



WPI

Creating a Project Engagement Portal for WPI Students

A Major Qualifying Project submitted to the faculty of
WORCESTER POLYTECHNIC INSTITUTE
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This report represents the work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review.

Abstract

WPI's project-based learning curriculum frequently requires students to collect primary data through surveys. This task can present challenges due to the lack of a centralized platform for survey distribution. To address this problem, our team developed a prototype WPI Project Engagement Portal (WPI PEP) using Mendix, a low-code application development platform. The WPI PEP aims to facilitate survey distribution for student projects, allowing WPI students to collect high-quality data and contribute to their peers' academic endeavors by responding to surveys. Our project details the planning, analysis, and development process of creating the prototype WPI PEP along with a set of next steps that offer guidance for future work on the portal.

Acknowledgments

We would like to thank our advisor, Professor Ryan, for his guidance and support throughout this project.

Executive Summary

WPI prioritizes project-based learning (PBL) in its curriculum, emphasizing hands-on problem-solving skills across disciplines. Projects frequently involve surveys of other students to obtain primary data from peers. However, collecting a sufficient amount of high-quality data can be difficult due to the lack of a centralized method for students to distribute surveys. Students often turn to pre-existing group chats to ask for participants, which can lead to selection biases and create unwanted clutter in social spaces.

As a solution, we propose a centralized survey portal: the WPI Project Engagement Portal (WPI PEP). By providing a single platform for survey distribution, this portal would mitigate biases and streamline the data collection process.

Methodology

We aimed to design a prototype portal where WPI students can post and respond to project and class-related surveys. To accomplish this, we outlined the following objectives:

- Understand how WPI students interact with class-related surveys
- Evaluate the portal's feasibility
- Plan a prototype of the portal
- Design a prototype of the portal

Survey results

We surveyed 137 WPI students, 121 undergraduate students and 16 graduate students, to understand how the WPI community interacts with surveys. The full survey and results can be found in Appendix A.

Our survey found that 16% of respondents only conduct one survey per academic year, 33% conduct between two and five surveys per academic year, and 11% conduct more than five surveys per academic year. Of these surveys, 66% only target WPI students, while 32% target both WPI students and non-WPI students. When asked how many times per academic year respondents are asked to participate in a peer survey, 33% of respondents indicated that they are asked to complete between one and five surveys, 37% are asked to complete six to ten surveys, and 22% are asked to complete more than ten surveys.

The responses indicate that there is a general need among students for a survey portal, given that a majority (60%) of surveyed students conduct at least one survey per academic year. This finding is underscored by how a majority (92%) of students are asked to complete multiple peer surveys each year. The variety of different channels students use to share these surveys signals that a consolidated survey portal would streamline the data collection process.

Feasibility study

To complete a feasibility study, we used a template created by ProjectManager. The full feasibility study can be found in Appendix B.

From a technical perspective, the WPI PEP was prototyped by our MQP team during the 2023-2024 academic year (AY) using Mendix, a low-code development platform for building web applications. A follow-up MQP during AY 2024-2025 or later may be necessary to further develop the platform using the previously determined requirements and prototype features.

The WPI PEP's target market consists of the WPI undergraduate and graduate study body. WPI's emphasis on project-based learning drives the demand for a centralized portal to facilitate data collection. A full-fledged marketing plan for the portal was developed as part of a companion Professional Writing MQP, *Creating a Marketing Plan for the WPI Project Engagement Portal*.

Financially, Mendix's standard pricing for server and application deployment costs begins at \$998/month. Our team believes that the WPI PEP will increase student satisfaction with WPI's project-based curriculum and thus enhance WPI's appeal to prospective community members.

Risks associated with the project include the complexities of getting it up and running on WPI's

servers, which depends on the assistance provided by WPI IT Services (ITS). Additionally, implementing the platform may be low on ITS's list of priorities because the platform is a student project not associated with any department.

From our feasibility study, we concluded that the WPI PEP is feasible for both the WPI administration and the community. After drawing this conclusion, we moved on to developing system requirements.

System requirements

We developed the following user, administrator, guest, functional, nonfunctional, and system requirements for the WPI PEP.

User requirements

- Input, modify, and delete posts
- Filter posts according to specified criteria
- Search for posts using keywords
- View posts and access surveys using an external link attached to posts

Guest requirements

- Filter posts according to specified criteria
- Search for posts using keywords
- View posts and access surveys using an external link attached to posts

Administrator requirements

- Modify and delete other users' posts
- Input, modify, and delete posts

- Filter posts according to specified criteria
- Search for posts using keywords
- View posts and access surveys using an external link attached to posts

Functional requirements

- Generate posts based on user inputs
- Store, modify, and recall posts
- Query posts based on filters or keywords

Nonfunctional requirements

- Multi-user capability
- Secure login system for users and administrators
- Users who are not logged in can still view, search for, and filter posts
- User-friendly design
- Able to quickly load data
- Incorporates WPI branding elements

System requirements

- Users should have a Chromium-based browser such as an up-to-date Microsoft Edge or Google Chrome application
- User interfaces for mobile, tablet, and desktop
- User should run Windows 10 64-bit version or above with at least 2 GB of disk space and 4 GB of RAM
- User accessing the site should have at least 2 Mbps internet speed, especially when uploading high-resolution images

Data flow diagram

The level 1 data flow diagram (DFD) contains five major functions: login, publish, edit current post, filter for posts, and search for posts (see Figure i).

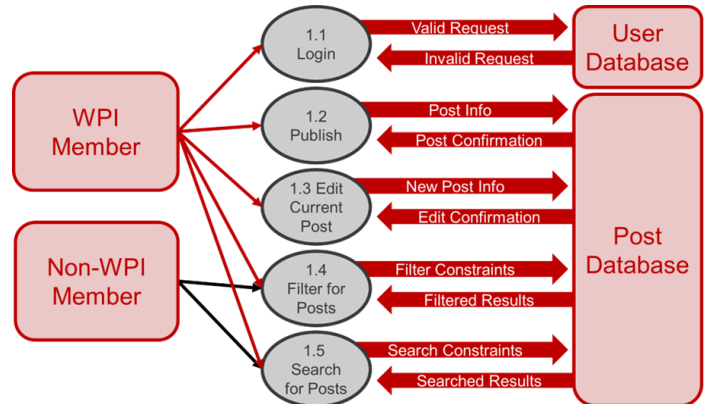


Figure i. The level 1 data flow diagram for the WPI PEP.

WPI members are able to login to the portal, publish posts, edit posts, filter for posts, and search for posts. Non-WPI members are only able to filter and search.

Data model

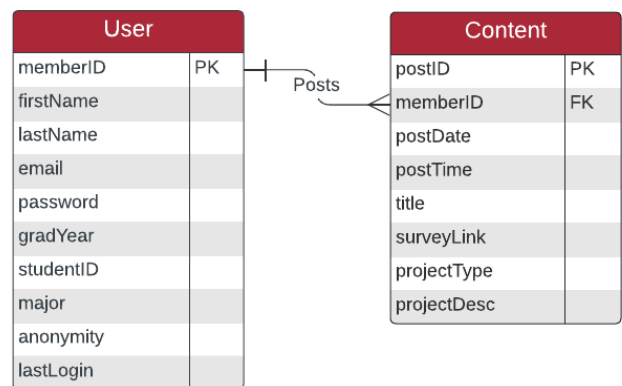


Figure ii. The entity relationship diagram for the WPI PEP.

The entity relationship diagram consists of two entities, Users and Content.

System development

The prototype can be accessed locally through the host workstation as different users. Once the portal is deployed, users would be able to access the portal through a customized domain such as “pep.wpi.edu.”

The portal’s interface remains consistent among mobile, tablet, and computer devices. The WPI logo can also be clicked to return to the home page.

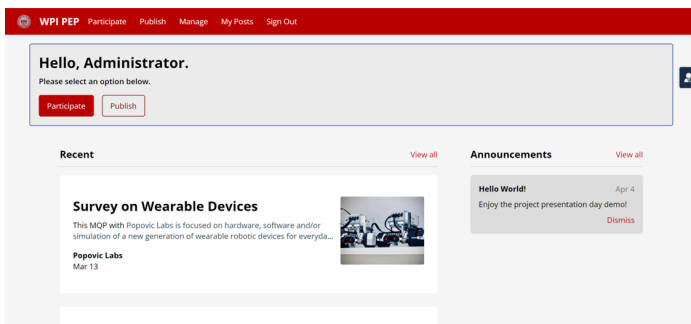


Figure iii. The WPI PEP home page.

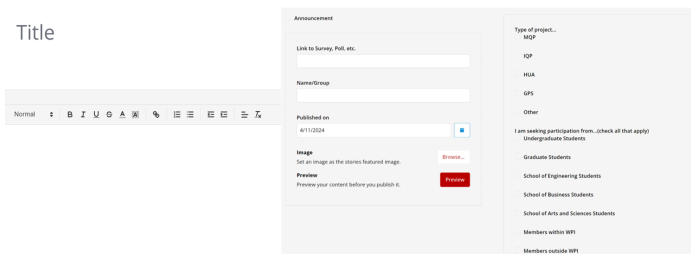


Figure iv. The WPI PEP “Publish” page.

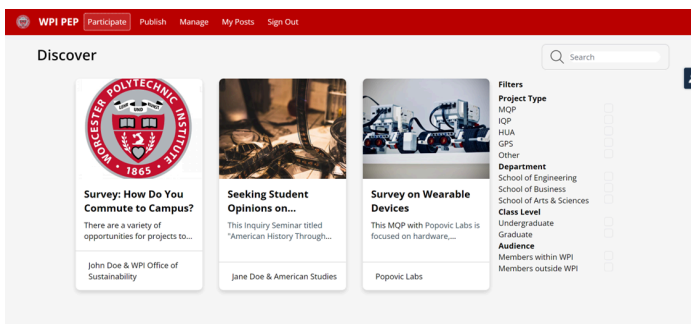


Figure v. The WPI PEP “Discover” page.

Integration test cases

These most important functions a general user of our platform will do are create and read posts. System administrators are able to edit, moderate, and delete posts. For all tests conducted and test results, refer to Appendix C.

User manual

While an attempt was made to make the website interface be simple and straightforward, a user manual was created to help users and administrators navigate the prototype. All clickable buttons and text fields are identified and explained in order to help a user understand the features of the WPI PEP. Figure vi shows an example section of the user manual that describes how to use the WPI PEP’s home page and participate page. The full user manual can be found in Appendix D.

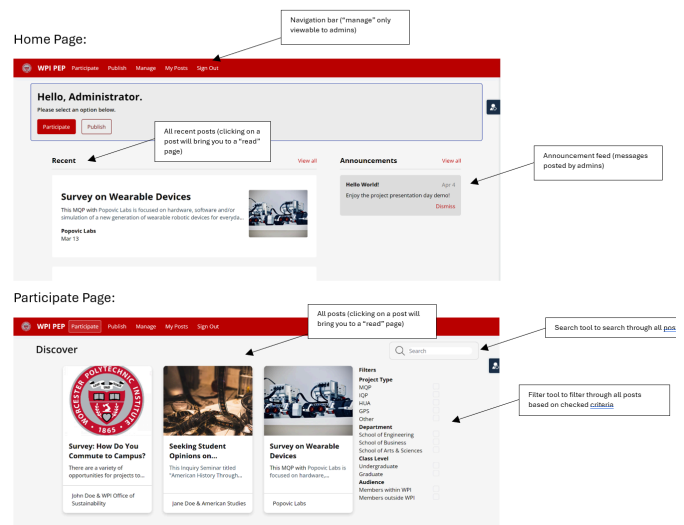


Figure vi. A section of the WPI PEP user manual that describes how to use the home page and participation page.

Next steps

To assist with future development on the WPI PEP, our team proposes the following key considerations.

Integration with existing WPI platforms

Integrating the WPI PEP with existing WPI platforms such as eProjects, Canvas, and the WPI Hub would help create a streamlined project experience. Our team especially recommends integrating the WPI PEP into eProjects, WPI's project lifecycle management system, to ensure all projects exist in a collaborative ecosystem where students' project data is accessible and complete. Proper analysis of existing system architecture and security protocols should be conducted to determine how best to integrate the WPI PEP into other WPI platforms.

Single sign-on login compatibility

Implementing single sign-on (SSO) login compatibility would improve the user experience, allowing students and faculty to access the WPI PEP using their WPI credentials. SSO enables users to sign in and authenticate once to access all WPI applications without needing to log in separately. Integrating SSO would also increase the security of the WPI PEP. This endeavor would require assistance from ITS to configure SSO and provide guidance on any necessary system changes to accommodate the feature.

Final thoughts

Our team is confident that the WPI PEP will facilitate the survey distribution process for students, guaranteeing sufficient, high-quality primary data and aligning with WPI's project-based learning curriculum. Furthermore, we believe that the WPI PEP has the potential to draw in prospective students by enhancing the student project experience.

We hope that future development on the WPI PEP will eventually bring the portal to a deployable state. We believe that the WPI PEP will benefit the entire WPI community by enabling seamless project engagement.

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1. Introduction

Worcester Polytechnic Institute (WPI) is a leader in project-based learning in educational institutions. The university implemented the WPI Plan in 1970, where “students [apply] knowledge and skills from the classroom to real problems around the world” through project work (“10 Things to Know...,” n.d.). WPI students participate in hands-on learning opportunities that aim to strengthen their problem-solving skills, reinforce the importance of collaboration, and demonstrate the interdisciplinary connection between STEM and the humanities. These projects frequently involve surveys of other students to obtain primary data regarding the opinions, behaviors, and characteristics of their peers. Collecting a sufficient amount of high-quality data can be difficult due to the lack of a centralized method for students to distribute surveys. Students often turn to pre-existing group chats to ask for participants, which can lead to selection biases and create unwanted clutter in social spaces.

In response to the challenges faced by WPI students in collecting primary data, the WPI Project Engagement Portal (WPI PEP) aims to offer a streamlined approach to engaging with projects at both undergraduate and graduate levels. This includes Interactive Qualifying Projects (IQPs), Major Qualifying Projects (MQPs), humanities seminars and practicums (HUA), and standard courses. Students will be able to post their surveys on the portal and respond to surveys from their peers.

This report details the planning and design process of a prototype WPI PEP built using Mendix, a low-code application development platform. The portal facilitates survey distribution for WPI student projects to ensure uncomplicated, high-quality data collection. The concept and prototype may be used by WPI as a basis for further development or implementation of a project engagement portal. Our deliverables include the prototype WPI PEP along with a set of next steps that offer strategic insights and guidance for future work on the portal.

2. Background

This section begins by highlighting the significance of project-based learning at WPI and the current most common methods of how students distribute surveys. We then address the challenges associated with existing distribution methods, the advantages of a centralized survey portal, and the benefits of low-code development.

2.1 Project-based learning at WPI

Project-based learning (PBL) is a fundamental educational approach at WPI that emphasizes hands-on, real-world problem-solving. WPI integrates PBL throughout its curriculum, fostering active student engagement and practical skill development.

Two key PBL components of the undergraduate curriculum are the Interactive Qualifying Project (IQP), typically completed during a student's junior year, and the Major Qualifying Project (MQP), completed during a student's senior year. IQP teams address global issues “that [lie] at the intersection of science and society” while working with fellow students from interdisciplinary backgrounds (“Interactive Qualifying Project,” n.d.). These projects enhance students' understanding of complex problems and their ability to work collaboratively. Similarly, MQPs allow students to explore specialized research topics within their majors (“Major Qualifying Project,” n.d.). These projects often involve industry partnerships, giving students practical experience and bridging the gap between theory and application.

WPI also incorporates a humanities and arts (HUA) project into its STEM-based curriculum (“The Humanities and Arts Project...,” 2021). Students complete coursework in a selected humanistic area of study which concludes with a practicum or seminar in the subject. These projects encourage students to consider the ethical and societal aspects of their work, ensuring they graduate not just as technically skilled individuals but as responsible and socially aware professionals.

Project work extends to the undergraduate and graduate-level classes students can take at WPI. Many courses are designed around collaborative group projects, instilling practical problem-solving and interactive learning within traditional academic structures. This approach empowers students to apply their knowledge, strengthens critical thinking, and prepares them for real-world challenges when they begin their careers. PBL influences learners of every level, from first-year to graduate students. Upon entering the university for the first time, first-year students

are encouraged to take a Great Problem Seminar (GPS), where they work in teams to analyze and tackle substantial issues facing our planet and society (“Great Problems Seminar,” n.d.). Graduate students complete a capstone project that demonstrates their comprehension of coursework and ability to apply the skills they learn to a professional setting (“Graduate School FAQs,” n.d.).

PBL provides WPI students with a unique learning experience. Projects encourage interdisciplinary collaboration, problem-solving, and practical application. The emphasis on soft skills and technical engagement with real-world challenges prepares graduates to excel in a variety of fields, making them highly sought-after by employers and preparing them for the rapidly changing world. WPI's success in combining real-world problem-solving, interdisciplinary collaboration, and global perspectives has garnered international attention (“WPI Receives International...,” 2023).

2.2 Student survey distribution

As a part of projects, WPI professors and advisors often require or encourage students to collect primary data from their peers or another population of interest. A common method of gathering this data involves the use of surveys. These surveys are often conducted using Microsoft Forms, as students' accounts are registered with the Microsoft Office application suite. WPI also recommends Qualtrics for more sophisticated surveys because the platform offers a wider variety of question types, distribution options, and collaboration options (“Online Survey Platforms,” n.d.). Given the lack of a centralized survey distribution portal, links to participate in surveys are often distributed via email, text messages, Slack, Discord, and various other peer-to-peer communication channels.

Collecting a sufficient amount of high-quality data often proves to be challenging. Students frequently promote their surveys in pre-existing group chats, which generates undesirable off-topic clutter in social spaces. The request may be skimmed over by uninterested readers or buried within other topical conversations. Pre-existing group chats often consist of the surveyors' friends or colleagues, which can lead to selection bias in the data. Selection bias occurs when respondents fail to reflect the broader population that the study intends to investigate (Arias et al., 2023). Surveying existing social spaces may lead to homogenous data, as respondents in shared circles likely have similar experiences or opinions. Participants may also feel pressured to provide socially acceptable or desirable answers and avoid controversial

responses when surveyed by friends or acquaintances (Zerbe & Paulhus, 1987). These factors indicate that if a student primarily surveys their friends and colleagues, the project may be at risk of inaccurate results due to biased data.

High-quality, unbiased data influences the accuracy and overall success of academic projects. Choosing efficient yet impartial survey distribution channels is critical to collecting high-quality data. A centralized survey distribution portal for WPI students would alleviate the risk of incorporating biased or otherwise low-quality data into student projects.

2.3 Benefits of a centralized survey portal

A centralized survey aggregator would integrate well within WPI's PBL curriculum. The portal would be relevant to nearly every undergraduate and graduate student due to the prevalence of projects that require primary data collection, spanning from standard class projects to large-scale projects such as the IQP, MQP, GPS, HUA seminar or practicum, and graduate capstone projects. A centralized portal would emphasize the interdisciplinary connection between the humanities and STEM, an important aspect of the PBL curriculum. By catering to projects based on the liberal arts and STEM, the portal would expose users to the differences and similarities between the two disciplines. The portal would also nurture students' essential soft skills, including project management, communication, and collaboration.

The portal would serve as a solution for many of the issues related to data collection discussed in Section 2.2. A centralized survey aggregator would reduce the need for using existing group chats as a distribution channel. Corresponding biases such as selection bias would hence be eliminated. In its nature, a centralized survey portal inherently supports the idea of project-based learning and encourages students to participate in a reciprocal system by which to easily complete their student projects.

2.4 Low-code development

Low-code refers to an approach to software development that involves minimal coding; instead, developers utilize a graphical interface. A low-code approach facilitates the application development process by eliminating the need for several software developers, allowing developers to focus on the application's business logic rather than its infrastructure needs and robustness (Sahay et al., 2020). This expedites and streamlines the development process.

Low-code development aligns with current industry trends in the business world. Recent market studies have shown that the prevalence of low-code platforms is expected to rise due to their practicality and accessibility. Gartner, Inc. predicted that 65% of application development will occur on low-code platforms by 2024 and Forrester Research predicted the low-code market potential to reach 21.2 billion US dollars in 2022 (Prinz et al., 2021). Low-code development also fits within the popular agile methodology. Agility refers to a business's ability to streamline and simplify processes by prioritizing adaptability, collaboration, and fast progress (Beck et al., 2001). By implementing low-code development practices, developers can produce frequent deliverables per stakeholder needs (Rokis & Kirikova, 2023).

Popular low-code development platforms include Mendix Studio, Microsoft Power Apps, and OutSystems (Sahay et al., 2020). Mendix allows users to develop applications, including data modeling and interface design, through a visual, drag-and-drop interface ("Mendix Low-Code Platform," n.d.). The platform is a cloud-based system that can run on both public, private, and on-premise clouds. The Mendix Marketplace offers a variety of widgets, connectors, and modules to facilitate the development process. Mendix also offers a Solutions Gallery where users can find existing applications to integrate or adapt.

Microsoft Power Apps consists of a suite of applications, services, connectors, and data platforms and utilizes a drag-and-drop interface ("Microsoft Power Apps..." n.d.). Developers can use the platform to build canvas apps, which focus on the user interface, or model-driven apps, which focus on the data model. Power Apps is compatible with the rest of the Microsoft suite, including Excel, PowerPoint, and SharePoint.

OutSystems is a cloud-native development platform for developing desktop and mobile applications ("OutSystems Low-Code Platform," n.d.). Applications can be published in minutes with a simple click of a button. OutSystems supports full-stack development, integration with existing systems, and strong security features.

