-theme analysis, responses were first filtered by sentiment. Positive and neutral responses were analyzed for questions four and five, while all responses were included for question six. Given the large text volume, ChatGPT-4o was used, as statistical methods (e.g., word frequency, bigrams, trigrams) proved ineffective. ChatGPT's ability to recognize linguistic patterns and recurring phrases made it a suitable tool (De Paoli, S., 2024). It was prompted to extract meta-themes, providing at least five supporting sentences per theme and total sentence counts. The example sentences consistently aligned with identified themes. Additionally, for questions four and five, common bigrams were extracted using Stanza-based sentiment analysis, offering further insights but lacking the depth of a large language model (LLM).

4. Results

4.1 Analysis of Responses to Questions One Through Three

Table 2 shows the number of responses for each question, along with the response rate for each question within the submitted surveys. As the table shows, more than 50% of responders chose to leave written responses to questions four, five, and six, even though it was not required.

Table 2. Survey response numbers

Question #	# of Responses	Response Percentage
1	975	100%
2	974	99.9%
3	973	99.8%
4	675	69.2%
5	649	66.6%
6	520	53.3%

As Figure 2 shows, for each of the three multiple-choice questions (shown in Table 1), responses were predominantly "Strongly Agree" followed by "Agree." In all, more than 96% of responses were positive. The greatest percentage of "Strongly Agree" responses for questions one through three are for question two, which asks if their faculty mentor is responding to their needs in a timely fashion. The greatest number of responses for "Disagree" and "Strongly Disagree" is attributed to question three, which asks if the projects and learning resources are meeting their needs, although the difference here is within 1% of the other responses, so it is likely statistically insignificant.

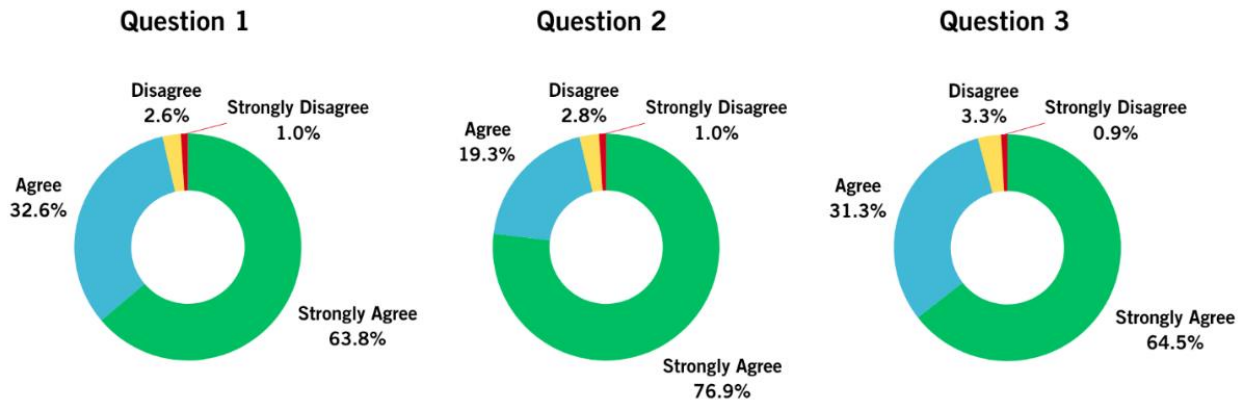

Figure 2. Aggregated survey results administered for the first three multiple-choice questions

Figure 3 shows the distribution of sentence sentiments for questions four through six. Sentiment was analyzed using the NLP library Stanza. Zero indicates a negative sentiment, one indicates a neutral sentiment, and two indicates a positive sentiment. As demonstrated, responses included a mix of negative, neutral, and positive sentiments. Responses to questions four and five primarily consisted of sentences with neutral and positive sentiments. Given that the wording of questions four and five led the learner towards sharing a positive sentiment, a neutral response was highly likely to indicate aspects which learners had positive sentiments but were devoid of words indicative of sentiment to be identified by the NLP library. It was common for responses to state a fact without words indicating sentiment. For example, a response may simply state "the learning resources" or "the project structure," which would be found by the NLP library Stanza to have a neutral sentiment, but was a statement in response to what the learner found valuable or to be working well.