3. Methodology

Our project aims to design a prototype WPI Project Engagement Portal where WPI students can post and respond to class-related surveys. We outlined the following objectives to achieve this goal:

- Understand how WPI students interact with class-related surveys
- Evaluate the portal's feasibility
- Plan a prototype of the portal
- Design a prototype of the portal

3.1 Understand how WPI students interact with class-related surveys

This objective aims to inform our understanding of how the WPI community uses surveys and gather data to support WPI's need for a project engagement portal. The following sub-objectives detail the specific information we sought to find out in the peer survey:

- Determine what channels students use to distribute and respond to surveys
- Determine how often students distribute and respond to surveys
- Determine what motivates students to respond to surveys

To collect this data, we designed and distributed an anonymous peer survey intended for WPI undergraduate and graduate students (see Appendix A). We chose a sample size of at least 100 students to represent the total WPI student population as accurately as possible.

3.2 Evaluate the portal's feasibility

This objective aims to determine the overall viability of the project engagement portal. We determined two primary stakeholders in the portal: its user base, the WPI student body, as well as its implementers and maintainers, WPI IT Service (ITS). Our analysis consisted of determining if the portal would serve the student body while also being easy to manage from an administrative standpoint. First, we used our survey data to determine whether the WPI PEP's functionality aligns with how often WPI students distribute and engage with class-related surveys. Next, we determined whether the portal is within WPI IT Services' ability and scope through a comprehensive feasibility study. The feasibility study consisted of technical considerations for developing and implementing the portal, an analysis of the target market and

possible competition, a marketing strategy, staffing needs, financial projections, and final recommendations.

3.3 Plan a prototype of the portal

This objective includes the planning phase of the system. The following sub-objectives comprise the specific steps to successfully plan the prototype project engagement portal:

- Determine the system requirements
- Design the data flow diagram
- Design the data model

3.4 Design a prototype of the portal

This objective includes the design phase of the system. The following sub-objectives comprise the specific steps to successfully design the prototype project engagement portal:

- Determine the system architecture
- Create use-case scenarios
- Design the system's interface structure
- Develop a prototype of the system
- Create and test integration test cases
- Write the user manual

We chose Mendix to develop the prototype WPI PEP because of its low-code approach to building applications, which saves time and increases efficiency.

4. Planning & analysis

This section summarizes the planning and analysis phases of our project, which consisted of a survey and feasibility study along with determining the system requirements, analysis strategy, recommended system, process model, and data model.

4.1 Survey results

Our survey received 137 responses, which exceeded our target of 100 responses. We decided to consider all of the responses in our analysis instead of narrowing it down to just 100 to ensure a comprehensive, nuanced understanding of all of our respondents' perspectives. A majority (88%) of our respondents were undergraduate students while 12% were graduate students, which reflects WPI's larger undergraduate population. The full survey results can be found in Appendix A.

Our survey found that 16% of respondents only conduct one survey per academic year, 33% conduct between two and five surveys per academic year, and 11% conduct more than five surveys per academic year. Of these surveys, 66% only target WPI students, while 32% target both WPI students and non-WPI students. When asked how many times per academic year respondents are asked to participate in a peer survey, 33% of respondents indicated that they are asked to complete between one and five surveys, 37% are asked to complete six to ten surveys, and 22% are asked to complete more than ten surveys.

The most popular survey distribution channels include email (used by 74.5% of respondents) and Slack (used by 55.5% of respondents), followed by text messaging, social media, and word of mouth (each used by 38% of respondents). Respondents indicated that they were least likely to respond to surveys posted to the WPI subreddit, Discord servers, and promoted on flyers. However, participants claimed that they are most likely to respond to surveys shared with them via text, email, and Slack (see Figure 1).

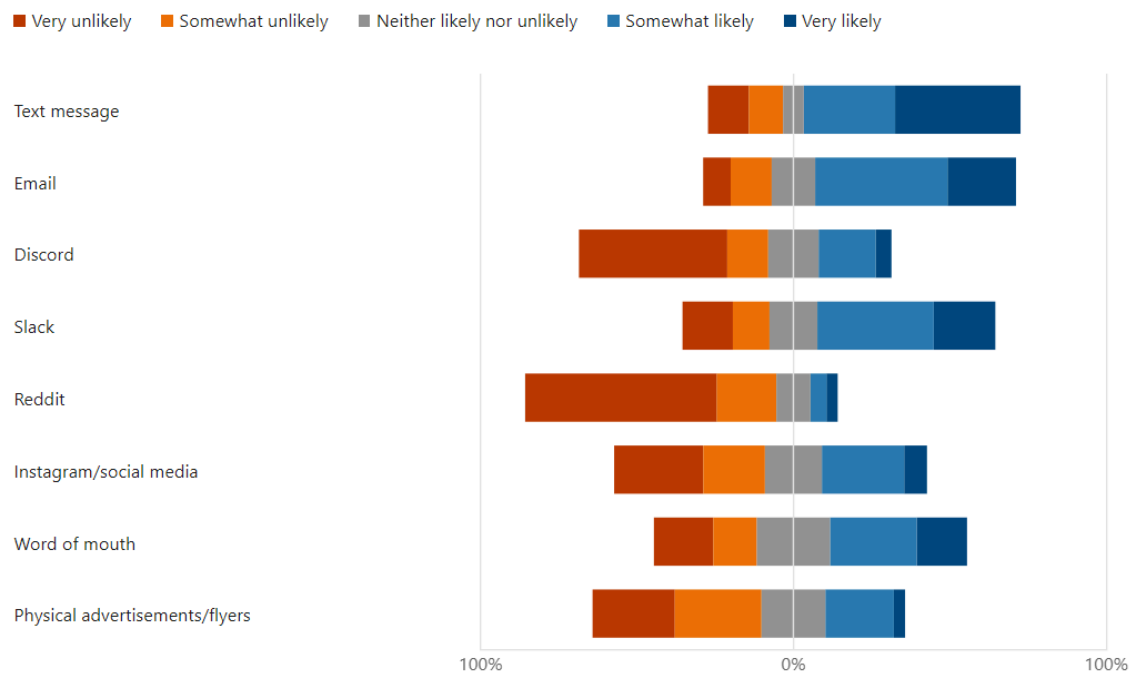


Figure 1. How likely respondents would be to respond to a survey shared from different distribution channels.

Finally, we asked respondents how likely they would be to respond to a survey with a monetary incentive, a social incentive (i.e., a friend requested the respondent to participate), and an academic incentive (i.e., a professor requested the respondent to participate). For each incentive, at least 84% of respondents shared that they were either somewhat likely or very likely to respond to the survey (see Figure 2).

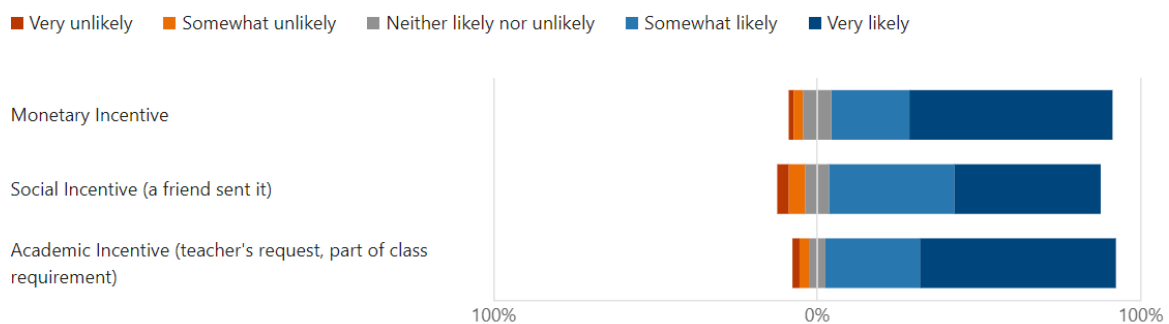


Figure 2. The breakdown of willingness to participate in a survey with a particular incentive.

The responses indicate that there is a general need among students for a survey portal, given that a majority (60%) of surveyed students conduct at least one survey per academic year. This finding is underscored by how a majority (92%) of students are asked to complete multiple peer surveys each year. The variety of different channels students use to share these surveys signals that a consolidated survey portal would streamline the data collection process.

4.2 Feasibility study

To complete a feasibility study, we used a template created by ProjectManager. This template includes an executive summary, description of the product, technical considerations, target market analysis, marketing strategy, staffing strategy, financial projections, and final findings and recommendations. The full feasibility study can be found in Appendix B. The remainder of this section provides an overview of the results and implications of the study.

From a technical perspective, the WPI PEP was prototyped by our MQP team during the 2023-2024 academic year (AY) using Mendix, a low-code development platform for building web applications. WPI IT Services (ITS) will be consulted to sponsor the implementation of the platform following the completion of the prototype, as they are equipped to take on campus-wide projects of similar scales. A follow-up MQP during AY 2024-2025 or later may be necessary to further develop the platform using the previously determined requirements and prototype features.

The WPI PEP's target market consists of the WPI undergraduate and graduate study body. WPI's emphasis on project-based learning drives the demand for a centralized portal to facilitate data collection. Key competitors include alternative channels for survey distribution, including Discord, Reddit, and Slack. The WPI PEP will be able to compete with these channels because of its proximity to the WPI community, user-friendly posting procedure, and ability to coexist with these platforms. A full-fledged marketing plan for the portal was developed as part of a companion Professional Writing MQP, *Creating a Marketing Plan for the WPI Project Engagement Portal*. This project determined the best practices of marketing plans and culminated with the creation of a marketing plan for the WPI PEP.

The WPI PEP benefits the WPI student body by providing an easy and effective way to collect survey responses and engage with projects. Facilitating data collection will increase student satisfaction with WPI's project-based curriculum and thus enhance WPI's appeal to prospective community members. Risks associated with the project include the complexities of

getting it up and running on WPI’s servers, which depends on the assistance provided by ITS. Additionally, implementing the platform may be low on ITS’s list of priorities because the platform is a student project not associated with any department.

From our feasibility study, we concluded that the WPI PEP is feasible for both the WPI administration and the community. After drawing this conclusion, we moved on to developing system requirements.

4.3 System requirements

Our requirements consist of user, administrator, guest, functional, nonfunctional, and system requirements. The remainder of this section details the requirements in full.

4.3.1 User requirements

The user requirements describe what actions users should be able to complete on the WPI PEP. In this case, users are members of the WPI community (students or faculty members).

User requirements
Input, modify, and delete posts with survey information
Filter posts according to specified criteria
Search for posts using keywords
View posts and access surveys using an external link attached to posts

Table 1. User requirements for the WPI PEP.

4.3.2 Guest requirements

The guest requirements describe what actions guests should be able to complete on the WPI PEP. In this case, guests include anyone outside of the WPI community (those who are not WPI students or faculty members). Guests are unable to post their own surveys to the WPI PEP, but can view existing posts.

Guest requirements
Filter posts according to specified criteria
Search for posts using keywords
View posts and access surveys using an external link attached to posts

Table 2. Guest requirements for the WPI PEP.

4.3.3 Administrator requirements

The administrator requirements describe what actions an administrator should be able to complete on the WPI PEP. Administrators should have privileges that users and guests do not have, including modifying other users' posts.

Administrator requirements
Modify and delete other users' posts
Input, modify, and delete posts with survey information
Filter posts according to specified criteria
Search for posts using keywords
View posts and access surveys using an external link attached to posts

Table 3. Administrator requirements for the WPI PEP.

4.3.4 Functional requirements

The functional requirements describe what features the WPI PEP should have.

Functional requirements
Generate posts based on user inputs
Store, modify, and recall posts
Query posts based on filters or keywords

Table 4. Functional requirements for the WPI PEP.

4.3.5 Nonfunctional requirements

The nonfunctional requirements describe the operational constraints of the WPI PEP.

Nonfunctional requirements
Multi-user capability
Secure login system for users and administrators
Users who are not logged in can still view, search for, and filter posts
User-friendly design
Able to quickly load data
Incorporates WPI branding elements

Table 5. Nonfunctional requirements for the WPI PEP.

4.3.6 System requirements

The system requirements are specifications that the WPI PEP should meet in order to run smoothly and facilitate the user experience.

System requirements
Users should have a Chromium-based browser such as an up-to-date Microsoft Edge or Google Chrome application
User interfaces for mobile, tablet, and desktop
User should run Windows 10 64-bit version or above with at least 2 GB of disk space and 4 GB of RAM
User accessing the site should have at least 2 Mbps internet speed, especially when uploading high-resolution images with their submission

Table 6. System requirements for the WPI PEP.

4.4 Data flow diagram

The level 1 data flow diagram (DFD) contains five major functions: login, publish, edit current post, filter for posts, and search for posts (see Figure 3).

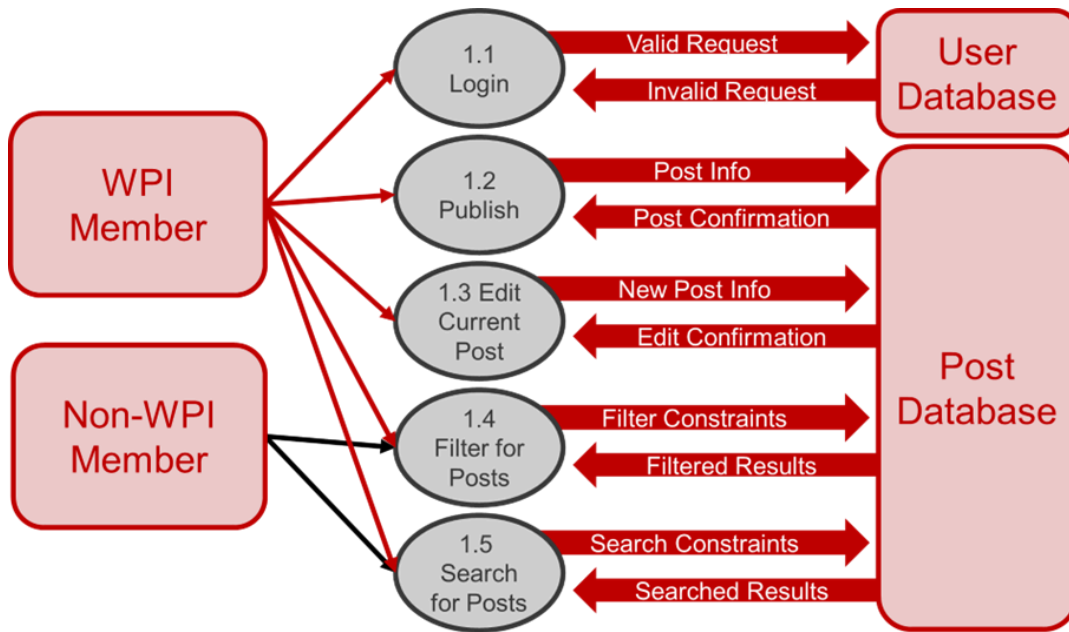


Figure 3. The level 1 data flow diagram for the WPI PEP.

WPI members are able to login to the portal, publish posts, edit existing posts that they have made, filter for posts, and search for posts. Non-WPI members are only able to filter and search for posts; they are not able to login or create any posts of their own.

4.5 Data model

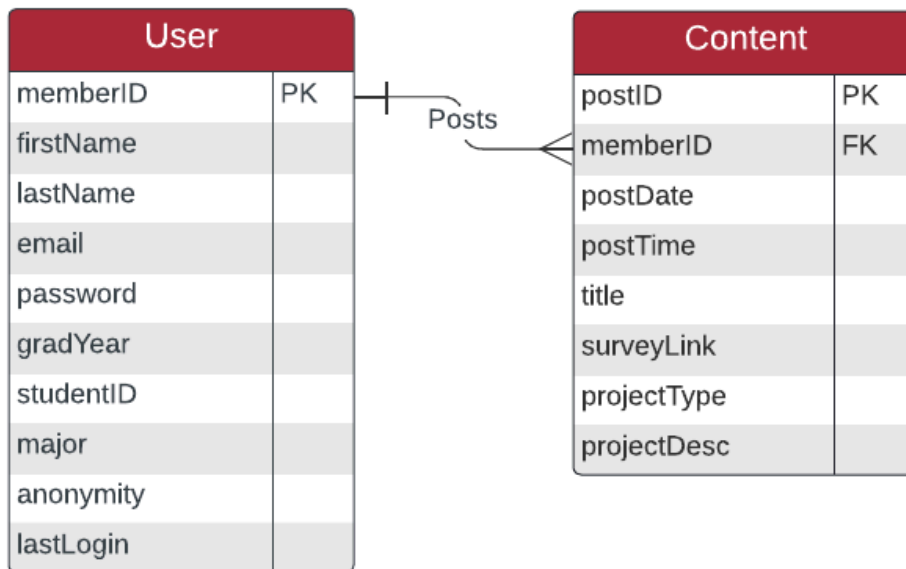


Figure 4. Entity relationship diagram for the WPI PEP.

The entity relationship diagram consists of two entities, Users and Content. This section provides an overview of each entity.

Users consist of a member ID, first and last name, email, password, graduation year, WPI student ID, major date of last login, and anonymity status. Users who enter as guests have the anonymous attribute set to true, which allows them to browse the pages as guests.

Content consists of all the attributes related to a post that a User creates: post ID, the member ID of the User who created the post, the date and time that the post was created, the title of the post, the link to the survey, the type of project it is (i.e., MQP, IQP, HUA, etc.), and the description of the survey or project written by the user.

5. System development

This section outlines the development of the prototype WPI Project Engagement Portal using the low-code application development software, Mendix.

5.1 System architecture

Mendix's system architecture comprises a web-based Modeler tool for visual application design. Backend services handle data storage, authentication, and integrations, abstracting away infrastructure concerns. Applications run in a managed runtime environment, with deployment options including the Mendix Cloud and on-premises servers, while integration services facilitate communication with external systems.

Mendix divides its components into two domain models. The system domain model (see Figure 5) includes all entities and attributes related to users, whereas the project domain model (see Figure 6) includes all entities and attributes related to the prototype itself, including post attributes.

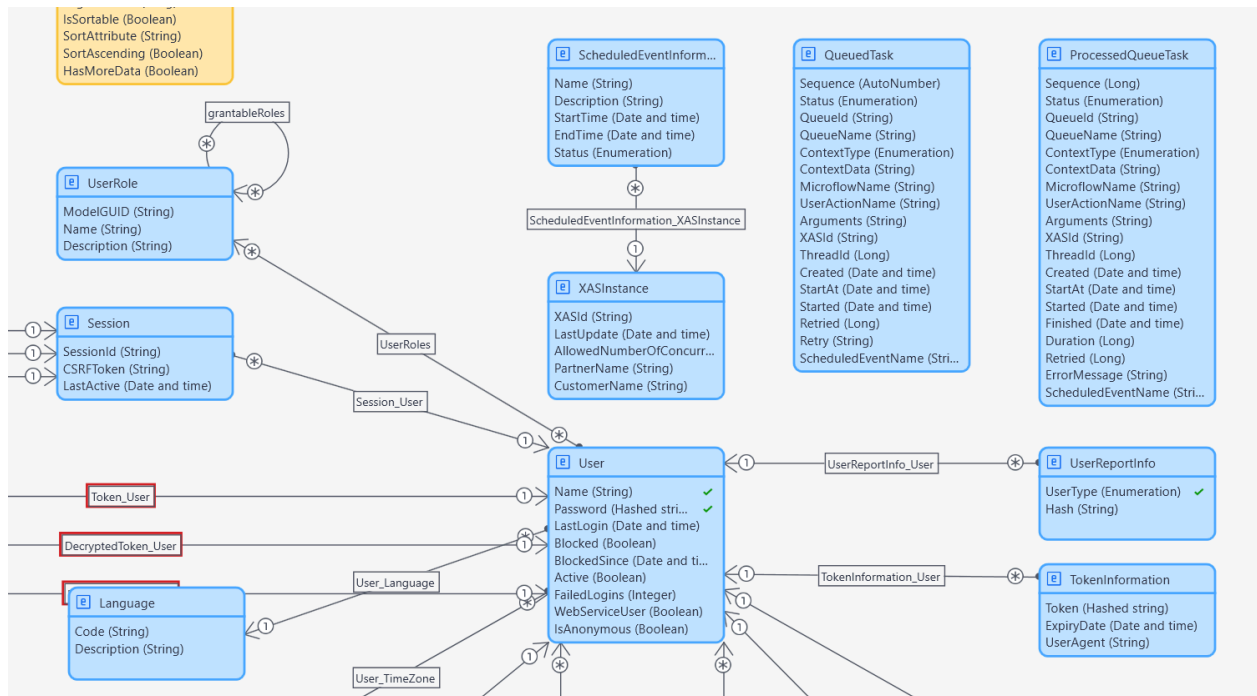


Figure 5. The prototype WPI PEP's system domain model within Mendix.

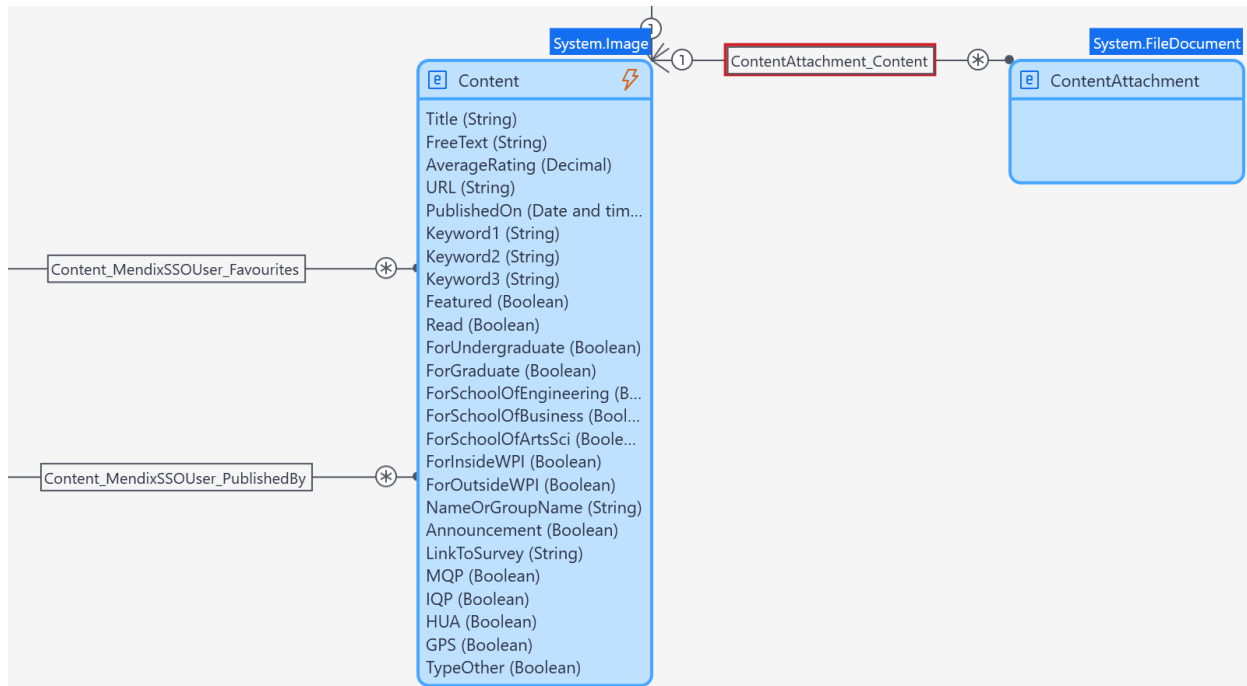


Figure 6. The prototype WPI PEP’s project domain model within Mendix.

5.2 Use scenarios

An administrator that enters the site with the administrator login is able to create, edit, read, and delete all posts that exist. The ability to post and read is allowed for users that login with a username and password. The ability to solely read posts is allowed for those that login as an anonymous guest. This may be an individual outside of WPI that chooses to participate in a student project.

5.3 Interface structure design

The portal’s interface includes the WPI logo in the top left corner, as well as WPI brand colors. This remains consistent among mobile, tablet, and computer devices. For ease of use, clickable words such as “Participate,” “Discover,” and “My Posts” exist at the top of the page as navigational tools for users. The WPI logo can also be clicked to return to the home page.

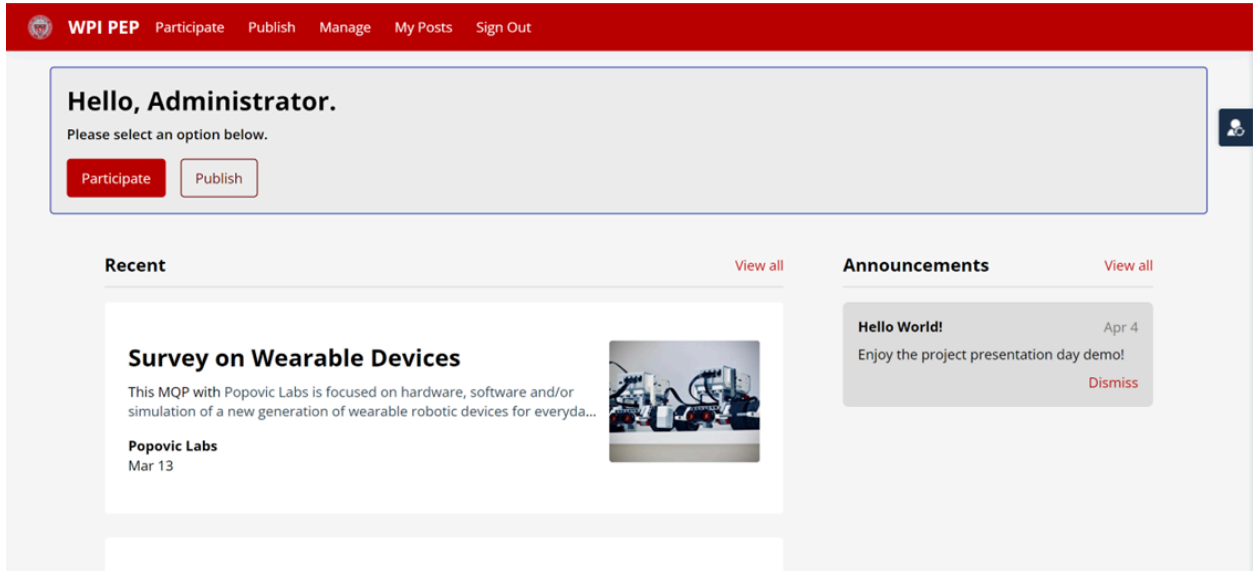


Figure 7. The WPI PEP home page.

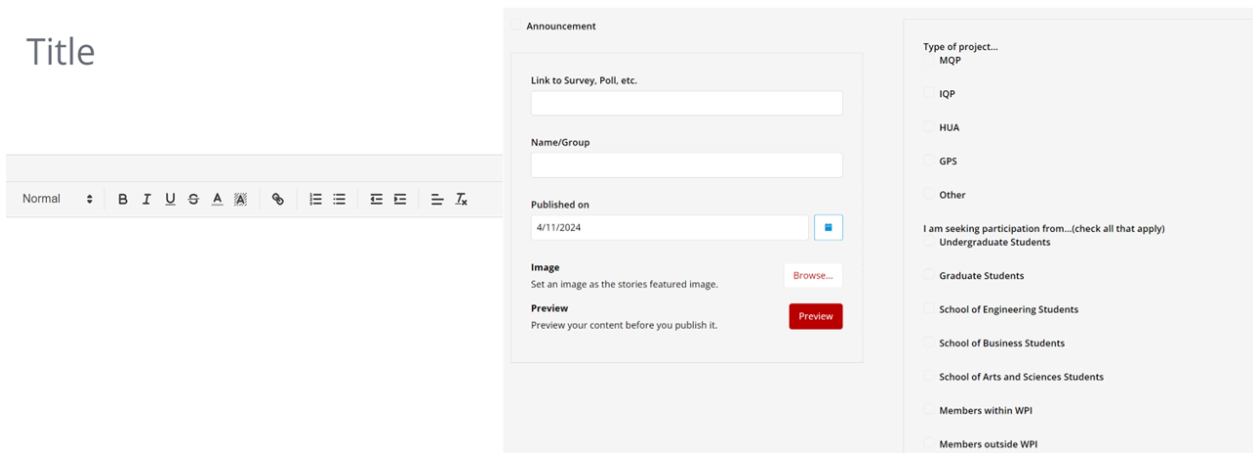


Figure 8. The WPI PEP “Publish” page where WPI users can create a post.

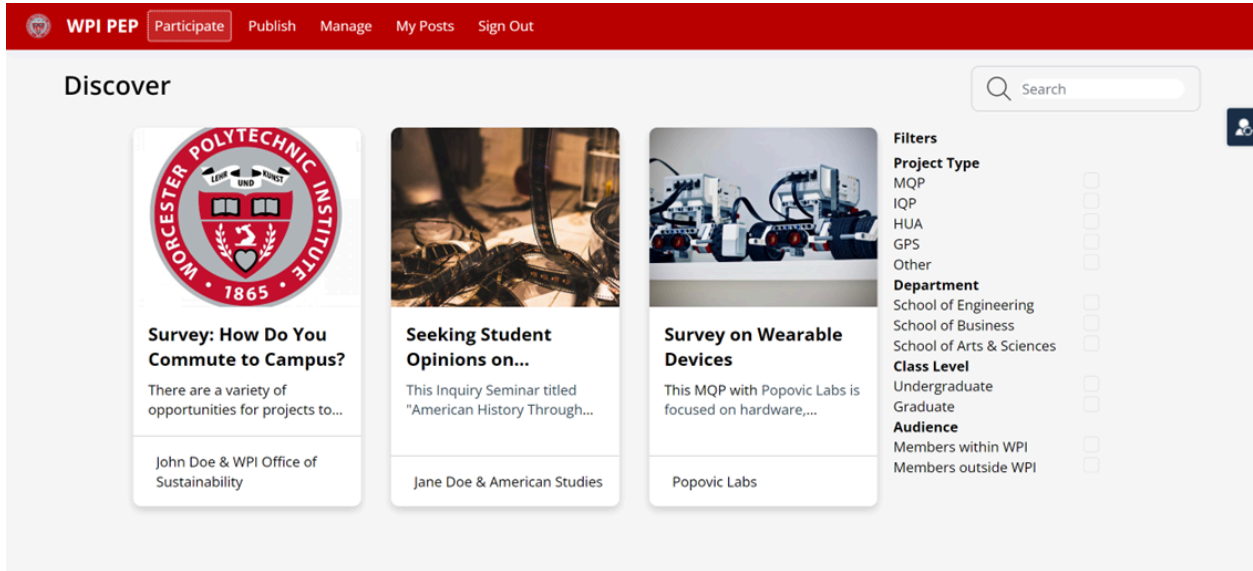


Figure 9. The WPI PEP “Discover” page with surveys that are in need of responses.

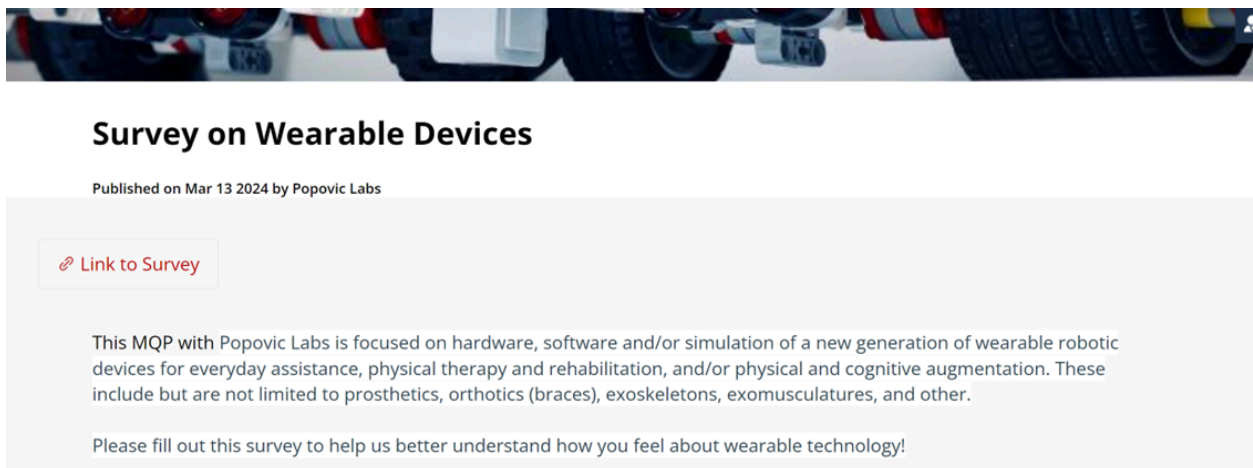


Figure 10. An example of a post on the WPI PEP.

5.4 Developing a prototype portal

The current prototype can be accessed locally through the host workstation as different users. Once the portal is deployed, users would be able to access the portal through a customized domain such as “pep.wpi.edu.”

5.4.1 Integration test cases

These most important functions a general user of our platform will do are create and read posts. System administrators are able to edit, moderate, and delete posts. Below is the testing completed for general actions of a user accessing our platform. A similar testing procedure was

followed for the other user types on the platform. For all tests conducted and test results, refer to Appendix C.

Use case	Test ID	Test procedure	Test result
Create	T.U.1	User able to create post, using the Publish button on both the Discover page or by clicking the Publish button on the top navigation bar	Pass
Read	T.U.2	User able to read others and own posts, clicking any published post on the Home page, the Discover page, or by using the My Posts button at the top of navigation bar	Pass
Edit	T.U.3	User able to edit own posts by clicking the Edit button under the My Posts tab	Pass
Delete	T.U.4	User able to delete own posts by clicking on the Remove button under the My Posts tab	Pass

Table 7. Integration test cases for the WPI PEP.

5.4.2 User manual

While an attempt was made to make the website interface be simple and straightforward, a user manual was created to help users and administrators navigate the prototype. All clickable buttons and text fields are identified and explained in order to help a user understand the features of the Project Engagement Platform. Refer to Appendix D for the user manual.

6. Final thoughts & future work

This report details the planning, analysis, and design phases of a project that will likely undergo several iterations before reaching its final state. To assist with future development, our team has evaluated and confirmed the feasibility of the WPI PEP, determined system requirements to ensure effective performance, developed a prototype portal with an intuitive user interface using Mendix, and created relevant documentation.

6.1 Next steps

This section outlines key considerations for future work on the WPI PEP.

6.1.1 Integration with existing WPI platforms

Integrating the WPI PEP with existing WPI platforms such as eProjects, Canvas, and the WPI Hub would help create a streamlined project experience. Our team especially recommends integrating the WPI PEP into eProjects, WPI's project lifecycle management system, to ensure all projects exist in a collaborative ecosystem where students' project data is accessible and complete. Proper analysis of existing system architecture and security protocols should be conducted to determine how best to integrate the WPI PEP into other WPI platforms.

6.1.2 Single sign-on login compatibility

Implementing single sign-on (SSO) login compatibility would improve the user experience, allowing students and faculty to access the WPI PEP using their WPI credentials. SSO enables users to sign in and authenticate once to access all WPI applications without needing to log in separately. Integrating SSO would also increase the security of the WPI PEP. This endeavor would require assistance from WPI IT Services (ITS) to configure SSO and provide guidance on any necessary system changes to accommodate the feature.

6.2 Final thoughts

WPI students often encounter challenges when collecting primary data, including being unable to reach the desired quantity or quality of data. These challenges demand a viable solution. Our team is confident that the WPI PEP will facilitate the survey distribution process for students, guaranteeing sufficient, high-quality primary data and aligning with WPI's project-based learning curriculum. Furthermore, we believe that the WPI PEP has the potential to draw in prospective students by enhancing the student project experience.

Our team hopes that future development on the WPI PEP will eventually bring the portal to a deployable state. We believe that the WPI PEP will benefit the entire WPI community by enabling seamless project engagement.

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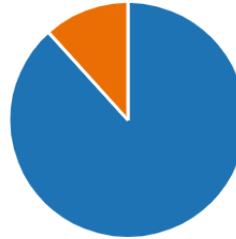
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Appendices

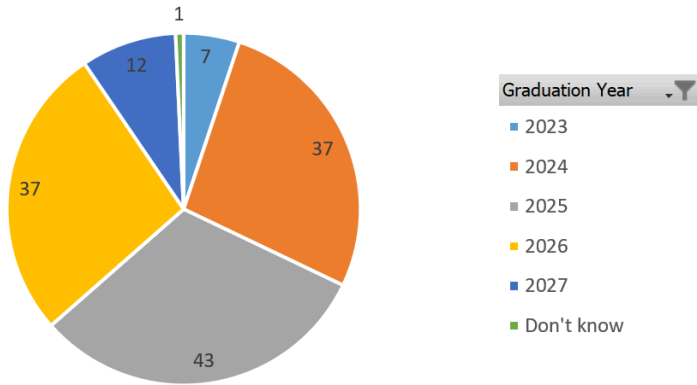
Appendix A: Survey questions and results

1. Class Level

● Undergraduate Student	121
● Graduate Student	16

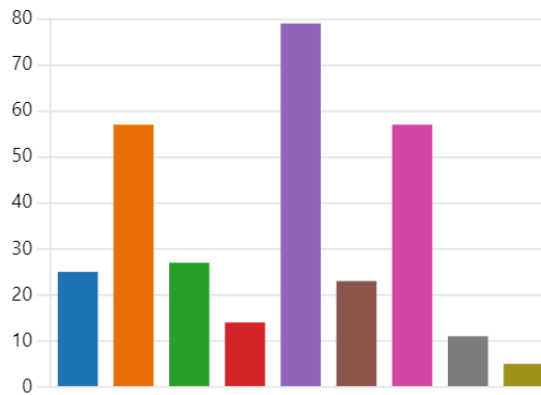


2. Graduation Year



3. Which of these campus identities do you identify most with? (multi-select)

● I am a student athlete	25
● I have an on-campus job	57
● I have an off-campus job	27
● I am a member of the school's b...	14
● I am a member in a few clubs o...	79
● I am a member in many clubs o...	23
● I am an officer of a club or stud...	57
● I don't identify as any of these	11
● Other	5



4. In an average academic year at WPI, how many times do you conduct a peer survey? Enter a number.

Surveys conducted per year	Count of ID
0	47
0.2	1
0.5	1
0-1	2
1	23
10	4
12	2
1-2	4
1-2 maybe	1
15	1
2	14
20	1
3	11
3-4	1
4	5
5	9
6	4
8	4
N/A	1
Twice	1
Grand Total	137

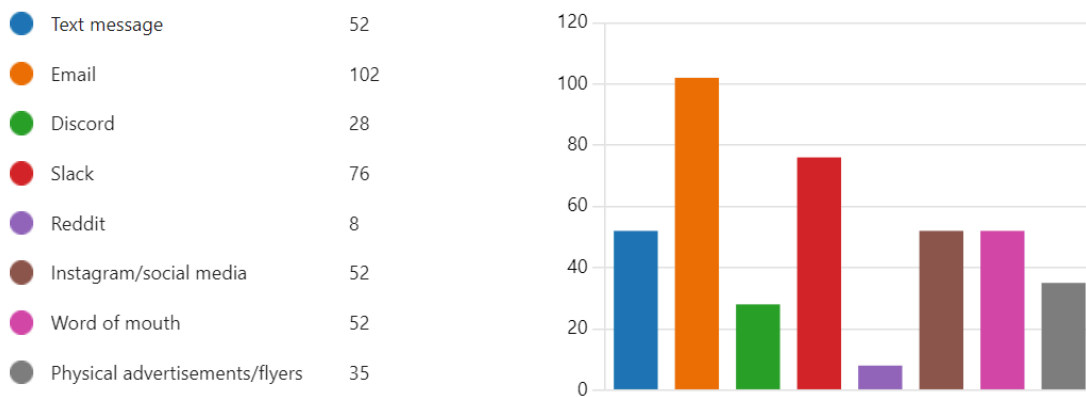
5. In an average academic year at WPI, how many are you *asked to complete* a peer survey? Enter a number.

Surveys conducted per year	Count of ID
~4	1
0	7
1	3
10	18
100	1
10-15	1
12	1
1-2	1
14	1
15	6
16	1
2	5
20	11
20?	1
2-3	1
25	2
3	9
3?	1
30	2
3-8	1
4	5
40	1
4-5	1
5	19
50	2
5-10	1
5-8	1
6	14
7	8
8	8
Four	1
maybe 30? how am i supposed to know this	1
Not often, this is the first	1
Grand Total	137

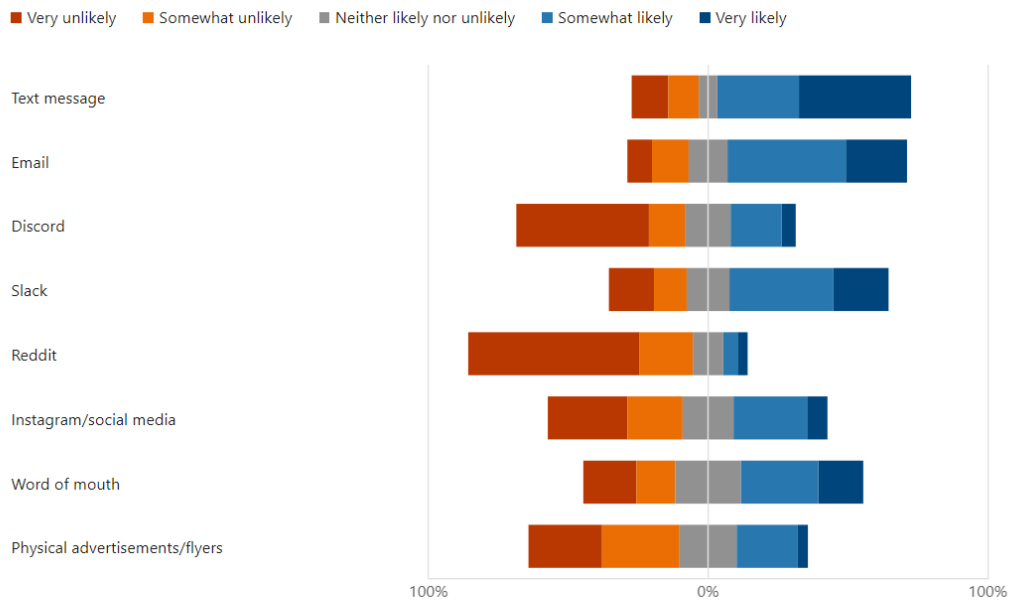
6. In the past, have your class-related surveys targeted WPI students, non-WPI students, or both?



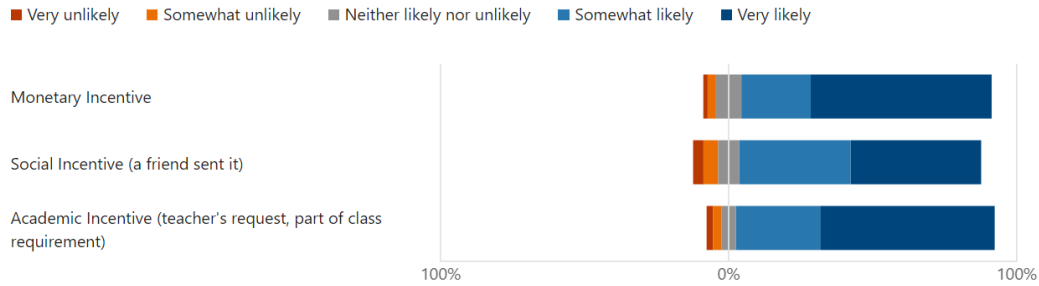
7. What communication channels do you typically use to share your class-related surveys with peers? (multi-select)



8. If a peer used the following to ask you to complete a survey for a class of theirs, how likely would you be to complete it?



9. If the following incentive was offered to you if you were to complete a survey, how likely would you be to complete it?