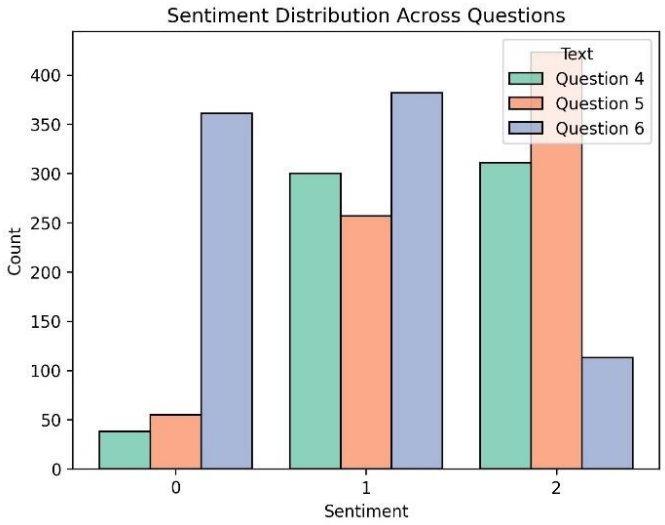

Figure 3. Distribution of sentence sentiment for responses to questions four through six of the survey

For question six, however, learners were asked to share improvements to better meet their needs. Here, the nature of the question implies that responses would have a negative sentiment, even if the response itself did not include words indicative of the sentiment, much like the case for questions four and five. Consequently, the trend in sentiment reverses for question six compared to questions four and five, and most responses are found to be of neutral or negative sentiment. This analysis shows that response sentiment does not always align with the implied sentiment of a question. Thus, sentences cannot be blindly categorized as positive, neutral, or negative and must be sorted appropriately. For questions four and five, neutral responses were analyzed alongside positive feedback, while for question six, all responses were included. The results of the sentiment and meta-theme analysis follow.

4.2 Analysis of Responses to Question Four of the Survey

As Figure 4 shows, responses to question four were primarily classified as having neutral and positive sentiments. Nonetheless, despite the question steering responders towards sharing positive sentiments, some learners used this as an opportunity to share criticisms and constructive feedback. The meta-theme analyses isolated sentences with positive and neutral feedback.

Figure 5 shows a histogram of the ten most common bigrams, appearing in the neutral and positive sentiment sentences of question four. The results for sentences with negative sentiment are not included in this histogram. In addition to filtering for common words, responses often used words within the question itself, and so these were filtered out during processing.

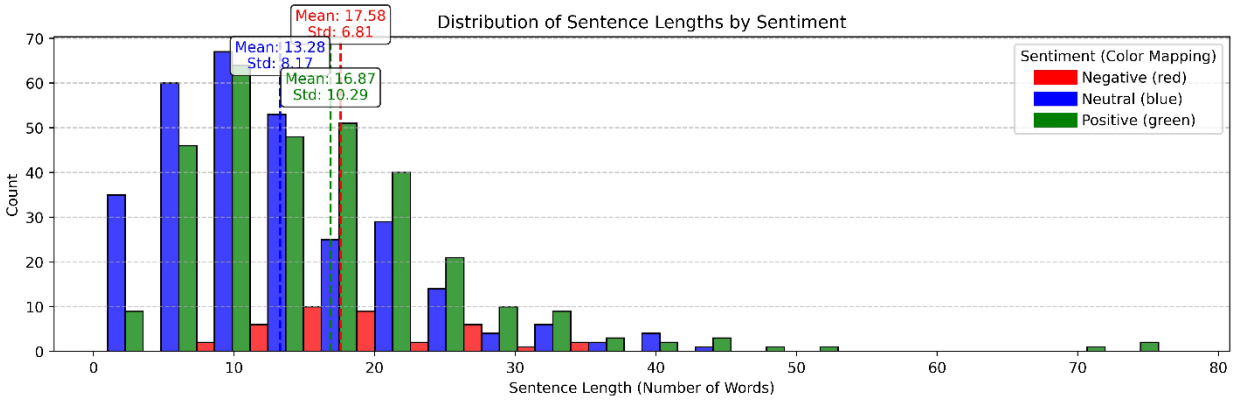

Figure 4. The distribution of sentence length by sentiment for question four of the survey

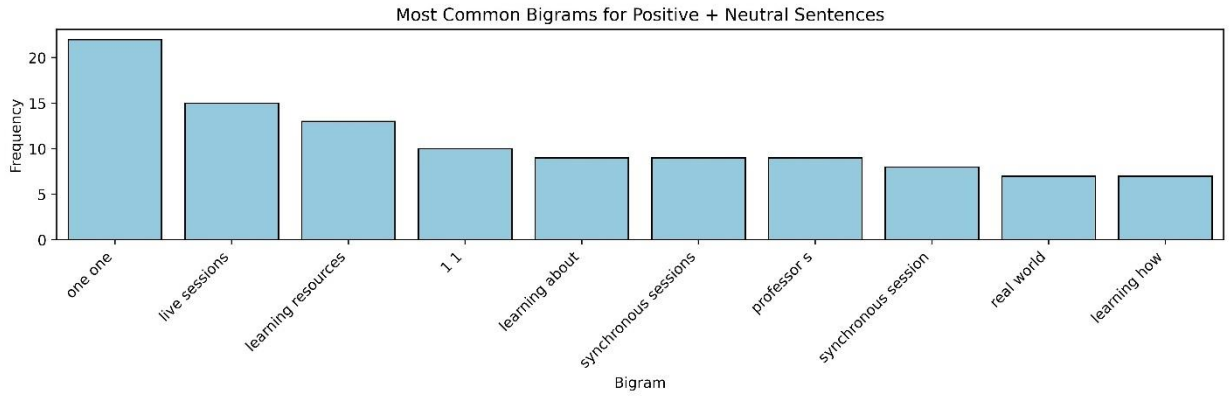

Figure 5. Frequency of the ten most common bigrams in responses to question four of the survey

Of note is that three bigrams relate to synchronous or live sessions, and two refer to one-on-one (or "1-on-1) sessions with faculty, and three refer to learning either through learning resources or learning "about" something or learning "how" to do something. Figure 5 also shows that six out of the top ten bigrams referenced the faculty member and interactions with them via one-on-one and live synchronous sessions. The remaining bigrams note the learning resources, learning "how" to do something new, and "about" specific things, as well as "real-world" connections.

Table 3 shows a summary of the meta-themes for question four. In total, there were 735 sentences in the text corpus analyzed. Responses with negative sentiment were limited, with groupings of responses being no more than five.

Nonetheless, some learners indicated that they felt a bit overwhelmed by the pace of projects, or the number of steps required to complete them. Additionally, some responses indicated that there was a desire for quicker and more detailed feedback.

Table 3. Meta-themes from responses to question four of the survey

Meta-Theme	Discussion	# of Sentences	% of Sentences
Supportive and Accessible Faculty-Mentors	Learners valued supportive and accessible faculty, with frequent mentions of mentorship and positive sentiments about interactions with instructors.	160	21.8%
PBL	Learners preferred project-oriented approaches, citing alignment between evaluation and learning, practical applications, and a well-structured course design.	134	18.2%
Practical and Relevant Application	Responses highlighted the ability to apply course content to real-world job situations, showing alignment with career goals and practical needs.	120	16.3%
Flexibility in Learning	Participants appreciated the adaptability of the course to fit their work-life balance, with flexibility in deadlines and self-paced elements.	90	12.2%

4.3 Analysis of Responses to Question Five of the Survey

As Figure 6 shows, the responses to question five were primarily classified as having a neutral and positive sentiment. Nonetheless, despite the question steering responders towards sharing positive sentiments, some learners used this as an opportunity to share criticisms and constructive feedback. The meta-theme analyses isolated sentences with positive and neutral feedback.