10. Did this survey raise any comments, questions, or concerns you'd like us to be aware of? (optional response)

Anonymous 1	No one likes the surveys. Its weird that we have to advertise on our own social medias for class.
Anonymous 2	WPI students are constantly bombarded with emails about events, university newsletters, and surveys. This results in information being scattered and lost.
Anonymous 3	Monetary incentive seems very expensive
Anonymous 4	it would be helpful to clarify peer survey
Anonymous 5	You probably should have provided the definition of what a peer survey is.
Anonymous 6	I don't track the number of average surveys. I'm sure there are some that show up in class, most through email. But even given that, while email is the most likely way to engage me, survey requests are generally ignored: I'm a remote student, and don't feel particularly closely tied to the campus. It's time I don't usually have, and my data would probably just dilute what you get.
Anonymous 7	I just started in my Master's program, so maybe I haven't been exposed to enough surveys yet. Also, I would have left questions 6 & 7 blank, but it wouldn't let me select no answer, so I picked an arbitrary answer.

Appendix B: Feasibility study

Executive summary

The WPI Project Engagement Platform (WPI PEP) is a user-friendly survey aggregator portal designed to improve how Worcester Polytechnic Institute (WPI) students collect primary data for their projects and classes. The WPI PEP aims to make academic work easier by offering a practical solution for one of the many challenges associated with project-based learning: gathering a sufficient number of high-quality survey responses. Undergraduate and graduate WPI students will be able to post a link to their survey/poll and respond to surveys posted by other community members. The WPI PEP will be prototyped by an MQP team of Management Information Systems students using Mendix during the academic year of 2023-2024. WPI IT Services will be consulted to sponsor the implementation of the platform, as they are equipped to take on campus-wide projects of similar scales. The WPI PEP's target market consists of the WPI study body, as WPI students require a centralized portal to facilitate primary data collection. Many classes and required projects such as the Interactive Qualifying Project and Major Qualifying Project require students to collect data through surveys or polls. The WPI PEP will be able to compete with alternative survey distribution channels such as Discord or Reddit because of its proximity to the WPI community,, user-friendly posting procedure, and ability to coexist with these platforms because many students already utilize multiple channels to distribute their surveys. Overall, the WPI PEP presents an accessible and easy-to-use solution for distributing and engaging with student surveys.

Description of product/service

The WPI PEP is a centralized data collection portal that intends to facilitate the data collection process for WPI projects and classes. Undergraduate and graduate students will be able to post a link to their survey/poll and respond to surveys posted by other community members. The WPI PEP satisfies the need for a centralized survey-based portal for students. WPI's project-based curriculum often requires students to conduct primary research as part of their Interactive Qualifying Project (IQP), Major Qualifying Project (MQP), humanities seminar or practicum, or other classes. Many students struggle to efficiently distribute their surveys and often resort to channels that introduce biases and disrupt non-academic spaces, such as existing club-affiliated or social group chats. Students will be drawn to the WPI PEP as it presents an easy method to reach the WPI student body, saving time and resources.

Technical considerations

The WPI PEP will be prototyped by an MQP team of Management Information Systems students during the academic year of 2023-2024. The prototype WPI PEP will be built using Mendix, a low-code development platform for building web applications. WPI IT Services (ITS) will be consulted to sponsor the implementation of the platform once all of the requirements and final features are determined, as they are equipped to take on campus-wide projects of similar scales.

Product/service marketplace

WPEP’s target market consists of the WPI study body. This includes both undergraduate and graduate students, as WPI’s project-based curriculum extends to all students. WPI’s focus on project-based learning drives the demand for a centralized portal to facilitate data collection, a necessity for many classes and required projects such as the IQP and MQP. Key competitors include alternative channels for survey distribution, including Discord, Reddit, and Slack. WPI PEP will be able to compete with these channels because of its proximity to the WPI community, user-friendly posting procedure, and ability to coexist with these platforms because many students already utilize multiple channels to distribute their surveys.

Marketing strategy

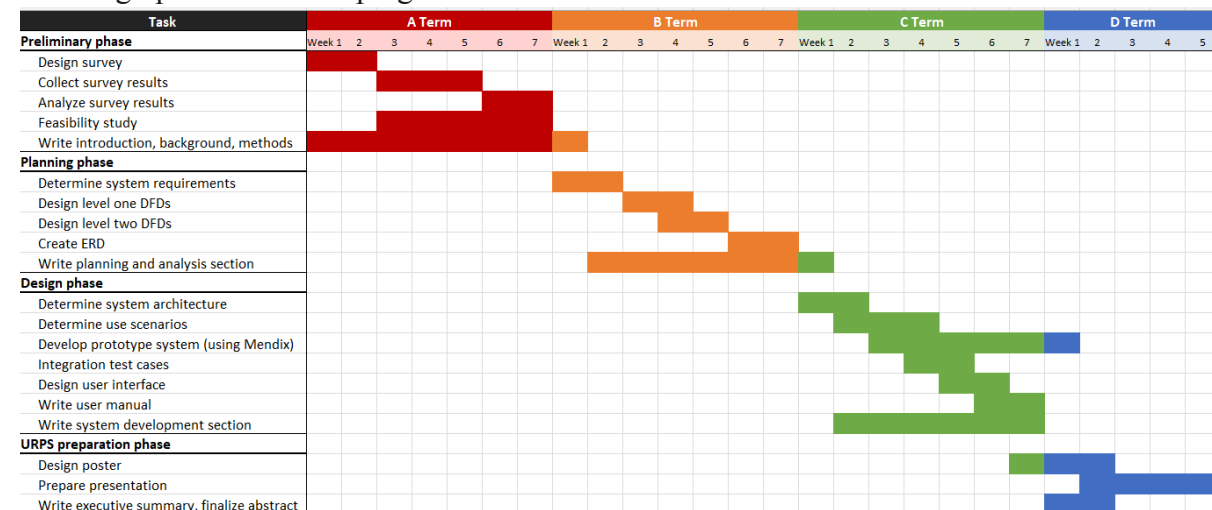
The marketing strategy for the platform will be developed as part of a companion MQP entitled *Creating a Marketing Plan for the WPI Project Engagement Platform* following a study of existing marketing research/plans and a survey to determine how to best engage with the student body. Marketing tactics include physical posters and digital signage around campus, social media posts, an email newsletter that highlights surveys in need of respondents, and raffles/tangible incentives for using the platform.

Organization/staffing

The WPI PEP will be prototyped by an MQP team of Management Information Systems students during the academic year of 2023-2024. A follow-up MQP during AY 2024-2025 or later may be necessary to further develop the platform using the previously determined requirements and prototype features. No additional hiring or restructuring is to be expected.

Schedule

Our MQP team created the following Gantt chart to guide the preliminary research, planning, and design phase of developing the WPI PEP:



Financial projections

The WPI PEP benefits the WPI student body by providing an easy and effective way to collect survey responses and engage with projects. Facilitating data collection will increase student satisfaction with WPI's project-based curriculum and thus enhance WPI's appeal to prospective community members. Risks associated with the project include the complexities of getting it up and running on WPI's servers, which depends on the assistance provided by ITS. Additionally, implementing the platform may be low on ITS's list of priorities because the portal is a student project not associated with any department. Another risk includes convincing students to respond to surveys on the platform without any incentives. This problem will be addressed in a companion Professional Writing MQP that seeks to offer solutions through an integrated marketing plan for the WPI PEP. For server and application deployment costs, Mendix's standard pricing begins at \$998/month.

Findings and recommendations

Our findings support the development and eventual implementation of the WPI PEP, beginning with prototyping by an MQP team of Management Information Systems students during the academic year of 2023-2024.

Appendix C: User testing

Test ID	Type of user	Use case	Results
T.A.1	Admin	Create post	Pass
T.A.2	Admin	Edit any post	Pass
T.A.3	Admin	Delete any post	Pass
T.A.4	Admin	Read post	Pass
T.A.5	Admin	Filter and search posts	Pass
T.U.1	User (Internal WPI)	Create post	Pass
T.U.2	User (Internal WPI)	Read post	Pass
T.U.3	User (Internal WPI)	Filter and search posts	Pass
T.G.1	Guest (External)	Read post	Pass
T.G.2	Guest (External)	Filter and search posts	Pass

Appendix D: User manual

Home Page:

The Home Page features a red navigation bar at the top with the following items: WPI PEP, Participate, Publish, Manage, My Posts, and Sign Out. A callout box points to this bar, stating: "Navigation bar ('manage' only viewable to admins)".

Below the navigation bar is a grey box with the text "Hello, Administrator." and "Please select an option below." It contains two buttons: "Participate" and "Publish". A callout box points to the "Participate" button, stating: "All recent posts (clicking on a post will bring you to a 'read' page)".

Below this box are two sections: "Recent" and "Announcements". The "Recent" section shows a post titled "Survey on Wearable Devices" by Popovic Labs, dated Mar 13. The "Announcements" section shows a message: "Hello World! Enjoy the project presentation day demo!" dated Apr 4, with a "Dismiss" button. A callout box points to the "Announcements" section, stating: "Announcement feed (messages posted by admins)".

Participate Page:

The Participate Page features a red navigation bar with the following items: WPI PEP, Participate, Publish, Manage, My Posts, and Sign Out. A callout box points to the "Participate" button, stating: "All posts (clicking on a post will bring you to a 'read' page)".

Below the navigation bar is a "Discover" section. It contains a search bar with the text "Search" and a magnifying glass icon. A callout box points to this search bar, stating: "Search tool to search through all [posts](#)".

Below the search bar are three post cards:

- Survey: How Do You Commute to Campus?** by John Doe & WPI Office of Sustainability
- Seeking Student Opinions on...** by Jane Doe & American Studies
- Survey on Wearable Devices** by Popovic Labs

To the right of the post cards is a "Filters" section with the following categories and options:

- Project Type:** MQP, IQP, HUA, GPS, Other
- Department:** School of Engineering, School of Business, School of Arts & Sciences
- Class Level:** Undergraduate, Graduate
- Audience:** Members within WPI, Members outside WPI

A callout box points to the filter options, stating: "Filter tool to filter through all posts based on checked [criteria](#)".

Publish Page:

The screenshot shows a web form for publishing an announcement. It is divided into two main sections: a text editor on the left and a form on the right. The text editor has a title field and a rich text area with a toolbar. The form on the right includes an 'Announcement' section with a 'Link to Survey, Poll, etc.' field, a 'Name/Group' field, and a 'Published on' date field. Below this is an 'Image' section with a 'Browse...' button and a 'Preview' button. To the right of the form is a 'Project details' section with a 'Type of project...' dropdown menu and a list of checkboxes for 'I am seeking participation from...'. Callouts with arrows point to various elements: 'Title of project' points to the title field; 'Admin Only: Checking "announcement" makes post appear on announcement feed' points to the 'Announcement' section; 'Description of project' points to the rich text area; 'Project details' points to the dropdown menu; and 'Project details for filter to use' points to the list of checkboxes.

Title of project

Admin Only: Checking "announcement" makes post appear on announcement feed

Title

Description of project

Project details

Project details for filter to use

Announcement

Link to Survey, Poll, etc.

Name/Group

Published on

4/11/2024

Image

Set an image as the stories featured image.

Browse...

Preview

Preview your content before you publish it.

Type of project...

MQP

IQP

HJIA

GPS

Other

I am seeking participation from...(check all that apply)

Undergraduate Students

Graduate Students

School of Engineering Students

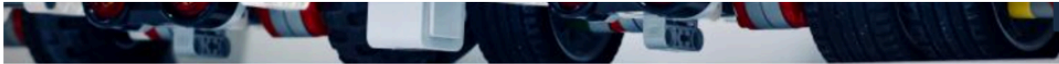
School of Business Students

School of Arts and Sciences Students

Members within WPI

Members outside WPI

Read Page:



Survey on Wearable Devices

Published on Mar 13 2024 by Popovic Labs

[Link to Survey](#)

Clickable button that brings user to external site such as Qualtrics or Microsoft Forms

This MQP with Popovic Labs is focused on hardware, software and/or simulation of a new generation of wearable robotic devices for everyday assistance, physical therapy and rehabilitation, and/or physical and cognitive augmentation. These include but are not limited to prosthetics, orthotics (braces), exoskeletons, exomusculatures, and other.

Please fill out this survey to help us better understand how you feel about wearable technology!



WPI

Creating a Marketing Plan for the WPI Project Engagement Portal

A Major Qualifying Project submitted to the faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for
the degree of Bachelor of Science

Submitted by:

Caroline McLaughlin

Management Information Systems & Professional Writing

Submitted on:

April 24, 2024

Approved by:

Professor Kevin Lewis

Professional Writing

This report represents the work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review.

Abstract

This project accompanied the development of a prototype WPI Project Engagement Portal (PEP), a portal dedicated to sharing surveys for WPI projects and courses, by determining best practices for marketing plans. The project culminated with the creation of a marketing plan tailored for the WPI PEP. Marketing plan best practices were informed by a literature review of marketing plan research and an analysis of sample marketing plans. Specific strategies for the WPI PEP marketing plan were derived from a survey of WPI students that identified effective communication channels and engagement incentives.

Acknowledgements

I would like to thank Professor Lewis for his guidance and support throughout this project. I would also like to thank Professor Hall-Phillips for providing vital background knowledge on marketing plans in BUS 4030: Achieving Strategic Effectiveness, which greatly contributed to this project's development and completion.

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1. Introduction

It is one challenge to create a product, but another challenge to convince people to use it. Marketers address this challenge by identifying promotional strategies that will reach and resonate with their intended audience. These strategies, along with relevant supporting context, are typically organized into a formal business document known as a marketing plan. At their core, marketing plans attempt to outline an organization's transition from innovation to product adoption in a clear, succinct, actionable manner (Chernev, 2020). The benefits of marketing plans include a consistent and research-based marketing approach that the project leaders can follow and adapt depending on the product's performance. Additionally, a cohesive plan helps to align business, information technology, and marketing functions toward a common set of objectives (Al-Surmi et al., 2020).

The Worcester Polytechnic Institute Project Engagement Portal (WPI PEP) exemplifies the need for a marketing plan. The portal offers a streamlined approach for WPI students to engage with Interactive Qualifying Projects, Major Qualifying Projects, and other class-related projects at undergraduate and graduate levels. Students will be able to post their surveys on the WPI PEP and respond to others' surveys. Without an active user base, the portal would be impracticable and unviable. A marketing plan for the WPI PEP would serve as a roadmap for persuading the student body to post their surveys on the portal and respond to surveys from their peers.

This report explains my efforts to understand marketing plans and create one for the WPI PEP as one half of an interdisciplinary Management Information Systems (MIS) and Professional Writing (PW) MQP. The MIS portion of the project focuses on developing a prototype of the portal and is detailed in a separate report titled "Creating a Project Engagement Portal for WPI Students." My attempt to craft a corresponding marketing plan comprises the PW aspect of the project and addresses the practical application and communication methods of marketing plans. This document establishes marketing plan best practices through a literature review of marketing plan research and an analysis of existing marketing plans. I apply these best practices to create a marketing plan for the WPI PEP, considering the preferences and behaviors of the portal's target consumers. The marketing plan I create will be used as an example of best practices; the full plan can be found in Appendix B. The remainder of this document identifies and communicates marketing plan best practices and determines how a marketing plan can garner a strong userbase for the WPI PEP through the following sections:

- Literature review of existing marketing planning research
- Methods to guide the development process of a marketing plan for the WPI PEP, including the literature review of marketing plan research, an analysis of sample marketing plans, and a survey of WPI students
- Results of the literature review, marketing plan analysis, and survey
- Conclusions and recommendations for marketing plan best practices

2. Background

This section consists of a literature review of marketing plan research and discusses the business need for marketing plans, marketing plan components, modern trends, and rhetorical strategies. The literature review culminates in highlighting a gap in research about marketing plans for cost-free offerings, such as the WPI Project Engagement Portal.

2.1 Business need for marketing plans

Marketing management gained prominence in the mid-twentieth century with the emergence of strategic planning as an essential managerial practice (Webster, 2005). The structured development and documentation of marketing plans was popularized throughout the latter half of the twentieth century, especially after the publication of Philip Kotler's *Marketing Management* in 1967. The book promoted the use of formal marketing plans and emphasized their role as a central guiding document (Kotler & Keller, 2016). Kotler primarily attributes the necessity of marketing plans to the document's concise outline of strategic objectives and ability to align multiple business functions toward common goals.

From a business perspective, marketing plans are necessary for many reasons. Marketing plans provide an organized approach to product promotion, including clear priorities and a system of procedures (McDonald & Keegan, 2002). This organizational approach enhances the specificity of the business's marketing goals and objectives. Marketing plans facilitate coordination between multiple business functions and contribute to triadic alignment between marketing, business, and information technology strategies (Al-Surmi et al., 2020). The documents provide consistent information about the course of action to every party involved. Marketing plans also convince the audience of the plan's viability, which is crucial for garnering credibility and stakeholder support (Chernev, 2020). Marketing plans further demonstrate viability by using quantitative metrics to support the selection of its strategies and to measure the success of its outcomes (Wood, 2017). Businesses need marketing plans as a strategic framework to organize, support, and evaluate their marketing strategy.

To best serve their organization, marketing plan writers consider the relevant target audiences: employees, stakeholders, and senior management (Chernev, 2020). Employees include those who are involved in the marketing process and those who are not, as the marketing plan should clearly convey its goals to the entire organization. Stakeholders are entities with a financial stake in the organization and thus require justification for continued support. Their positions may allow them to influence the final target audience, senior management. Members of senior management typically have the final say over whether the marketing plan can be put into action.

Marketing plans are strategic in nature, or a collection of choices made to contribute to an overall goal (Whitler, 2021). Strategic marketing plans minimize the quantity of marketing strategies, feature complementary strategies, and ensure the strategies are compatible with plans

made by other business functions. These strategies should fall into a hierarchy of prioritization to make sure efforts and resources are divided accordingly (McDonald & Keegan, 2002). Additionally, a marketing plan should allow continuous flexibility. An overly rigid plan that leaves no room for adaptation will hinder an organization's competitive advantage in dynamic environments (Slotegraaf & Dickson, 2004).

2.2 Marketing plan components

Several guides to writing marketing plans reveal a standard framework that most guides adhere to, to varying degrees. The standard framework for marketing plans includes seven components from executive summary to implementation controls.

2.2.1 Executive summary

Marketing plans begin with an executive summary, which outlines the plan's goals and central ideas (Wood, 2017). The executive summary also provides context for the product or service in question, such as its basic characteristics and target market. This section is typically a brief and broad overview that is only one to two pages long (Chernev, 2020).

2.2.2 Situation analysis

A situation analysis consists of an overview of the current state of the organization and the market. This section covers the organization's competencies, resources, offerings, and market position as compared to the rest of the competitive environment (Chernev, 2020). Situation analyses also address the competitive market's current size, growth potential, relevant trends, and issues (Kotler & Keller, 2016). A PESTEL analysis, which assesses the political, economic, social, technological, legal, and environmental factors of the external environment, may be used to provide relevant context (Wood, 2017). The situation analysis facilitates a SWOT analysis, which examines the strengths, weaknesses, opportunities, and threats that may influence the organization's marketing performance (Kotler & Keller, 2016).

2.2.3 Goals and objectives

Goals are typically considered broad, qualitative desired outcomes or achievements, while objectives are specific, measurable benchmarks that contribute to goals. In marketing plans, goals are based on the organization's high-level aspirations (Wood, 2017). Objectives highlight the performance metrics the company wants to achieve and how they will be quantitatively evaluated (Kotler & Keller, 2016). The SMART framework guides the development of understandable, obtainable goals and objectives with five qualities: specific, measurable, attainable, relevant, and time-bound (Doran, 1981).

2.2.4 Marketing strategy

The marketing strategy encompasses a high-level marketing approach that aims to deliver value to customers and meet the designated goals and objectives (Wood, 2017). This includes an analysis of the target consumer's behaviors, preferences, values, and needs along with the organization's resources to align with these traits (Chernev, 2020). Marketing strategies aim to

determine how to appeal to the target market through product positioning and market segmentation.

2.2.5 Marketing tactics

Marketing plans consider the results of the situation analysis, goals, objectives, and marketing strategy to propose a series of marketing tactics (McDonald & Keegan, 2002). Tactics are specific promotional initiatives that align with the marketing strategy (Kotler & Keller, 2016). Marketing tactics usually address each area of the marketing mix: product, price, place (or distribution), and promotion.

2.2.6 Financial projections

The financial projections demonstrate the economic implications of the marketing process. Projections include the following evaluations:

- Sales forecast: The estimated number of sales
- Expense forecast: The expected marketing costs
- Break-even analysis: The amount of time or the number of units sold that will allow the organization to offset its expenses (Kotler & Keller, 2016).

This data is presented in the form of a chart for easy comprehension. Financial projections aim to demonstrate that the marketing plan is economically reasonable and will provide a return on investment.

2.2.7 Implementation controls

The implementation controls establish how progress will be managed and monitored to ensure the marketing plan meets its goals and objectives. This includes designating responsibilities to specific people or groups, providing a timeline or schedule, and identifying metrics for measuring progress (Wood, 2017). The project's monthly or quarterly budget is also provided to ensure the project is financially on target (Kotler & Keller, 2016). The implementation controls section provides contingency plans in case of unexpected events or if something goes wrong.

2.3 Modern trends

As marketing plans advanced, trends from the general corporate environment affected the development and content of plans. These modern trends include digitalization, globalization, sustainability, and agile practices. The following subsections provide a contextual overview of each trend and their functional applications through the lens of marketing planning.

2.3.1 Digitalization

Digitalization is the progressed form of digitization. Although the two words sound very similar, they are differentiated by their scope and influence. Digitization is the straightforward conversion of physical or analog information into digital form, while digitalization is the innovative use of technology and digital information to create business value (Gobble, 2018).

Two primary channels for digitalization that emerged in the twenty-first century are social media and artificial intelligence (AI).