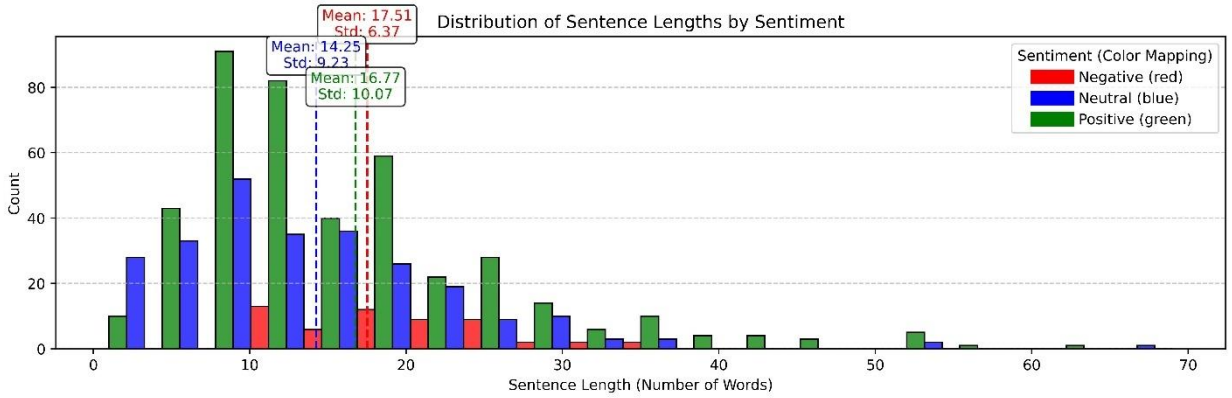

Figure 6. The distribution of sentence length by sentiment for question five of the survey

Figure 7 shows a histogram of the ten most common bigrams appearing in the neutral and positive sentiment sentences of question five. Interestingly, eight out of ten of the most common bigrams directly reference core design decisions for the programs, including, in order of frequency, the live sessions (also referred to as synchronous sessions), project-based coursework, one-on-one time with faculty, the learning resources (and learning materials) provided as part of projects, the real-world nature of courses, and the course structure. The final bigram of "helped me" was used in various ways, such as how the course materials helped at work, how the learning resources helped complete projects, and how the faculty mentor helped the learner.

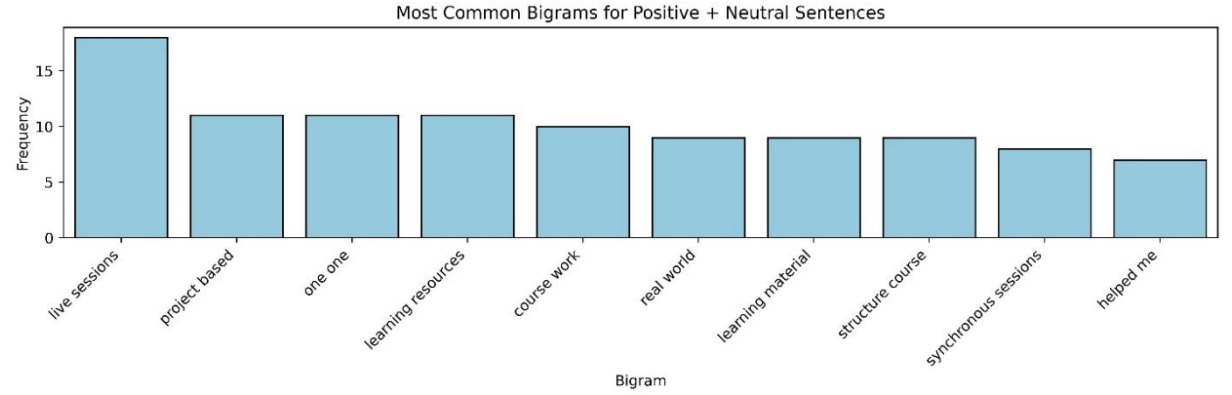

Figure 7. Frequency of the ten most common bigrams in responses to question five of the survey

Table 4 shows a summary of the meta-themes for question five. In total, there were 649 sentences in the text corpus analyzed. Many of the same themes are present, with most responses focusing on the faculty member as a mentor. One distinct theme, though, is related to collaboration and peer learning, specifically during live synchronous sessions.

4.4 Analysis of Responses to Question Six of the Survey

Figure 8 shows the distribution of sentence length by sentiment for responses to question six. Unlike questions four and five, there were no distinguishable bigrams for this question. In addition, responses to question six did not naturally fall as easily into major themes as did the prior questions as there is a greater mix of sentences with both positive, neutral, and negative sentiment.