Following the precedent of early email and bulletin board systems, modern social media networks emerged after the Internet became available to the public in 1991 (Edosomwan et al., 2011). Marketers first utilized social media as an inexpensive yet far-reaching promotional channel. Given that social media allows two-way communication between brands and consumers, businesses quickly began to use social media to build customer relationships and gain insights into consumer behaviors (Ibrahim & Aljarah, 2021). Besides incorporating social media promotional campaigns as a marketing strategy, marketers utilize social media when researching and developing marketing plans. Social media platforms provide a space for marketers to research their target audience, as social media users frequently express their personalities, interests, and ideas in online environments (Ziyadin et al., 2019). Insights from target audience research can be applied to the plan's marketing strategy and help determine how the organization can appeal to existing or potential consumers.

Aside from social media, AI plays a role as a prominent catalyst for digitalization in marketing planning. Recent technical advancements, such as generative AI and transformer models, have made AI a popular tool across multiple fields. Marketers have capitalized on AI to process and analyze copious amounts of data, detect and predict trends, and enhance the consumer experience through automation and customization (Haleem et al., 2022). AI programs can help create marketing plans through tasks such as developing a situation analysis, analyzing competitors' strategies, and even setting marketing goals in a cost and time-efficient manner (Elsayed Fayed, 2021). The progression of AI will continue to shape the future of marketing planning, strategy, and decision-making.

2.3.2 Globalization

Globalization is a complex phenomenon that involves the interconnection of global economies, information, and technologies (Durand, 2018). Attributing globalization to a single catalyst or linear series of events would diminish its multifaceted origin and evolution. However, some key events that contributed to global interconnectedness include colonization and the Industrial Revolution (Eriksen, 2020). For businesses, the rise of the Internet, cultural exchange, multinational corporations, and international supply chains have all facilitated globalization by making it easier than ever to communicate and operate on a worldwide scale.

In terms of marketing, global business expansion has necessitated international marketing strategies due to significant differences between foreign and domestic markets (Nguyen et al., 2019). An international marketing strategy considers cultural differences in the countries it will market to and outlines how to adapt strategies appropriately (Green & Keegan, 2020). Developing an international marketing strategy offers organizations many advantages, such as diversifying revenue streams, strengthening competitive advantage, and mitigating risk. Additionally, globalization has caused marketing trends and consumer behavior to accelerate

across international markets (Gomes et al., 2020). Marketing planners must account for these changes in their plans and anticipate how to adapt accordingly.

2.3.3 Sustainability

Henion & Kinnear brought attention to the intersection between environmental consciousness and marketing with the publication of *Ecological Marketing* in 1975. This concept evolved throughout the rest of the twentieth century, especially in the wake of man-made environmental disasters such as the 1986 Chernobyl accident (Katrandjiev, 2016). Marketers began to center long-term environmental strategies and corporate social responsibility alongside eco-friendly product features. Today, the idea of sustainable marketing reflects both the ecological and social impact of businesses. Although there are not definitive criteria for what makes a business practice sustainable, customers and businesses typically perceive initiatives like bio-degradable packaging, carbon neutrality, and environmental philanthropy as examples of sustainability (Jacobs & Finley, 2019).

Marketers discovered that incorporating sustainable practices into a marketing plan's strategy appeals to environmentally conscious consumers, a growing subset of individuals who are willing to pay more for eco-friendly products (*Global Sustainability Report*, 2015). However, some consumers may be wary of price markups that lack sufficient justification (Reimers & Hoffmann, 2019). "Greenwashing" has become a popular term to criticize businesses for deceptive or untrue sustainable marketing tactics (Lane, 2012). To justify their products' price points and avoid greenwashing accusations, marketing planners must develop strategies and tactics that provide detailed, accessible information about their sustainable practices and pricing strategies (Reimers & Hoffmann, 2019).

2.3.4 Agile practices

Agility refers to an organization's ability to quickly make decisions, adapt to changes, and operate efficiently (Theobald et al., 2020). Although agile techniques such as concurrent engineering and prototyping have existed since the mid-twentieth century, the modern concept of agility was popularized in 2001 with the publication of the *Manifesto for Software Development* by the Agile Software Development Alliance (Whiteley et al., 2021). Originally conceptualized as an approach to software development, the manifesto attempts to streamline and simplify processes by prioritizing adaptability, collaboration, and fast progress (Beck et al., 2001). In subsequent years, business professionals realized that agile methods can be applied across many non-technical fields, including marketing.

Applying agile strategies to marketing planning means two things: the plan itself should be agile and the planning process should be agile. An agile marketing plan leaves room for adaptation in case of unforeseen events and develops contingency plans to address potential emergencies or shortcomings (Slotegraaf & Dickson, 2004). Adaptation based in agility allows marketing planners to quickly make decisions based on market changes, so the creators of agile marketing plans must operate agilely themselves (Kalaignanam et al., 2020). Marketing planners

can adopt an agile mindset by closely collaborating with consumers and implementing their feedback, working at a moderate pace to foster innovation and creativity among team members, and embracing flexibility.

2.4 Rhetorical strategies

Besides serving as a roadmap and description of the marketing process, marketing plans are a tool for persuasion. The documents themselves are not meant to persuade potential consumers to purchase the product in question but persuade the document's internal target audiences of the plan's viability. The strategic inclusion of classical rhetorical appeals intends to reinforce the marketing plan's credibility and logical foundation while fostering an emotional connection with the audience.

There is little existing research about how specific rhetorical strategies can enhance marketing plans. A few sources indirectly reference how marketing plans utilize classical appeals to ethos, pathos, and logos. Kotler & Keller describe how a marketing plan's credibility, or ethos, depends on whether the audience perceives the plan and its author(s) as knowledgeable and trustworthy (2016). Wood provides strategies to resonate with the readers' sense of pathos, such as emphasizing how the plan connects to company values, utilizing an amicable tone, and highlighting instances of social impact (2017). Bly mentions the importance of constructing logical, data-driven arguments to appeal to the audience's sense of logos (2010). Despite alluding to rhetorical strategies, the authors neither explicitly label them nor discuss their rhetorical purpose or effective implementation strategies.

Marketing plans utilize rhetorical strategies despite the absence of specific categorization or detailed explanations. Nonetheless, defining and describing rhetorical strategies and best practices offers many benefits to marketing plan writers. For example, marketing planners with a strong understanding of rhetorical techniques may demonstrate enhanced persuasiveness, credibility, and ability to connect with the audience. Due to the lack of literature on rhetorical techniques in marketing plans, I explored sources that explain how rhetorical strategies can be utilized in other types of business documents. My own research, discussed in Section 4.1.1, led to findings about how marketing plans can utilize rhetoric in comparable ways.

2.5 Marketing free offerings

The literature lacks research into creating marketing plans for free offerings. Cost-free products and services occupy an interesting niche in the realm of marketing plans, as one might assume that they do not require promotion at all. Nonetheless, even organizations with complementary solutions may need to develop a marketing strategy to bring attention to the offering and garner a user base. The WPI Project Engagement Portal, a free service to WPI students, requires a marketing plan for these reasons. The literature gap emphasizes the need to explore effective marketing strategies for free offerings. Section 4.1.2 further explores how marketing plans can cater to free services.

3. Methodology

The following methodologies guided my research and development process for creating a marketing plan for the WPI Project Engagement Portal (WPI PEP). My methodologies included a literature review of marketing plan research, an analysis of marketing plans, and a survey of WPI students.

3.1 Literature review

My first objective was to determine the best practices for successful marketing plans. To accomplish this, I completed a literature review of marketing plan research. Examining secondary research helped me to determine how to maximize effectiveness and efficiency when creating a plan for the WPI PEP. The final literature review addressed the following goals:

- **Understand the business need for marketing plans:** Discern why marketing plans are necessary from a business perspective and how they can be written to best serve the organization
- **Determine marketing plan components:** Understand what sections marketing plans typically include and how to optimize each section's content and organization
- **Examine modern trends:** Analyze how marketing plan strategies have developed in the twenty-first century, especially regarding digitalization, globalization, sustainability, and agile practices
- **Identify rhetorical strategies:** Recognize how marketing plan writers use the document as a rhetorical tool, including their specific techniques and purpose. Having conducted preliminary research, I found that the shared knowledge in this area is limited. Therefore, I broadened the scope of my research to include rhetoric in general business documents and identified strategies that can be applied to marketing plans.

When selecting sources, I ensured that each article contributed to the above goals, offered perspectives from a diverse range of credible authors, and included a balance between recent studies and historical works that have greatly impacted the field. I found relevant articles using JSTOR and Google Scholar, two academic search engines that provide a high volume of marketing-related journals and literature. I collected sources that discussed the following topics: marketing plans as a document, modern marketing tactics, and aligning marketing and business functions.

3.1.1 Marketing plans as a document

An important part of being able to write a marketing plan is knowing what the plan should include. In searching for such sources, I used the following selection criteria:

- Includes a definition of a marketing plan to establish an understanding of the document's characteristics and purpose
- Offers guidance on creating a marketing plan by explaining the following:

- What content sections to include
- How to organize the document
- How to convince readers of the plan's viability
- Describes the preliminary research process and subsequent implementation process.

3.1.2 Modern marketing tactics

To ensure the development of a marketing plan closely aligned with current trends, I selected sources that explored the evolution of marketing tactics over the twenty-first century. I used the following selection criteria:

- Discusses marketing strategies that changed or resulted from any of the following:
 - The rise of the Internet, social media, and artificial intelligence
 - Globalization
 - The growing emphasis on sustainability and environmental consciousness
 - Modern agile business practices
- References how to successfully develop and implement the strategies
- Includes examples of specific strategies with explanations of why they were chosen

3.1.3 Aligning marketing and business functions

A successful organization requires all business functions, including marketing, to work toward a common set of goals. To help ensure the cross-functional success of the WPI PEP's marketing plan, I used the following selection criteria:

- Offers strategic insight into integrating marketing plans with an organization's broader objectives
- Discusses the benefits of aligning multiple business functions, particularly marketing, operations, and information technology (IT)
- Explains practical strategies to help align functions toward common objectives
- Includes actual examples of how business leaders managed the strategic alignment process across multiple functions

3.2 Marketing plan analysis

While the literature review provides a conceptual and academic foundation, analyzing authentic marketing plans reveals the practical applications of these theories in a business environment. My analysis focused on the following objectives:

- **Assess how context shapes marketing plans:** Understand how the distinct challenges and opportunities faced by the business inform the written and organizational aspects of marketing plans
- **Analyze outcomes:** Use genuine performance metrics to evaluate the success of each plan compared to its corresponding goals
- **Recognize adaptable strategies:** Identify effective marketing strategies that may apply to the WPI PEP, including how each strategy is developed and communicated

- **Consider the purpose of visual elements:** Examine the layout and design features of each document to inform the visual presentation of a marketing plan for the WPI PEP

I selected four sources posted by the Adobe Experience Cloud team on the Adobe Experience Cloud Blog, a blog dedicated to digital marketing managed by a reputable Fortune 500 company. I decided to evaluate four marketing plans to capture an adequate range of samples from diverse backgrounds while still thoroughly analyzing each document. Each marketing plan I chose was created by a reputable company or organization, reflected a unique industry or company size to offer a holistic analysis, clearly described their goals and challenges, and aligned with my objectives. I selected which specific plans to examine based on the inclusion of a target audience analysis, competitive landscape evaluation, and an in-depth marketing mix strategy. Prior to this project, I took the course BUS 4030: Achieving Strategic Effectiveness with Professor Adrienne Hall-Phillips, where we learned about the marketing planning process. I used what I learned in the course to develop this criterion.

3.2.1 Target audience analysis

Determining, describing, and analyzing a product or service's target audience is crucial to developing a purposeful marketing plan (Hall-Phillips, personal communication, March 17, 2023). I used the following criteria when selecting marketing plans that included a comprehensive target audience analysis:

- Clearly defines the target audience's demographics, preferences, behaviors, and how they interact with the product or service in question
- Includes segmentation strategies on how to categorize and appeal to distinct types of consumers
- Provides evidence for why each marketing strategy appeals to the target audience's characteristics and preferences

3.2.2 Competitive landscape evaluation

Marketers must be able to understand and navigate the competitive environment as part of an effective marketing plan (Hall-Phillips, personal communication, March 24, 2023). To select marketing plans with a thorough analysis of the competitive landscape, I used the following criteria:

- Uses standard marketing frameworks to assess the current competitive environment, such as the following:
 - Situation analysis (analysis of the internal, external, and customer environments)
 - PESTEL analysis (analysis of the political, economic, social, technological, environmental, and legal environments)
 - SWOT analysis (analysis of the product or service's strengths, weaknesses, opportunities, and threats)

- Identifies specific competitors and their existing promotional, pricing, and product positioning strategies
- Examines industry trends and explains how the organization can leverage specific strategies to gain a competitive advantage

3.2.3 Marketing mix strategy

A marketing plan should include a well-rounded set of strategies that address various aspects of the internal and external business environments (Hall-Phillips, personal communication, April 7, 2023). I used the following criteria when selecting marketing plans with a sufficient marketing mix strategy:

- Includes at least one strategy derived from each of the four strategic marketing mix components: product, price, place, and promotion
- Devises marketing strategies based on findings from the target audience analysis and/or the competitive landscape evaluation
- Describes the implementation process of each strategy

3.3 Survey

I conducted an anonymous survey of WPI students to help develop specific marketing tactics for the WPI PEP's marketing plan. The survey intended to identify the most effective communication channels to target students, determine what motivates students to respond to peer surveys, and determine what incentivizes students to participate in WPI-sponsored initiatives.

I aimed to survey an equal distribution of male-identifying and female-identifying individuals, as well as an equal distribution of undergraduate and graduate students. My purpose for targeting these demographics was to accurately capture and cater to the student body's diverse preferences. I chose a sample size of at least 100 students to represent the total WPI student population as accurately as possible.

The following sections provide further details about the goals of my survey and what I set out to learn. The full survey can be found in Appendix A.

3.3.1 Identify the most effective student communication channels

To aid in the creation of a wide-reaching yet concentrated advertising strategy, I needed to decide which communication channels to prioritize. I considered the following criteria when developing survey questions about communication channels:

- Pinpoint what channels students use to find out about campus news and events
- Determine which channels reach the largest number of student body members
- Discern what advertising tactics are most likely to catch students' attention

3.3.2 Determine the most effective survey participation incentives

Identifying factors that influence students to participate in surveys guided the development of marketing tactics designed to convince students to respond to surveys posted on

the WPI PEP. I considered the following criteria when developing survey questions about survey participation incentives:

- Determine how often students respond to surveys
- Identify what tangible and intangible incentives motivate students to respond to surveys
- Figure out whether fellow students or faculty members are more likely to influence students to respond to a survey

3.3.3 Determine the most effective event participation incentives

Understanding what motivates students to engage in on-campus promotional events helped shape interactive marketing approaches for the WPI PEP. I considered the following criteria when developing survey questions about event participation incentives:

- Determine how often students participate in WPI-sponsored events
- Identify what tangible and intangible incentives motivate students to attend WPI-sponsored events
- Figure out whether fellow students or faculty members are more likely to influence students to attend a WPI-sponsored events

4. Research Results

This chapter discusses the findings from the literature review of marketing plan research, analysis of marketing plans, and survey of WPI students.

4.1 Literature review

My literature review of marketing plan research can be found in Section 2, where I discuss my findings regarding the business need for marketing plans, typical plan components, the impact of modern trends, and rhetorical strategies. The research results of the literature review are further explored in this section.

4.1.1 Audience and purpose of marketing plans

Strategic planning techniques and Philip Kotler's 1967 textbook *Marketing Management* popularized the marketing plan, with Kotler claiming that they are "one of the most important outputs of the marketing process [as they] provide direction and focus for a brand, product, or company" (Kotler & Keller, 2016, p. 77). Marketing plans are necessary for businesses because they provide an organized outline, facilitate cross-functional coordination, and show viability through quantitative metrics (McDonald & Keegan, 2002; Al-Surmi et al., 2020; Wood, 2017). Successful marketing plans are dynamic in nature, "anticipating changes and including guidelines for how to react with customer relationships and competition in mind" (Wood, 2017, p. 6). Striking a balance between a comprehensive yet adaptable marketing plan allows business to effectively respond to changing environments while remaining aligned with long-term goals (Slotegraaf & Dickson, 2004). Marketing planners consider employees, stakeholders, and senior management as target audiences (Chernev, 2020). To clarify, the marketing plan's target audience differs from target consumers because it is an internal document for the business, generally not accessible to consumers.

4.1.2 Marketing plan components

Marketing plans typically consist of seven primary components, adhered to by most guides to varying extents. Beginning with the executive summary, this section briefly outlines the plan's goals and central ideas while providing context for the relevant product or service (Wood, 2017; Chernev, 2020). Following this, the situation analysis describes the organization's current state and the competitive market (Chernev, 2020). A PESTEL analysis or SWOT analysis may be employed to fully illustrate the organization's internal and external environments (Wood, 2017; Kotler & Keller, 2016). A detailed situation analysis allows the remainder of the document to be "a realistic statement of what the business desires to achieve as a result of market-centered analysis" (McDonald & Keegan, 2002, p. 233). Next, the plan introduces its goals and objectives. Goals are high-level and based on the organization's "financial, marketing, and societal" aspirations while objectives are narrower and based on desired performance metrics (Wood, 2017, p. 15; Kotler & Keller, 2016). The marketing strategy determines how to provide value to consumers while achieving the plan's goals and objectives, typically through effective product positioning and market segmentation (Chernev, 2020; Wood,

2017). This strategy informs marketing tactics, “specific activities [...] employed to execute a given strategy” built on the foundation of the marketing mix (Chernev, 2020; McDonald & Keegan, 2002; Kotler & Keller, 2016). Financial projections then assess the economic impact of the marketing process through a sales forecast, expense forecast, or break-even analysis (Kotler & Keller, 2016). Finally, the implementation controls section details how progress will be managed and tracked. This section designates responsibilities to appropriate parties, presents a schedule and budget, and outlines any necessary contingency plans (Wood, 2017; Kotler & Keller, 2016).

4.1.3 Modern trends

Industry patterns have heavily influenced the development and content of marketing plans. For example, digitalization, “the use of digital technology [...] to create and harvest value in new ways,” consists of two primary channels: social media and artificial intelligence (AI) (Gobble, 2018). The way marketers utilized social media evolved from a straightforward promotional platform to a means of researching and communicating with target consumers (Ibrahim & Aljarah, 2021; Ziyadin et al., 2019). Marketers use AI tools to analyze large data sets, identify and forecast trends, and even “[develop] marketing plans by contributing to environmental analysis and analysis of competitors' strategies” (Haleem et al., 2022; Elsayed Fayed, 2021). Fundamentally, digitalization enables marketers to engage with consumers and generate data-driven insights.

Marketing planners should also consider the impact of globalization, or the connection between entities and individuals driven by international communication channels, corporations, and supply chains (Durand, 2018). Marketing planners must adopt an international business strategy that considers cultural differences and accelerated consumer behavior (Green & Keegan, 2020; Gomes et al., 2020).

In addition, marketing planners should incorporate practices related to sustainability, which involves environmentally conscious business decisions such as bio-degradable packaging or carbon neutrality (Jacobs & Finley, 2019). These practices appeal to the growing subset of environmentally conscious consumers who are willing to pay more for eco-friendly products that provide justification for higher prices and proof that their actions are impactful (“Nielsen Global Corporate...,” 2015; Reimers & Hoffmann, 2019). Truthfully labelling and advertising sustainable products and business practices “enables consumers to better understand the external effects of their consumption decisions and strengthens consumers’ awareness of their own responsibility” (Reimers & Hoffmann, 2019, p. 21).

Lastly, agility refers to an organization’s ability to efficiently operate and respond to changes through prioritizing adaptability, collaboration, and fast progress (Theobald et al., 2020; Beck et al., 2001). Agile practices allow marketing planners to “rapidly [iterate] between making sense of the market and executing marketing decisions to adapt to the market” through the

assistance of ready-to-go contingency plans (Kalaiganam et al., 2020; Slotegraaf & Dickson, 2004).

4.1.4 Gaps in knowledge

In Section 2.4, I identified a lack in literature that considers how marketing plans can effectively employ rhetorical techniques. Additionally, in Section 2.5, I identified a lack of research into creating marketing plans for cost-free offerings like the WPI Project Engagement Portal. In the remaining part of this section, I attempt to fill in the gaps by identifying best practices in each area. First, I explore how rhetorical strategies can enhance marketing plans. Then, I identify effective strategies for creating a marketing plan to promote a free product or service.

4.1.4.1 Rhetorical strategies

Leveraging rhetoric allows marketing planners to successfully articulate and advocate for key goals, objectives, strategies, and tactics. While not much literature on rhetorical strategies for marketing plans exists, I found applicable research on rhetorical strategies for business communication in general. This section explores my findings on rhetorical strategies in corporate settings and their applications to marketing plans.

Establishing ethos involves demonstrating credibility as an author. Cardon highlights traits that enhance an individual's credibility within a corporate context, including being action-oriented with an emphasis on results, alongside attributes such as honesty, openness, empathy, and ethical conduct (2021). While it may seem difficult to demonstrate these traits without turning a marketing plan into a pseudo-biography, marketing planners can still indirectly build rapport with readers. Specifying objectives with clear metrics can underscore an author's results-driven outlook (Cardon, 2021). Honestly acknowledging relevant challenges can help frame the document as reliable and open while instilling confidence that the author can address potential obstacles (Newman, 2017). Adopting a professional yet pleasant tone can enhance trustworthiness, fostering a more receptive attitude toward the plan's initiatives (Men, 2015). Seemingly minor informalities or mistakes can also affect an author's ethos. A 2020 study found that most surveyed business professionals dislike simple writing errors such as incorrect word usage, misspellings, or sentence fragments (Gubala et al., 2020). Participants reported that such writing errors negatively affect their perception of the author, implying carelessness or lack of knowledge. Therefore, marketing planners should be sure to avoid simple errors by thoroughly proofreading the document.

Appealing to pathos involves connecting with the audience's emotions and values to cultivate a meaningful connection between them and the author. For example, highlighting outcomes that benefit the audience can elicit positive emotions and increase stakeholder buy-in (Oeppen Hill, 2019). Marketing planners can call attention to beneficial outcomes such as stronger organizational performance and a clearer sense of direction. Den Hartog & Verburg explore how business leaders can appeal to pathos through storytelling, especially if the narrative

includes imagery and figurative language (1997). Storytelling has the potential to captivate the audience and provide an element of humanity.

Employing logos involves using data and logical reasoning to support an argument. Justifying goals, objectives, strategies, and tactics through appeals to logos strengthens their plausibility. While factual data such as market research is the most persuasive form of logos, expert opinions and inferences based on available data may also provide a logical foundation for arguments (Newman, 2017). A logical framework grounded in empirical evidence enhances the credibility of a marketing plan and instills confidence in its proposed course of action.

4.1.4.2 Marketing free offerings

Creating a marketing plan for a cost-free offering presents a unique challenge. While one may assume that a free product or service requires little to no promotion, they require a planned marketing approach to generate interest and establish a user base. This section explains my findings on marketing approaches that could be applied to a free product or service, such as the WPI Project Engagement Portal.

Marketing plans for free offerings must center value proposition in its strategy to ensure maximum impact on target consumers. Value proposition involves showing a potential consumer that the benefits of a product or service outweigh its associated costs (Smith & Colgate, 2007). In this context, costs are not monetary and instead in the form of time or energy. Therefore, marketing planners should ensure their marketing strategy conveys that the benefits of the offering surpass the time or energy a consumer spends on it. Highlighting the product or service's functional utility, unique features, or cost-efficiency compared to alternatives can help consumers understand its value (Osterwalder et al., 2014).

For free products and services that require a consistent user base, marketing tactics that encourage long-term engagement are crucial. Building a community around the product, implementing incentives, and utilizing user-generated content (UGC) can ensure lasting participation. Community building increases brand loyalty and engagement by fostering a sense of belonging among consumers (Stokburger-Sauer, 2010). Marketing planners can build a community around their product or service by actively communicating with users and incorporating their feedback, providing frequent informational resources, and organizing in-person events. Incentives reward users for their participation and can motivate repeated involvement as they come back for more rewards. While financial incentives are the most effective, providing other incentives that cater to the target audience's interests can lead to comparable results (Shaw & Gupta, 2015). UGC refers to any content created by a consumer in response to a product, service, or brand. This may take the form of a review, a social media post, participation in a marketing campaign trend, and so on. UGC is a powerful tool to enhance the perceived quality and likeability of an offering due to the content's personal, down-to-earth nature (Mayrhofer et al., 2020). Encouraging and platforming UGC is an effective way to engage the brand community.

4.2 Marketing plan analysis

I analyzed four sample marketing plans from different organizations:

1. **Lush Marketing Plan (2017):** A British cosmetics company expanding its market presence into Portugal
2. **Safe Haven Family Shelter Marketing Plan (2022):** A Tennessee-based nonprofit shelter-to-housing program
3. **Visit Baton Rouge Marketing Plan (2019):** A destination marketing organization dedicated to promoting tourism in Baton Rouge, Louisiana
4. **University of Illinois Urbana-Champaign Marketing Plan (2020):** An American university

The following sections explore how each marketing plan addresses three key factors: analyzing the organization's target audience, evaluating its competitive landscape, and presenting its marketing mix strategy.

4.2.1 Target audience analysis

This section covers how each sample marketing plan analyzes its target audience.

4.2.1.1 Lush

Lush explores its target audience in the marketing model section of its plan, following an analysis of the competitive market and Lush's offerings and company values. The marketing model begins by discussing segmentation, or the criterion that define typical consumers. The criteria fall into four distinct categories: geographic, demographic, psychologic, and behavioral. Each category contains specific consumer attributes; for example, demographic criteria include the average consumer's sex, age, income, education, and so on.

After segmentation, the marketing plan discusses its targeting strategy. While the plan states that "Lush does not define a particular target," the marketing planners acknowledge that Lush's consumer demographics align with the broader cosmetics market (Pottier & Muiños, 2017). To compromise with the company's reluctance to select a specific target audience, the plan distinguishes audience stereotypes based on what draws consumers to the brand. These stereotypes include consumers who are attracted to Lush's fun and playful side, new and innovative products, and commitment against animal exploitation, among other company values (2017).

4.2.1.2 Safe Haven Family Shelter

Safe Haven Family Shelter identifies ten target audiences at the end of the document after presenting its goals and objectives. The audiences are presented in the form of a bulleted list and include direct parties such as staff, clients, and program leadership; community collaborators such as donors, corporate partners, and volunteers; and broader authority figures such as local leaders and legislators.

It is important to clarify that this marketing plan is not solely focused on reaching potential clients, but targeting contributors who can offer essential resources like time or financial support. However, the plan does not examine the characteristics or needs of any group.

4.2.1.3 Visit Baton Rouge

In the situation analysis section, Visit Baton Rouge’s marketing plan describes two target audience groups: leisure travelers and sales/meetings travelers. The plan further divides each group into primary, secondary, and tertiary categories.

Primary leisure travelers consist of people who live within six hours of Baton Rouge. Secondary leisure travelers include residents of relatively close major cities such as Chicago and Nashville. Tertiary leisure travelers consist of parish (county) residents and international travelers. The plan underscores the importance of considering parish residents, stating that “Google has seen 6x growth in mobile searches for ‘things to do near me’” (Visit Baton Rouge, 2019). Overall, the leisure group prioritizes local and regional travelers while recognizing the growing importance of parish residents and far-distance travelers.

Primary sales/meetings travelers include convention, meeting, and group travel planners, while secondary travelers consist of meetings attendees. Designating event planners as the primary group places emphasis on attracting organizers who in turn bring in large groups of attendees.

Aside from segmenting each group, the plan also examines their travel behavior. Personas, fictional depictions of possible target consumers, are used to represent leisure traveler demographics. Each persona includes their age, household income, and travel behavior. For example, the “in-the-moment millennial” looks for authentic, unique places and uses social media to scout possible destinations (Visit Baton Rouge, 2019). Personas are not used to characterize sales/meetings travelers, but the plan still defines their travel behavior. Sales/meetings travelers value convenience, accessibility, affordability, and the guest experience.

4.2.1.4 University of Illinois

The University of Illinois Urbana-Champaign’s (UIUC) marketing plan begins by providing context for audience terminology. This involves explaining “the pipeline” a prospective student follows. Students begin as a prospect, someone who the university takes interest in. After reciprocating interest in UIUC, prospects become inquiries. Inquiries become applicants once they have officially applied for admission. Someone who unexpectedly applies to UIUC is considered a stealth applicant. From there, applicants either become accepted or denied students. Finally, an accepted student who accepts their admission offer becomes an enrollee. The plan emphasizes how marketing tactics and messaging should change as individuals progress through the pipeline.

UIUC also highlights “key populations for recruitment” in terms of identifying prospects (University of Illinois, 2020). Key populations include broad categories such as international

students and transfer students and more specific categories such as downstate residents and high achievers.

The target audience analysis focuses on students' decision-making process as they apply for college. It reveals that students wait until they begin submitting applications to narrow down their list of schools to apply to, and the number of daily applicants increases as the deadline approaches. The analysis also identifies a significant finding regarding UIUC's student body. At the time, over 70% of students were in-state residents, but the in-state population was expected to decrease in the coming years. This finding characterizes the future of UIUC's target audience. In response to this, the plan designates out-of-state and international students as important target audiences.

4.2.2 Competitive landscape evaluation

This section details how each sample marketing plan evaluates its competitive landscape.

4.2.2.1 Lush

Lush's marketing plan begins with an overview of the sector it wants to break into, the Portuguese cosmetics market. Key insights include the industry's average annual growth, number of companies and employees, current market leader, and growth forecast. Despite the Portuguese cosmetics market's small size compared to other European countries, the marketing planners highlight the sector's growth potential due to "innovation, technology, and the increasing appeal of organic products" and consumers' rising interest in maintaining their physical appearance (Pottier & Muiños, 2017).

The marketing plan further examines the growing popularity of organic, sustainable products, referencing the organic cosmetics sector's high predicted growth rate. The subsequent marketing model section describes Lush's positioning and differentiation strategies. Lush positions itself as a high-end, ethical, natural brand that differentiates itself from competitors through its "fun side" (Pottier & Muiños, 2017). A chart visually depicts Lush's attributes in comparison to other cosmetics competitors (see Figure 1). Later in the document, the marketing planners identify Lush's top competitors within the situational analysis. These include The Body Shop, Kiehl's, and Clinique.



Figure 1. Lush's price position comparison with their competitors (Pottier & Muiños, 2017).

4.2.2.2 Safe Haven Family Shelter

Safe Haven Family Shelter's marketing plan does not identify competitors. As a 501(c)(3) non-profit organization, the plan focuses on outlining goals and promoting the organization's impact on the community rather than engaging in competition.

4.2.2.3 Visit Baton Rouge

Visit Baton Rouge's marketing plan features a SWOT analysis of the city of Baton Rouge. The weaknesses section identifies New Orleans as the most prominent in-state competitor, recognizing that prospective visitors may choose to visit New Orleans instead. However, the marketing planners note that Baton Rouge may hold a competitive advantage due to its "cleaner, more family-friendly perception" (Visit Baton Rouge, 2019).

4.2.2.4 University of Illinois

UIUC weaves its competitive landscape evaluation into its target audience analysis in a section dedicated to context. After explaining that applicants typically wait until they begin applying to colleges to narrow down their choices, the marketing planners note that students may still apply to 10 or more schools. This means that UIUC can potentially face many unique competitors vying for a single student.

In response to UIUC's relatively high population of in-state students, the marketing planners use a chart to compare the school's percentage of in-state students to other Big Ten universities. The chart shows that UIUC has the third highest percentage of in-state students, which was 76.8% in 2018. Since the school aims to target more out-of-state and international students as Illinois' population decreases, UIUC will face more competition from comparable Big Ten universities with larger out-of-state populations. This includes the University of Maryland College Park (60.9% in 2018), University of Iowa (58.2%), Indiana University Bloomington (55.5%), and University of Wisconsin-Madison (53.2%).

4.2.3 Marketing mix strategy

This section covers how each sample marketing plan presents its marketing mix strategy.

4.2.3.1 Lush

Lush's marketing mix strategy begins by describing the company's international practices using the traditional four Ps: product, price, place, and promotion. The product section covers the core benefits of Lush's offerings, such as its quality level, ethical value, and sustainable packaging. Details behind each core benefit are elaborated upon using a bulleted list. The price section discusses Lush's skimming price strategy and the average customer expenditure per visit. The place section explains Lush's distribution strategy and how they determine where to open a store. Lastly, the promotion section outlines Lush's marketing approach, which excludes traditional advertising campaigns because of the company's "[preference] to invest in the quality of products" (Pottier & Muiños, 2017). The marketing planners explore Lush's alternative promotional strategies, including its in-store advertisements, friendly and knowledgeable staff, social media channels, and shock campaigns. Throughout the marketing mix section, bold text emphasizes important concepts and images provide eye-catching visual references. Overall, this section provides background information before the delineation of strategies tailored specifically for the Portuguese market.

Next, the marketing planners present a set of marketing objectives, which are broad goals with multiple measurable performance indicators. For example, the objective to "create customer loyalty" includes earning "1000 additional subscribers on Instagram" and increasing website traffic by 50% (Pottier & Muiños, 2017).

The final marketing strategy includes two sections: the "Lush strategy," which is used in all stores, and "our strategy," the marketing planners' ideas to develop Lush in the Portuguese market (Pottier & Muiños, 2017). "Our strategy" describes distribution expansion strategies as well as in-person and digital promotional campaigns. One interesting proposition includes an online option for customers to create a personalized product, inspired by existing concepts used by Skoda and Nike. The marketing planners provide screenshots of customization pages on Skoda and Nike's websites as inspiration. After the marketing strategy, the plan presents a schedule in the form of a Gantt chart, an itemized budget, and controls and updates that may influence the marketing plan.

4.2.3.2 Safe Haven Family Shelter

Following a brief overview of the plan, the Safe Haven Family Shelter marketing plan promptly delves into its 2022 goals and objectives. The plan consists of four broad goals: build industry authority, build brand awareness, build brand loyalty in established audiences, and build event and fundraising campaign brands. These statements are elaborated upon with a more detailed description; for example, "build industry authority: position Safe Haven Family Shelter as the leader in housing, supporting, empowering and advocating for families experiencing homelessness" (Safe Haven Family Shelter, 2022).

Each goal consists of multiple objectives, specific and measurable promotional tactics that contribute to the corresponding goal. For instance, one of the objectives aligned with the goal of building event and fundraising campaign brands is to “assist in raising \$150,000 for the 2022 Hike for Safe Haven” (Safe Haven Family Shelter, 2022). Each objective has action steps that explain the course of action and relevant channels, ensuring a clear roadmap for implementation and achieving the plan’s goals. Some action steps include deadlines, the responsible individual(s), and whether the step has been completed. Objectives and actions steps are displayed in a two-column chart under each goal.

To supplement the marketing strategy, the plan includes long-term goals that span the next two to three years. The plan also includes key themes and messages they wish to promote across all objectives and metrics to create semiannual performance reports.

4.2.3.3 Visit Baton Rouge

Visit Baton Rouge’s marketing plan categorizes its marketing strategy according to the organization’s primary teams, each with their own concentration: leisure marketing, meetings and conventions marketing, destination sales, destination services, and special projects and events. The marketing strategy section begins by succinctly listing the teams and their corresponding goals on a single page. Each category contains at least one specific and measurable goal statement, such as “increase overall visitation for new and returning visitors” and “increase leads and bookings for new and returning meetings and conventions” (Visit Baton Rouge, 2019).

Following the overview of the teams and their goals, the marketing plan provides further detail through subsections for each team. These subsections outline the team’s role and reiterate their goals, accompanied by complimentary strategies and tactics. Strategies involve positioning and broad approaches aimed at achieving goals. Tactics are specific methods used to implement strategies. For example, “[positioning] the visitor center and registration staff as experts on [...] Baton Rouge” is a strategy, while “[ensuring] services staff members are briefed on [...] new and up-and-coming features/businesses/events” is a tactic (Visit Baton Rouge, 2019). The marketing planners give the teams recommended evaluation metrics for measuring impact and reach.

4.2.3.4 University of Illinois

UIUC’s marketing programs section is sorted by promotional channel, which includes content marketing, digital advertising, direct mail, email, events, handouts, search, social media, text messaging, video marketing, and websites. Most programs provide a description of the channel or additional context regarding the channel’s purpose.

Each program includes objectives, tactics, and success metrics. Objectives are broad statements that represent what UIUC wants to accomplish through each channel, such as “show appreciation and express interest toward students” through direct mail (University of Illinois, 2020). Tactics are methods of communication that factor into each program, such packets and postcards for direct mail. For more specific programs like email, tactics pertain to what the

promotions should be about, such as application deadlines and event reminders. Success metrics outline measurable initiatives, such as “bring all digital ads under \$1 per click through testing” and “increase search rankings” (2020).

After describing the program’s objectives, tactics, and success metrics on one page, the following page provides imagery that shows sample advertisements. A caption that explains the advertisements’ characteristics accompanies the images.

4.3 Survey

While I aimed for 100 survey responses from WPI students, the survey ultimately received 52 responses. Out of the respondents, 38 were undergraduate students and 14 were graduate students. 19 respondents identified as male, 31 respondents identified as female, and 2 respondents identified as non-binary. The remainder of this section covers the key results from the survey. The full survey and all responses can be found in Appendix A.

The first section of the survey aimed to discern how students interact with promotional events and surveys. When asked where they primarily find information about WPI news and events, responses indicated that email was the most popular channel (see Figure 2). A majority of respondents shared that they use email to find out about news and events. Additionally, many students refer to WPI’s social media accounts and physical signage for information. Less popular informational channels included WPI-associated Slack and Discord channels, table sitting booths, Tech News, and the WPI mobile app.

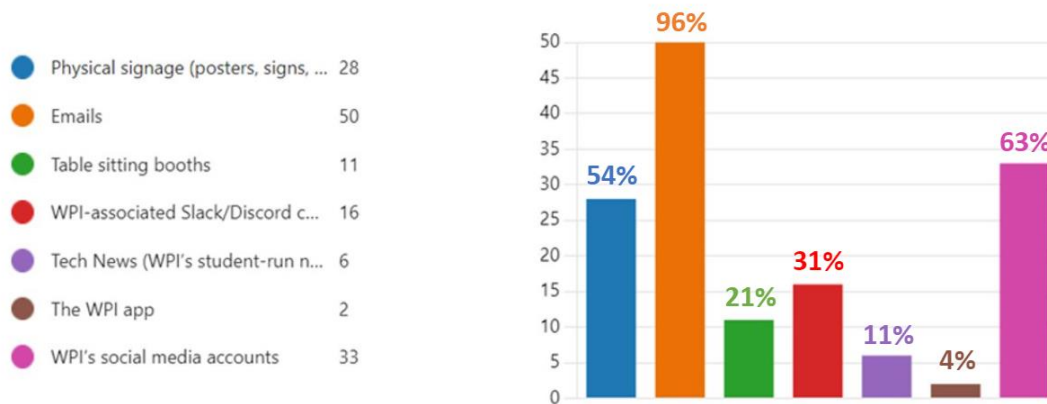


Figure 2. The popularity of channels that survey respondents use to find information about WPI news and events.

The survey then asked how often respondents attend on-campus events. I considered two types of events: events hosted by on-campus groups and events hosted by student-run organizations. An on-campus group is any WPI-associated group that is not run by students, such as such as a specific department or the Career Development Center. A student-run organization would include clubs.

Most respondents either go to events put on by **on-campus groups** once per term or once per semester (see Figure 3). However, 19% of respondents attend these events less than one time per year.



Figure 3. Breakdown of how often survey respondents attend events hosted by an on-campus, non-student group.

On the contrary, most students attend an event hosted by a **student-run organization** more than once per term (see Figure 4). The results indicated that a majority (90%) of respondents attend these events at least once per semester.



Figure 4. Breakdown of how often survey respondents attend events hosted by a student-run organization.

I found that most students respond to about one to three surveys per semester (see Figure 5). Very few students respond to more than six surveys per semester. A handful of students shared that they usually respond to no surveys.



Figure 5. Breakdown of how many student-administered surveys participants respond to each semester.

The next section of the survey asked participants to rank how likely they would be to **attend a WPI event** based on a specific incentive, with one being least likely to attend and six being most likely to attend. Based on average ratings, a close friend’s recommendation is the most effective incentive to come to an event, while a free raffle is the least effective. Table 1 shows the average ratings of four different incentives to attend on-campus events.

Incentive	Average Rating (out of 6)
Recommendation from a close friend	4.69
Free snacks	4.50
Recommendation from a professor or faculty member	4.08
Free raffle	3.35

Table 1. Average ratings of incentives that would convince participants to attend a WPI event.

To supplement this information, the survey asked respondents if there were any other incentives that would motivate them to attend a WPI event. Seven students shared that free food would motivate them to come to WPI events, with one specifying that “full meals that don’t cost meal swipes” would be a particular motive. Another seven respondents expressed that free merchandise such as t-shirts or stickers would incentivize them to attend an event. Other mentioned incentives included live performances, prizes, networking opportunities, and educational usefulness.

In a similar manner, I attempted to determine the most effective incentives to convince a student to **participate in a survey**. These questions used the same scale as the previous section, with one being most likely to respond and six being least likely to respond. Based on average ratings, the survey being sent by a close friend is the most effective incentive to respond, followed by the survey being sent by a professor or faculty member (see Table 2). Being put into a raffle to win a gift card is the least effective incentive. As a benchmark, the likelihood of a student responding to a survey with no tangible or social incentives received an average rating of 2.90.

Incentive	Average Rating (out of 6)
Helping a close friend	5.10
Helping a professor or faculty member	4.37
Being entered into a gift card raffle	3.87
None	2.90

Table 2. Average ratings of incentives that would convince participants to respond to a student-administered survey.

When asked if there were any other incentives that would convince students to participate in a survey, six students stated that a guaranteed gift card would motivate them to respond. Four students shared that knowing the purpose and impact of their participation would incentivize them to respond. Two students mentioned that they are more likely to respond to a survey that is short and concise, while another two students stated that they simply enjoy responding to surveys and do not require an incentive.

5. Conclusions

Based on my literature review, marketing plan analysis, and survey, I was able to draw the following conclusions.

5.1 Purpose of marketing plans

At its core, a marketing plan is a road map that details the strategies and timeline an organization follows to promote its products and achieve its business goals. Marketing plans should serve to align multiple business functions, provide qualitative metrics for evaluating success, and clearly articulate goals. The plans must be coherent, educative, and relevant to each target audience: employees, stakeholders, and senior management. Additionally, marketing plans should incorporate flexibility and contingency measures to account for the dynamic consumer environment.

5.2 Marketing plan components

My literature review revealed that the standard framework of a marketing plan consists of an executive summary, situation analysis, goals and objectives, marketing strategy, marketing tactics, financial projections, and implementation controls. However, marketing planners may take liberty to add, modify, and remove sections based on relevancy or to ensure optimal articulation of its points. This can be seen in the example marketing plans discussed in Section 4.2. Some additional sections include a schedule or Gantt chart, a budget, and a list of key advertising messages and themes.

5.3 Analyzing the target audience

The sample marketing plans I analyzed avoided relying on a single target audience. Instead, the plans identify two or more distinct audiences that the organization wishes to attract. These audiences may be further divided into primary, secondary, and even tertiary categories depending on the organization's objectives.