Thus, to capture a greater percentage of sentences and not overlook any underlying themes, a meta-theme analysis was conducted by first isolating all sentences with positive feedback and then exploring the themes of the remaining sentences. Table 5 provides a summary of the themes emerging from responses to question 6, the associated number, percentage, and cumulative percentage of sentences. In total, there were 835 sentences in the text corpus analyzed. The table provides a comprehensive look at the responses and the themes outlined account for greater than 97% of all sentences.

Table 4. Meta-themes from responses to question five of the survey

Meta-Theme	Discussion	# of Sentences	% of Sentences
Supportive and Accessible Faculty-Mentors	Responses highlighted one-on-one meetings, open discussions, and the speed of response by faculty, enhancing understanding and engagement.	140	21.2%
Real-World Application	Learners valued real-world applications, citing relevance to their workplaces, confidence-building, and better understanding of their organizational contexts.	100	15.2%
Collaboration and Peer Learning	Collaborative discussions during synchronous sessions were seen as beneficial and engaging, especially when project deliverables were worked on together.	70	10.6%
Course Structure and Learning Resources	Breaking projects into smaller deliverables and the logical flow of tasks were appreciated, as well as the availability of learning resources at the moment of need.	70	10.6%

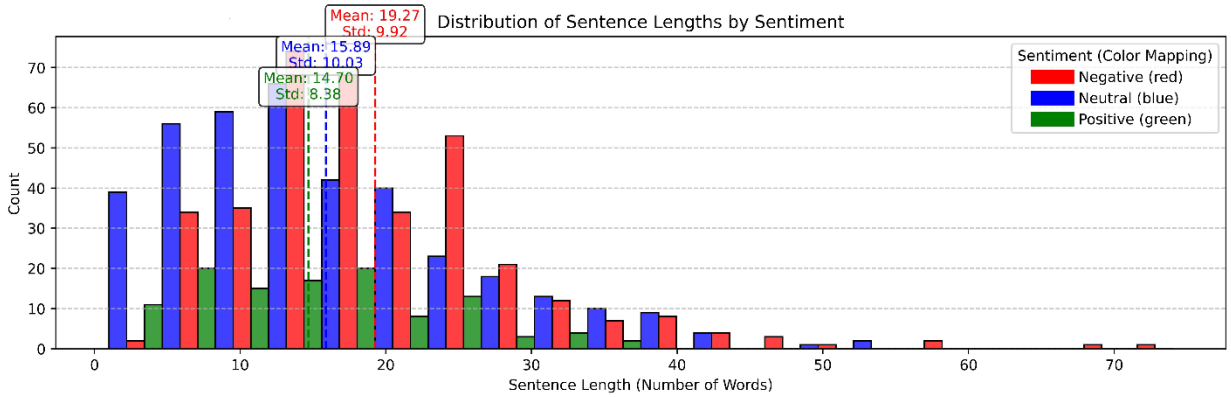

Figure 8. The distribution of sentence length by sentiment for question five of the survey

As can be seen in Table 5, the greatest number of sentences within the responses for question six were associated with positive feedback. These represented just over 20% of all sentences. The theme with the next greatest number of associated sentences highlights the desire for more real-world application. This theme accounted for 93 sentences which represented just over 11% of all sentences. Further exploration of this theme uncovered that there were requests for additional real-world examples, discussion of more examples in synchronous sessions, as well as the desire for content to be better connected to workplace challenges.

The theme with the third most associated sentences highlights suggestions for improving the pace of the course. This theme accounted for 74 sentences or 8.9% of all sentences. Most comments referred to increasing or decreasing the duration of specific project milestones. A subset of responses referred to being rushed or having due dates that did not align well with the synchronous sessions.

The theme with the fourth greatest number of associated sentences highlights alignment between course materials. This amounted to 73 sentences or 8.7% of all sentences. Some learners shared that they found the connection between project instructions, learning resources, and rubrics to be misaligned, and there were additional comments that the requirements of certain projects were not clear.