Marketing planners can examine target audiences through direct analysis or by using fictional personas. A direct analysis involves describing the geographic, demographic, psychological, and behavioral characteristics of typical consumers. Alternatively, marketing planners may choose to represent the typical consumer through "personas." A persona is a fictional depiction of a person that displays common characteristics of a target audience but has unique traits that distinguish them as an individual. Personas help specify consumer preferences, in the case of Lush's marketing plan, or delve further into consumer behavior, in the case of Visit Baton Rouge' marketing plan.

5.4 Evaluating the competitive landscape

The competitive landscape evaluation involves an overview of the market sector that the product or service is a part of. This includes insights such as the industry's annual growth rate, growth forecast, market leaders and other competitors, and recent industry developments.

Following this overview, the plan can divulge positioning and differentiation strategies that intend to set the offering apart from other competitors. A SWOT analysis can also be used to present elements of the competitive landscape.

5.5 Developing the marketing mix strategy

Examining marketing mix strategies across a diverse range of organizations highlighted how every marketing plan presents its strategies in a different way. Strategies may be based on the traditional four Ps framework, which can be seen in Lush’s marketing plan. Contrarily, the University of Illinois organized its strategies according to promotional channels. Visit Baton Rouge organized its strategies by the organization’s different marketing teams, while Safe Haven Family shelter organized its strategies according to their corresponding goals. Each marketing mix strategy is organized in a unique way that caters to the organization’s structure and aspirations, reflecting a personalized approach to aligning marketing efforts with overarching priorities. Regardless of how the strategies are organized, marketing mix strategies are typically based on the marketing goals and objectives.

5.6 Differentiating goals, objectives, and tactics

My analysis of sample marketing plans underscored the difference between goals and objectives. Goals tend to be broader than objectives and provide a long-term outlook. Objectives tend to be more specific than goals with a short-term outlook. Multiple objectives often comprise a single goal. Goals articulate the organization’s primary desired outcomes in a qualitative manner, while objectives are measurable milestones that aim to support a goal. Safe Haven Family Shelter’s marketing plan demonstrates this relationship between goals and objectives. For example, one goal was to “build brand awareness” and corresponding objectives included “[increasing] social media followers by 3 to 5% in 2022” and “[launching a] new website by July 30, 2022” (Safe Haven Family Shelter, 2022). Incorporating both goals and objectives in a marketing plan clearly breaks down and organizes the plan’s strategic intentions.

Tactics are specific actions that intend to achieve goals and objectives. Each tactic includes the channels, activities, and messages utilized to reach target audiences and drive desired outcomes. For example, in the marketing plan for Safe Haven Family Shelter, tactics that align with the objective of “[launching a] new website” included “obtain bids and decide on vendor,” “approve Site Map, and “create text content for interior pages (Safe Haven Family Shelter, 2022).

5.7 Incorporating modern trends

Marketing planners benefit from including strategies related to digitalization and sustainability in their marketing plans. Social media is an effective channel for product promotion and soliciting consumer feedback. Highlighting honest, sustainable business decisions when applicable appeals to the expanding subset of consumers who prioritize environmentally conscious products.

Additionally, marketing planners benefit from leveraging modern trends related to digitalization, globalization, and agility throughout the plan development process. Digitalization allows marketing planners to research the target audiences' behaviors on social media and create marketing plans using AI. Adopting a global mindset facilitates the adaptation of marketing strategies to diverse cultural contexts. Similarly, adopting an agile mindset increases developmental efficiency and emphasizes the importance of thorough contingency plans.

5.8 Incorporating rhetorical strategies

Rhetorical strategies allow marketing planners to successfully articulate their ideas and persuade the document's audiences (employees, stakeholders, and senior management) of the plan's viability. This can be accomplished by appealing to the audiences' senses of ethos, pathos, and logos.

To appeal to ethos, marketing planners should demonstrate credibility by being honest about challenges, using a professional yet pleasant tone, and avoiding writing errors. To appeal to pathos, marketing planners should strive to elicit optimism by highlighting beneficial outcomes. Marketing planners can also craft compelling stories throughout the entire document or narrative-based sections, such as the situation analysis and marketing strategy. To appeal to logos, marketing planners should provide data and logical reasoning to support their claims.

5.9 Prioritizing long-term engagement

In general, marketing plans for free offerings can employ many of the same strategies as standard marketing plans. This includes using the typical marketing plan structure, integrating modern trends, and incorporating effective rhetorical strategies. Aside from that, marketing plans for free offerings should implement tactics that foster long-term engagement. This ensures that the product or service will retain a consistent user base. Marketing planners can attract a consistent user base through effective value proposition, building a community around the product, offering incentives, and utilizing user-generated content.

5.10 Marketing plan format

A marketing plan's format varies based on how the planners wish to communicate its concepts and ideas. Some plans may be written with full paragraphs in the style of an essay, while others may be comprised mainly of brief bullet points. Oftentimes, marketing plans incorporate both paragraphs and bullet points depending on whether a concept requires a detailed explanation or a concise summary.

Visual elements such as images, charts, and typography can convey important ideas in an easily digestible manner. In the case of images and charts, captions help explain their significance. Typography is an especially important tool to facilitate readability. Bold, italicized, or colorful text draws a reader's eye to specific words or phrases, while headings and subheadings establish a hierarchal structure. Incorporating brand-specific elements such as fonts,

colors, and imagery allows marketing plans to reinforce its alignment to the brand's overall strategy.

5.11 WPI students' engagement preferences

The survey results informed the strategies and tactics that went into the WPI PEP's marketing plan. My survey results show that email is the most effective communication channel to spread information about WPI PEP-related news and events, followed by WPI's social media accounts and physical signage. For promotional events, student-run events are more likely to attract attendees than events run by on-campus groups. The majority of WPI students attend a student-run event at least once per semester. In terms of surveys, students should be expected to participate in about one to three surveys each semester.

5.12 Attracting participants with incentives

Through the survey, I found that incentives are very effective at drawing students to promotional events and getting them to answer surveys. Students are more likely to attend an on-campus event if it is recommended to them by a close friend, provides free snacks or meals, offers free merchandise, is recommended to them by a professor or faculty member, or enters them into a raffle. Students are more likely to respond to a survey if it helps a close friend, helps a professor or faculty member, enters them into a gift card raffle, or clearly explains the purpose and impact of the project. Assisting a close friend is the most effective incentive across both categories.

6. Recommendations

This section consists of my recommendations concerning general best practices for marketing plans, as well as recommendations for what elements should go into a marketing plan for the WPI Project Engagement Portal (PEP).

6.1 Marketing plan best practices

The following sections describe the recommended approaches to creating a marketing plan. I include screenshots of the WPI PEP marketing plan I created to demonstrate how the suggestions appear within a plan.

6.1.1 Marketing plan components

A marketing plan should consist of a title page, executive summary, situation analysis, goals and objectives, marketing tactics, financial projections, and implementation controls.

The title page includes the title of the document, the month and year that the plan was created, and the individual or team responsible for the plan. The title page should also include the organization's logo and visual brand identity components, such as the organization's color palette, fonts, and graphic elements (see Figure 6).

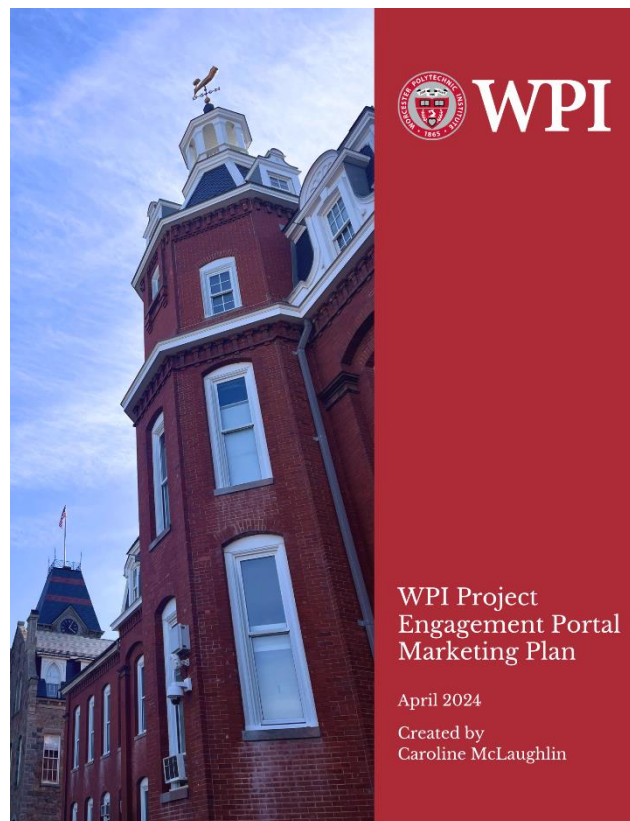


Figure 6. The WPI PEP marketing plan's title page.

The executive summary consists of a brief overview of the entire marketing plan, including background information about the offering and the plan’s primary goals, key strategies, and central ideas. This summary should be no more than two pages long to ensure conciseness and scannability. Following the executive summary, the marketing planners should include a table of contents.


The situation analysis presents relevant context about the organization’s current state, the competitive environment, and the target audience. Marketing planners should consider using subheadings throughout this section to maintain the flow of the plan, as it encompasses extensive and crucial information essential for strategic decision-making. Information about the organization’s current state should include the business’s competencies, challenges, and market position. A SWOT analysis should be used to succinctly convey the organization's strengths, weaknesses, opportunities, and threats related to the offering (see Figure 7). Additionally, a PESTEL analysis should be used to provide an overview of the broader external environment that affects the offering. However, in the case of products or services where the macro-environment is less influential, the PESTEL analysis can be excluded.



Figure 7. The SWOT analysis from the WPI PEP marketing plan.

Next, the situation analysis section describes the competitive environment. This includes the annual growth rate and growth forecast of the market, main competitors, and any recent industry developments that may influence the offering’s performance. Finally, the target audience analysis should designate at least two consumer demographics so as not to rely on a

single group of customers. The marketing planners should describe the geographic, demographic, psychological, and behavioral characteristics of each target audience in the form of a bulleted list. To better contextualize the consumer base, the marketing plan should include fictional personas that represent at least one member of each target audience (see Figure 8).



The Busy Senior

Name: Jacob
Gender: Male
Age: 21
Hometown: Haverhill, MA
Year and Major: Senior computer science major

- Very involved on campus, including a varsity sports team, a fraternity, and multiple clubs
- Trying to spend as much time as possible with his friends before graduation
- Conducting a survey for his HUA seminar about WPI students' favorite musical artists

Jacob uses the WPI PEP to reduce the time it takes to distribute his HUA survey. Now, he has more time and energy to focus on his friends and on-campus involvement!

Figure 8. A persona included in the WPI PEP marketing plan.

The goals and objectives section defines the specific outcomes that the marketing efforts aim to achieve. Goals should encompass broad, qualitative desired outcomes that reflect high-level organizational aspirations. Each goal should consist of at least two objectives, measurable milestones that contribute toward goals. Marketing planners should base objectives on the SMART framework: they should be specific, measurable, attainable, relevant, and time-bound. This section should be organized in the form of a chart to provide a clear and structured overview of the goals and their corresponding objectives (see Figure 9).

Goals	Objectives
1. Get students to post surveys to the WPI PEP	1A. Publish at least 6 new advertisements per term
	1B. Collect at least 8 student testimonials and pieces of user-generated content (UGC) per year that highlight the benefits of the WPI PEP to use in advertising campaigns
	1C & 2C: Form a WPI PEP Student Ambassadors organization to promote the portal among the student body
2. Get students to respond to surveys on the WPI PEP	2A. Increase survey participation by 50% using tangible rewards
	2B. Ensure that 70% of students respond to at least 1 survey per term by the end of the WPI PEP's third year
3. Enable professors to be advocates for the WPI PEP	3A. Educate professors on how the WPI PEP works and how to best assist students with the portal
	3B. Partner with at least 2 professors of research-intensive courses (i.e., GPS or ID 2050) to integrate the WPI PEP into the curriculum
	3C. Platform at least 2 professors to showcase their survey-related research per year

Figure 9. The goals and objectives section from the WPI PEP marketing plan.

The marketing tactics section consists of a set of specific actions to attain the outlined goals and objectives. Each tactic should include the relevant communication channels, promotional messaging, key performance indicators, and how the activity ties back to a specific goal or objective (see Figure 10). Marketing tactics should be organized according to the plan's goals and objectives. This organizational framework ensures that the plan offers a comprehensive approach to addressing all critical aspects of the marketing strategy.

Goal 3: Enable professors to be advocates for the WPI PEP



Informational seminar for professors

This event will teach professors about the purpose and benefits of the WPI PEP, show them how to assist students with the portal, and answer any of their questions.

Channel:

- In-person live session accompanied by a PowerPoint presentation (an online option should be available via Zoom)
- A recording of the session will be sent to professors via email and accessible via the WPI PEP

Consistency: Once per academic year, preferably in A term

Figure 10. A marketing tactic from the WPI PEP marketing plan.

The financial projections section contains a sales forecast, expense forecast, and break-even analysis. To facilitate comprehension, the data should be presented in the form of a chart. Key takeaways should be clearly explained for those who may not understand the calculations. If the offering is free, this section may be omitted, as sales revenue and the break-even point would be irrelevant. In this case, expenses can be addressed within the budget as part of the implementation controls section.

Lastly, the implementation controls section includes necessary contingency plans, outlines an itemized budget, and provides a schedule. Contingency plans should account for potential obstacles and deviations from the original plan, with clear protocols for how to address them. An itemized budget should include all recommended expenses, their quantities and prices, and the total cost. The schedule should include specific dates and deadlines to ensure the plan

stays on track. For the schedule, marketing planners should create a Gantt chart to clearly visualize the overall timeline (see Figure 11).

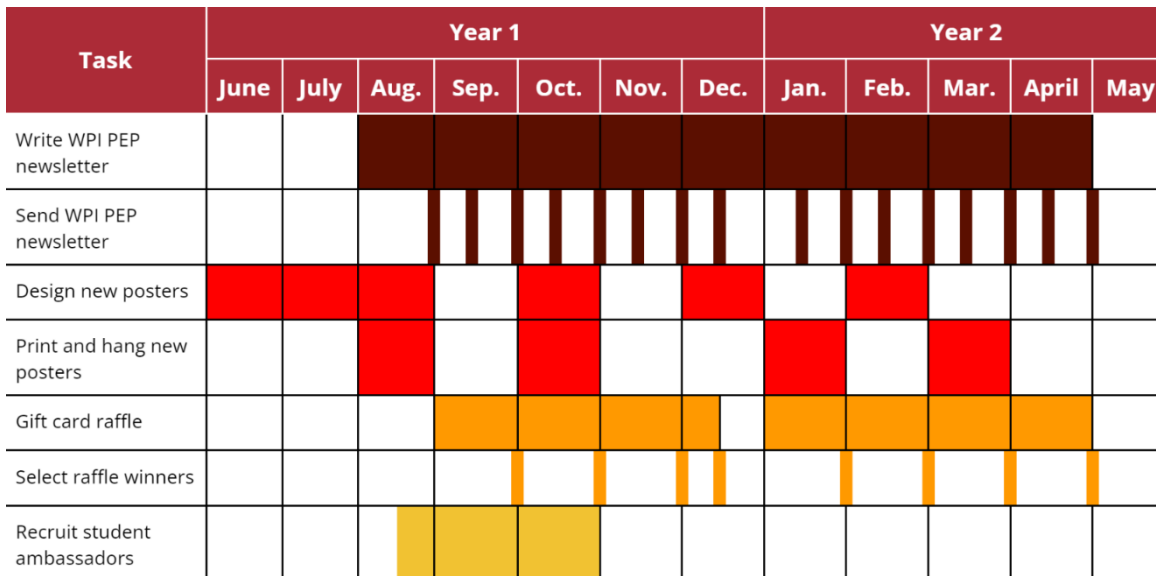


Figure 11. Part of a Gantt chart included in the WPI PEP marketing plan to serve a schedule.

6.1.2 Incorporating rhetorical techniques

Appealing to the audiences’ senses of ethos, pathos, and logos allows marketing planners to strengthen their arguments and convince readers of the plan’s viability. This section explains how marketing planners should incorporate rhetorical techniques into the document.

Marketing planners should always be honest and transparent to demonstrate credibility and establish trust and favorability with the audience. This involves clearly addressing any relevant challenges that the offering or marketing campaign will face. Challenges should be explained in the marketing plan’s situation analysis, SWOT analysis, and contingency plans. The marketing planners should also employ a professional yet pleasant tone throughout the document, ensuring effective communication that resonates positively. An appropriate tone should convey confidence and expertise while remaining friendly and engaging (see Figure 12). Marketing planners should proofread the document to eliminate writing errors, awkward phrasing, and unclear explanations. The plan should also reference authority figures to back up the marketing planners’ ideas, as the audience will likely exhibit trustworthiness toward them. Authority figures may include well-known sources of knowledge, experienced members of upper management, or organizations that have found success using similar means.

While we want to encourage students to primarily utilize the WPI PEP in order to address the challenges associated with sourcing participants from pre-existing group chats—including unwanted clutter, selection bias, and social pressure—students retain the option to use multiple survey distribution channels in addition to the WPI PEP. This means that the competitive success of the portal relies on convincing students to choose the WPI PEP as their preferred method of survey distribution.

Understanding the competitive landscape helps us assess the strengths, weaknesses, opportunities, and threats faced by the WPI PEP.

Figure 12. An example of a professional yet pleasant tone in an excerpt from the WPI PEP marketing plan.

To emotionally connect with the audience, marketing planners should strive to elicit positive feelings through text and imagery. This can be accomplished by emphasizing beneficial outcomes, incorporating uplifting and relatable visuals, and using aspirational language (see Figure 13). Marketing planners should ensure to frame the success of the marketing campaign as success for the employees, stakeholders, and members of upper management. Marketing planners should also employ storytelling techniques, utilizing a narrative structure and analogies when applicable. The executive summary and situation analysis would particularly benefit from a narrative approach.

By implementing the strategic marketing initiatives outlined in this plan, we will enable widespread adoption of the WPI PEP and facilitate survey distribution for members of our community.

Figure 13. An example of aspirational language from the WPI PEP marketing plan.

Marketing planners should support their claims with data and logical reasoning to appeal to the audience’s sense of logos. Research findings, statistics, or case studies that serve as a foundation for the planners’ line of reasoning should always be provided. If not based on data, arguments should be fully fledged out, rational, and easy to follow.

6.1.3 Incorporating modern trends

Marketing plans should leverage trends related to digitalization, specifically social media and artificial intelligence (AI). The organization’s social media accounts should be used as a channel for marketing tactics when attempting to reach a wide range of potential consumers. Marketing planners should also use social media to solicit or ascertain public feedback on marketing campaigns, using it to determine which strategies work and which do not. Social media should also be used to determine consumer behavior as part of the target audience analysis. Analyzing user interactions and profiles allows marketing planners to better understand the target audiences’ geographic, demographic, psychological, and behavioral characteristics.

Marketing planners should use AI tools to draw conclusions from large data sets related to the competitive environment, target audience, and the organization itself. Generative AI tools such as ChatGPT and DALL-E can help with writing content, creating imagery, and suggesting additional goals, objectives, and tactics. However, marketing planners should exercise caution and avoid excessive reliance on the tool. Before incorporating any AI-generated text into the plan, marketing planners should ensure that the information is factual and reasonable, the formatting is consistent with the rest of the document, and the tone is appropriate and not overly robotic or flowery. For AI-generated imagery, marketing planners should make sure there are no visual inconsistencies or quirks that may distract from the image's intended purpose. In general, marketing planners should only use AI to supplement human expertise and creativity rather than to replace it.

Marketing planners should consider globalization when developing a marketing plan for an offering that will be available internationally. International offerings require an international marketing strategy, so marketing planners should outline how they will adapt different tactics across different cultures. Marketing planners should also anticipate rapid changes in consumer behavior depending on global events and cultural shifts. Contingency plans should address any relevant and impactful possible changes.

Sustainable initiatives such as bio-degradable packaging, carbon neutrality, and environmental philanthropy should be incorporated into the marketing strategy. Marketing planners should develop tactics that ensure awareness of sustainable measures while providing accessible proof of their environmental impact. However, marketing planners should avoid “greenwashing” and never fabricate or exaggerate the product or service’s sustainable attributes.

Marketing planners should adopt an agile mindset when developing a plan. The development process should be efficient and iterative, incorporating relevant changes to the organization’s external and internal environments as they occur. In addition to an agile development process, the marketing plan itself should encompass agile principles. The marketing planners should anticipate unexpected events by embracing flexibility and preparing contingency plans.

6.1.4 Marketing plan format

Marketing plans should have an easy-to-follow yet visually interesting format. To enhance the accessibility and readability of the documents, marketing planners should include page numbers throughout the plan. These numbers should be referenced within the table of contents to facilitate navigation (see Figure 14).

Executive summary	i
Situation analysis	1
Competitive environment	2
SWOT analysis	3
Target audience analysis	4
Goals and objectives	7
Marketing tactics	8
Advertising and awareness campaign	8
WPI PEP Newsletter	9
WPI PEP Student Ambassadors	10
Table-sitting sessions	11
Live events	12
Informational seminar for students	13
Gift card raffle	14
Informational seminar for professors	15
Professor partnerships	16
Professor research spotlights	17
Implementation controls	18
Contingency plans	18
Itemized budget	19
Schedule	20
References	21

Figure 14. The WPI PEP marketing plan's table of contents.

The marketing plan should utilize headings to designate different sections, along with subheadings to delineate specific topics within each section. Headings and subheadings also provide a hierarchical structure to organize the plan.

Content should either be written in the form of full-fledged paragraphs or bullet points. Paragraphs should be used to detailed explanations and analyses, while bullet points should be used to provide concise lists or key points. Marketing planners should use bold text to emphasize important words or phrases throughout the document (see Figure 15).

The WPI PEP's target audiences consist of **undergraduate WPI students** and **graduate WPI students**. Although these groups share similar characteristics such as an interest in STEM, their geographic, demographic, behavioral, and psychological traits set them apart.