The theme with the fifth greatest number of associated sentences highlights a desire for increased clarity in expectations as well as in the timeliness of feedback. This amounted to 67 sentences or 8% of all sentences. In some instances, learners expressed confusion about what they were asked to do. Responses also indicate that there were instances in which learners did not receive feedback on their submissions in a timely manner. These comments indicate that feedback is valued and even sometimes necessary to progress to the next part of a project. Not having feedback prior to beginning work on the next deliverables was seen to make the work more difficult and add uncertainty or complexity. The remaining themes, the associated number, percentage, and cumulative percentage of sentences can be seen in Table 5.

Table 5. Meta-themes from responses to question six of the survey

Meta-themes	# of Sentences	% of Sentences	Cumulative % of Sentences
Positive Feedback	168	20.1%	20.1%
Requests for More Real-World Application	93	11.1%	31.2%
Suggestions for Improving Course Pacing	74	8.9%	40.1%
Alignment of Course Materials	73	8.7%	48.8%
Timeliness and Clarity of Feedback	67	8.0%	56.8%
Challenges with Software	64	7.7%	64.5%
Desire for More Engaging Synchronous Sessions	59	7.1%	71.6%
Miscellaneous/Unclassifiable	56	6.7%	78.3%
Challenges with Group Work	56	6.7%	85.0%
Heavy Workload	54	6.5%	91.5%
Improving Accessibility and Usability	48	5.7%	97.2%

5. Discussion

To meet the complex needs of a WP learner, Rensselaer at Work prioritized several key attributes in the creation of its portfolio of online graduate programs, including real-world, PBL deployed through a standardized LMS design, faculty as mentors, and the inclusion of live synchronous sessions. As shown in the quantitative and qualitative results described above, learners expressed overall satisfaction with their experience in their program. They expressed positive sentiments related to the project-based approach, the consistent structure of the project within the LMS to provide persistent access to materials, the flexibility and support provided by their faculty mentors, the ability to connect in a synchronous setting with faculty and peers as well as one-on-one with faculty, and their ability to draw applicable connections between their learning experience and their workplace.

5.1 PBL as a Professional Pathway

Learners considered the project-based approach to be an effective strategy to develop real-world ability sets. They found the project content to be practical and relevant, aligning with real job situations. In terms of the project structure, they appreciated the ability to deliver larger projects in smaller milestones. This approach, paired with clear deadlines and encouragement of resubmissions, helped them to stay on track and chart a clear path from one deliverable to the next. Learners stressed the importance of ensuring that project deadlines communicated by faculty mentors aligned with the information presented in the LMS, which highlights the need for WP learners to carefully plan their time, given other competing personal and professional priorities.

Learners also considered their experience with PBL to contribute positively to their professional role—building their confidence, enhancing their understanding of the work being done around them, and critically analyzing their specific role within their organization's business model. In this way, their experience in the program helped them to see the "bigger picture" of their organization, making them a more well-rounded contributor to their workplace setting and industry, as well as providing them with a competitive advantage for career advancement.

5.2 The Value of Mentor Presence and Guidance

Learners cited the availability and support of faculty mentors as contributing factors to their satisfaction and success. They appreciated mentors who provided detailed, constructive feedback in response to each milestone deliverable, noting that this ensured that they were prepared when the time came for their final submission. This open line of communication between the mentor and learner created an environment where learners did not encounter any "surprises" as they approached the end of the course—a shared acknowledgment of learners' standing in the course exists throughout the learning journey, with both the mentor and learner playing active roles in their progress. For this reason, the speed of their mentor's response to their deliverables within the LMS was critical, especially when each submission was dependent on the previous one to move on to the next project.

In terms of synchronous sessions, learners expressed a preference for opportunities to engage in collaborative content exploration with peers. This live connection is all the more important in digital settings, as it helps to overcome the physical distance that some learners find isolating. When leveraging digital breakout rooms, learners preferred the ability to call their faculty mentor into their room to ensure they were on the right track with their discussion and using time effectively.

5.3 A Structured, Yet Flexible Model

As the literature suggests, learners expressed overall satisfaction with the flexible model afforded by the online programs. Learners appreciated the ability to access resources and complete project work at a time that was convenient for them, which positively contributed to their work-life balance. Learners also shared positive sentiments about the support and availability of their faculty, as well as the consistent structure within their courses and across their programs. This supports the literature on the need for an organized, predictable LMS design. Presenting content in this consistent manner removes a learning curve related to the course navigation as learners begin each course within their program. This allows learners to devote their sole focus to deep engagement with the content and skill building—the elements of the experience that align with their initial goals for enrolling.

5.4 Comparative Analysis and Implications for the Field

Prior research (Miller & Krajcik, 2019; Doney, 2019; Hall & Liva, 2022; Yee et al., 2021) has focused on discrete online course and program design approaches that support learner success and motivation. While these studies highlight research-informed practices that have impacted learners, they largely focus on analyzing specific instructional strategies at the course level rather than a holistic, programmatic approach. This case study extends research on the impact of standardizing instructional design practices for learner satisfaction and retention across programs (Casey et al., 2021; Santelli et al., 2020) by providing an example of a portfolio of programs (three master's degrees and nine, three course graduate certificates) that were intentionally and holistically designed with consistency and the learner perspectives in mind. These design decisions are then directly mapped to learner feedback that validates their impact on learner satisfaction. Taken together, this research offers a holistic approach for program-level instructional design, consolidating insights that might otherwise be published across several studies.

In addition to providing a single source for a programmatic instructional design approach, the results of this case study suggest several implications for online graduate programs. First, although the faculty were not meeting with learners twice a week, as is common in many residential and even online classes, they had a profound impact on the learners' experience, as evidenced by the meta-themes from the first two free-response questions about what is "valuable" and what is "working well." The faculty mentor often serves as the learner's main connection point to the university. Thus, this relationship is crucial not only for learner success and motivation but also for their ability to feel a sense of affiliation with the institution and program. Therefore, it is important to ensure that faculty understand the significance of the role they play and are equipped with the tools to successfully fulfill that role. To achieve this, key performance indicators (KPIs) and associated guidance can be agreed upon by faculty and program administration. In the case of the organization discussed in this paper, the faculty KPIs are tied directly to the learner survey questions (i.e., learners are asked about timeliness of instructor response; the corresponding faculty mentor KPI includes responding to learner inquiries within 24 hours).

Second, there is clear appreciation not only for PBL and real-world, situated projects but also for a well-designed LMS with consistent, familiar navigational elements across all courses in a program. Since all projects are experienced through the LMS, the connection between the two is inextricable. To operationalize this, a set of design principles can be established and templatized by instructional design and administrative staff across programs, and portfolios of programs, then upheld by faculty. Course design templates should clearly communicate standardized elements to all stakeholders while identifying areas for adaptation or customization (e.g., presentation styles for synchronous sessions, welcome messages, or personal videos).

This leads to a final overarching implication across all results: achieving high levels of learner satisfaction in online programs for WP requires a thoughtful design process. Through the design process shared here, the pillars of the learner experience emerge. Through identification of the design decisions and articulation of them, it becomes possible to disentangle the many factors influencing the learner experience and "test" whether the design decisions are valued and working well for learners.

5.5 Limitations and Directions for Future Research

Though this study aims to provide a comprehensive overview of learner feedback on program design, several limitations should be addressed. First, because the survey responses were largely anonymous, it is difficult to follow up and deeply explore the specific circumstances behind learner response. Second, this format does not easily allow the ability to track a learner's experience through their survey responses during their time in the program, or to decipher whether a learner continued to respond to the surveys over time. Future research efforts would ideally include a coding approach to map responses to specific learners across semesters, as well as interviews and focus groups to facilitate a deeper qualitative analysis and understanding of the context surrounding each response.

6. Conclusion

This case study reinforces that intentional program design enhances meaningful, engaging experiences for WP learners. It also enables feedback collection to validate key design decisions. Here, online delivery prioritized real-world PBL through an LMS with structured navigation, styling, and curated resources. Faculty mentors, rather than traditional lecturers, guided learners through projects. Findings confirm that well-designed online programs empower learners to develop real-world skills, take ownership of their learning, and align experiences with personal and professional goals. This portfolio of programs integrates research-based pedagogy, mentorship, and technology, with learner feedback consistently affirming their value and effectiveness.

7. Declaration of Interest Statement

The authors report there are no competing interests to declare.

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