Figure 15. An excerpt from the WPI PEP marketing plan that uses bold text to emphasize the two target audiences.

Visual elements allow marketing planners to convey information in an eye-catching, efficient manner. They can also facilitate the communication of complex ideas. Marketing

planners should use color-coded charts and graphs to present data and findings. Charts can also be used to display interrelated concepts, such as a SWOT analysis or the goals and objectives.

Marketing plans should also include images when relevant. Images can serve as a visual aid, a way to emotionally resonate with the audience, or a means to integrate company branding (see Figure 16). In addition to images that incorporate company branding, the marketing plan should include other brand-specific logos, typography, and colors. Doing so helps to reinforce the plan’s alignment to the brand’s overall strategy.

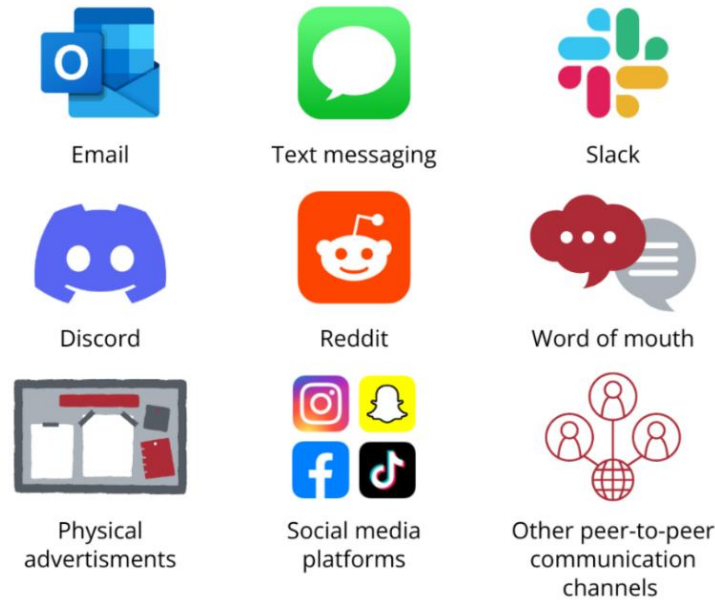


Figure 16. A series of images from the WPI PEP marketing plan. These graphics serve as a visual aid to illustrate different survey distribution channels and incorporate WPI’s brand-specific colors (gray and crimson).

6.2 WPI Project Engagement Portal marketing plan

While Section 6.1 details best practices applicable to all marketing plans, this section uses the results of the peer survey to recommend specific tactics and strategies that the marketing plan for the WPI PEP should include. The WPI PEP marketing plan should incorporate the best practices recommended in Section 6.1, including the proper components, rhetorical strategies, modern trends, and format. The remainder of this section provides promotional tactics and student engagement strategies that the WPI PEP marketing plan should implement.

Advertisements for the WPI PEP should emphasize its value to all students, whether they post surveys, respond to surveys, or both. For survey posters, the value of the WPI PEP resides in its role as a centralized platform for reaching fellow students and garnering survey responses. For survey respondents, the portal’s value lies in assisting their peers with research and contributing to academic initiatives across the student body. Advertisements should leverage user-generated content (UGC), such as student testimonials of how the WPI PEP has enhanced

their academic experience. The marketing planners should offer incentives to survey respondents and highlight these incentives in advertisements. A monthly gift card raffle, where one survey response equates to one raffle entry, would entice students to respond to more surveys to increase their chances of winning. Primary promotional channels should include emails to students' WPI inboxes, posts on WPI social media accounts, and physical signage around campus. Students should be encouraged to participate in one to three surveys on the portal each semester, as any more than that would likely overwhelm or irritate the average student.

On-campus events to promote the WPI PEP should occur at least once per semester. These events can vary in complexity, providing a diverse range of experiences to attract students with different interests and social inclinations. For example, an event can consist of a table-sitting session at the Rubin Campus Center, a workshop on how to design effective surveys, or a guest speaker presentation about survey-based research in a lecture hall. The events should offer extra incentives for attendance, such as free snacks or Chartwells catering, merchandise including WPI Superfan t-shirts and stickers, and raffles for enticing prizes.

Since student-run events are more popular than events hosted by faculty members, the marketing planners should recruit undergraduate and graduate students to serve as WPI PEP ambassadors. This group can assist with organizing, promoting, and running events as well as promoting the use of the WPI PEP among the student body. The marketing planners should specifically target students who are involved with multiple clubs or organizations to become ambassadors. Involved students are likely to have many connections within the student body, allowing them to recommend the WPI PEP and corresponding promotional events to a variety of on-campus groups and individuals. In turn, recommendations from friends are likely to incentivize other students to participate in events or try out the portal. Of course, no student who wishes to participate in the WPI PEP ambassadors program should be excluded because of their level of campus involvement. The program is open to all WPI students. To recruit ambassadors, the marketing planners should advertise the program to students via email, WPI social media accounts, and signage around campus. The marketing planners should aim to appoint at least ten ambassadors to ensure sufficient representation across student communities.

In addition to a group of WPI PEP student ambassadors, the marketing planners should encourage professors to advertise the portal to their students and advisees. Professors should receive promotional material about the WPI PEP via email to enable them to recommend the portal for student surveys. The marketing planners should invite professors to all promotional events, encouraging them to let their students know about these events as well. For guest speaker sessions, the marketing planners and the WPI PEP ambassadors should reach out to professors who are familiar with survey design, distribution, or analysis. Platforming WPI professors emphasizes the importance of surveys within the community and has a better chance of attracting students who admire these professors.

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Appendices

Appendix A: Survey questions and results

This appendix contains the introduction, questions, and participant responses from my survey on effective student communication channels, peer survey response incentives, and WPI-sponsored event engagement incentives.

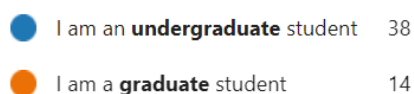
Introduction:

Hello! I am a Professional Writing student working on an MQP to develop a marketing plan to promote a project engagement platform for WPI students. The following questions intend to identify the most effective communication channels to reach WPI students, determine what motivates students to respond to peer surveys, and determine what incentivizes students to participate in WPI-sponsored initiatives. The information I collect will not make your answers identifiable and will only be used to develop potential marketing strategies. You may stop this survey at any time.

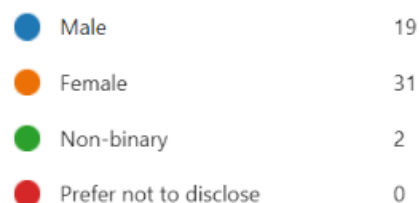
To contact the owner of this survey, Caroline McLaughlin, with any questions or comments, you may reach out to ckmclaughlin@wpi.edu.

Questions and results:

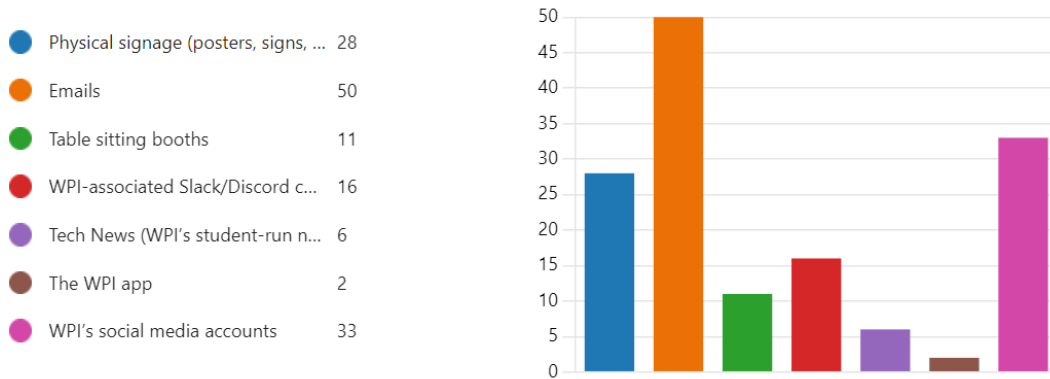
1. Are you an undergraduate or graduate student?



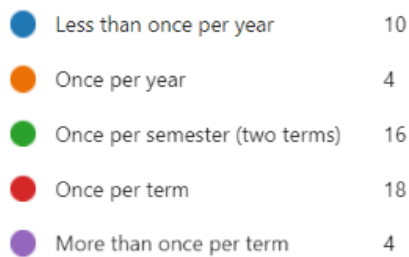
2. Which of the following gender identities do you most closely align with?



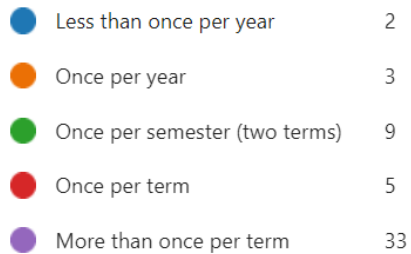
3. Where do you primarily find information about WPI news and events? (Select multiple)



4. How often do you go to events hosted by an on-campus group that is NOT a student-run organization? (i.e., a specific department, academic advising, CDC, GEO, TechEats, etc.) (Select one)



5. How often do you go to events hosted by a student-run organization? (Select one)



6. How many WPI student-administered surveys do you approximately respond to each semester (two terms)? Note: A WPI student-administered survey is a form that intends to collect data for a WPI student or student team's class, IQP, MQP, etc.

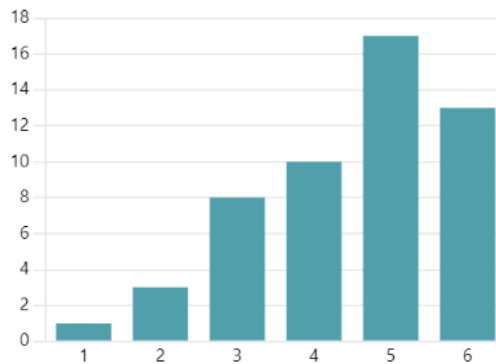
● None	5
● About 1-3 surveys	29
● About 4-6 surveys	12
● About 7-10 surveys	3
● More than 10 surveys	3



Rate the following questions on a scale from 1 to 6, with 1 being very unlikely and 6 being very likely.

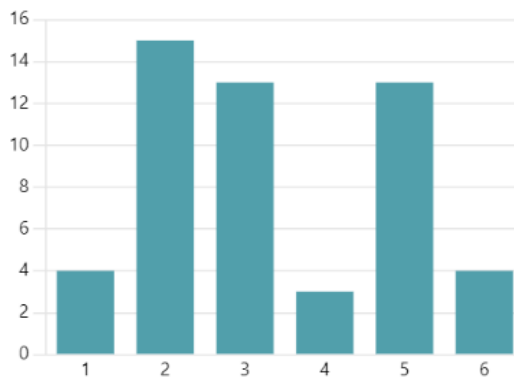
7. How likely would you be to attend a WPI event if they offered free snacks? (Select one)

4.50
Average Rating



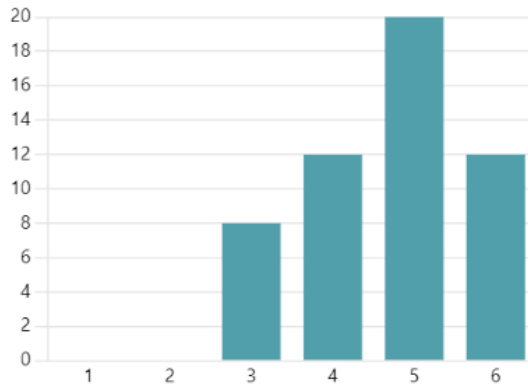
8. How likely would you be to attend a WPI event if they were running a free raffle that you could enter? (Select one)

3.35
Average Rating



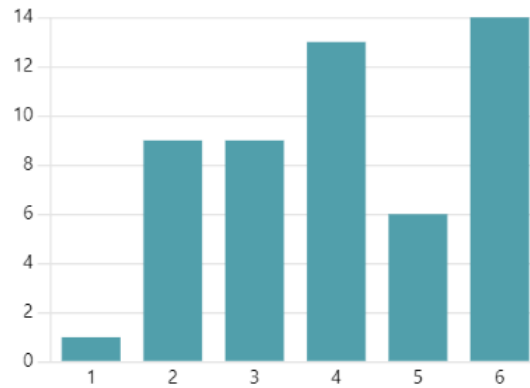
9. How likely would you be to attend a WPI event that was recommended to you by a close friend? (Select one)

4.69
Average Rating



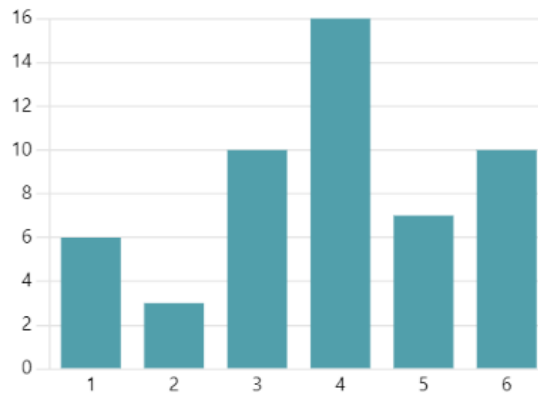
10. How likely would you be to attend a WPI event that was recommended to you by a professor or faculty member? (Select one)

4.08
Average Rating



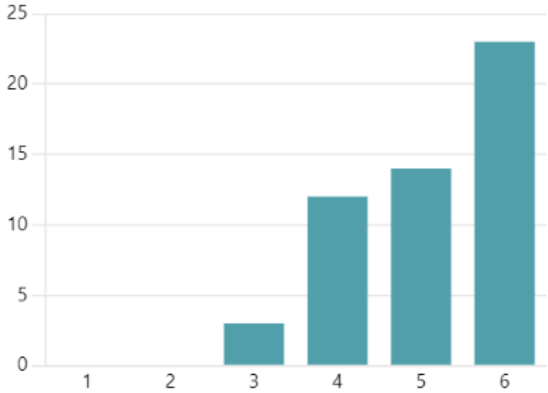
11. How likely would you be to respond to a survey that puts all respondents into a raffle to win a gift card? (Select one)

3.87
Average Rating



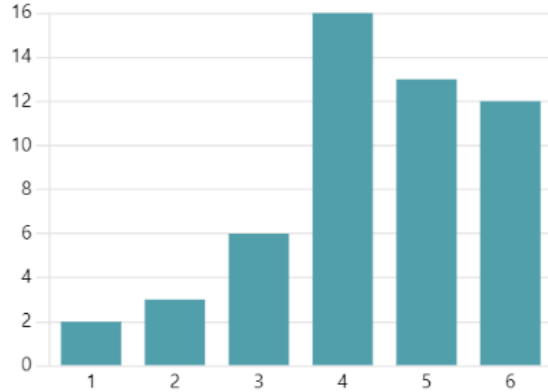
12. How likely would you be to respond to a survey that was sent to you by a close friend?
(Select one)

5.10
Average Rating



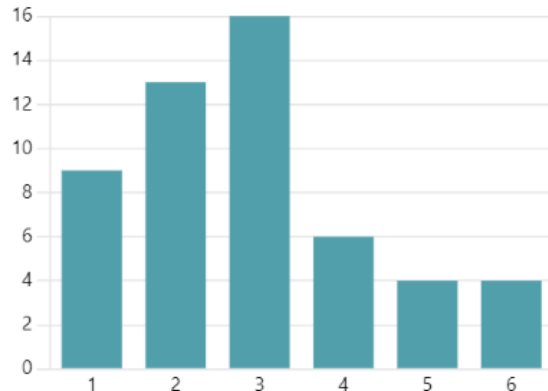
13. How likely would you be to respond to a survey that was sent to you by a professor or faculty member?
(Select one)

4.37
Average Rating



14. How likely would you be to respond to a survey with no tangible or social incentive?
(Select one)

2.90
Average Rating



15. Are there any other incentives that would motivate you to attend an on-campus event?
Describe them here. (Optional open response)

Respondent	Response
Anonymous 1	Free something (food, stuffed animal, stickers)
Anonymous 2	if it seems fun/interesting
Anonymous 3	If there are good events going on and I have time I would show up. Some events are a waste of time and those are the ones I avoid.
Anonymous 4	free food
Anonymous 5	Frequent reminders, live music, dancing--Clark has social events frequently in their lounge that features student bands and everyone goes and has fun (like a concert), that would be awesome
Anonymous 6	Gift cards or prizes, full meals that don't cost meal swipes
Anonymous 7	Getting to meet esteemed members of major/community, social activities, educational usefulness
Anonymous 8	Free food, if the event is in the daytime. I do not go to events after sundown.
Anonymous 9	As you mentioned before, food is probably my biggest incentive along with WPI merchandise.
Anonymous 10	free stuff or catering
Anonymous 11	Academic help, networking for professional or academic purposes, being in a club
Anonymous 12	Free food or free merch (Tshirts / Hoodies)
Anonymous 13	Friends and Instagram WPI posts
Anonymous 14	Family is welcome, WPI souvenirs
Anonymous 15	my interests
Anonymous 16	free merch like shirts
Anonymous 17	Free stuff like food or merch
Anonymous 18	Merch or food

16. Are there any other incentives that would motivate you to respond to a student-administered survey? Describe them here. (Optional open response)

Respondent	Response
Anonymous 1	I just like surveys so I don't need incentive
Anonymous 2	not being a generic "please fill out for my IQP"
Anonymous 3	If the results would help improve an issue I care about
Anonymous 4	to help a friend
Anonymous 5	Telling me what the survey will be used for
Anonymous 6	It was beneficial for a friend, gift cards
Anonymous 7	If someone explains to me their motives, and what my answer is going towards.
Anonymous 8	N/a. I like doing surveys
Anonymous 9	I would respond to some sort of gift card survey.
Anonymous 10	gift card incentive or friend suggested me to do it
Anonymous 11	Merch giveaway giftcard
Anonymous 12	Instagram posts
Anonymous 13	It must be short, and concise, should not take more than 5-7 minutes to complete.
Anonymous 14	short and crisp
Anonymous 15	gift cards
Anonymous 16	Gift cards

Appendix B: WPI Project Engagement Portal Marketing Plan

This appendix includes the marketing plan I created for the WPI PEP based on my research and final recommendations. The marketing plan begins on the next page (page 53).



WPI

WPI Project Engagement Portal Marketing Plan

April 2024

Created by
Caroline McLaughlin

Executive summary

Worcester Polytechnic Institute (WPI) students frequently conduct **surveys** as part of the university's project-based learning curriculum. To facilitate high-quality data collection, the **WPI Project Engagement Portal (PEP)** allows students to post surveys and respond to surveys from their peers. The WPI PEP requires a marketing strategy to establish an active user base.

The portal's **main competitors consist of survey distribution channels** used by WPI students, including email, text messaging, physical advertisements, and social media. The competitive success of the portal relies on convincing students to choose the WPI PEP as their preferred method of survey distribution. To do so, the marketing campaign must leverage the portal's strengths and unique features.

The WPI PEP's **target audiences are undergraduate and graduate WPI students**. Undergraduate students typically have an interest in STEM, thrive in fast-paced and hands-on environments, and display common characteristics of Generation Z. Graduate students are also interested in STEM, exhibit ambition and academic curiosity, and display common characteristics of older members of Generation Z and millennials. With these audiences in mind, the marketing campaign intends to achieve the following goals:

- Get students to post surveys on the WPI PEP
- Get students to respond to surveys on the WPI PEP
- Enable professors to be advocates for the WPI PEP

To convince students to post and respond to surveys, the WPI PEP team will create physical and digital **advertisements**, a biweekly WPI PEP **newsletter**, and an **informational seminar** for students. A group of **WPI PEP Student Ambassadors** will assist with running promotional events, including **table-sitting** sessions and **live events** such as survey workshops and guest speaker presentations. A monthly **gift card raffle** where one WPI PEP survey response is equivalent to one raffle entry will further entice students to respond to their peers' surveys.

To enable professors to serve as advocates for the WPI PEP, the WPI PEP team will offer an **informational seminar** about the portal for faculty members. The team will also form **partnerships with professors** of research-centric courses to integrate the WPI PEP into course curriculums. Promotional material and live events will **showcase professors' research** to emphasize the importance of primary data collection within the WPI community.

Contingency plans account for low initial adoption rates from students, low faculty engagement, and prolonged technical issues. The marketing campaign's budget should be \$1,446.50 each year to support effective promotional outreach. Adherence to the proposed schedule is essential to ensure efficient planning and consistent promotion.

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Situation analysis

WPI is a leader in **project-based learning (PBL)** among educational institutions. The university implemented the WPI Plan in 1970, where “students [apply] knowledge and skills from the classroom to real problems around the world” through project work (“10 Things to Know...,” n.d.). While PBL’s role in WPI’s curriculum is best exemplified through the mandatory Interactive Qualifying Project (IQP), Major Qualifying Project (MQP), and humanities seminar or practicum (HUA), standard courses also incorporate PBL. PBL aims to strengthen students’ problem-solving skills, reinforce the importance of collaboration, and demonstrate the interdisciplinary connection between STEM and the humanities.

Student projects frequently involve surveys that aim to obtain primary data about their peers’ opinions, behaviors, and characteristics. **Collecting a sufficient amount of high-quality data can be difficult for students due to the lack of a centralized survey distribution channel.** Asking members of pre-existing group chats to participate in a survey generates **undesirable off-topic clutter** in social spaces. The request may be skimmed over by uninterested readers or buried within other topical conversations. Pre-existing group chats often consist of surveyors’ friends or colleagues, which can potentially lead to **selection bias** in the data. Participants may also feel **pressured to provide socially acceptable or desirable answers** and avoid controversial responses when surveyed by friends or acquaintances (Zerbe & Paulhus, 1987).

The **WPI Project Engagement Portal (WPI PEP)** facilitates survey distribution and alleviates the risk of incorporating biased or otherwise low-quality data into student projects. The WPI PEP allows students to collect high-quality data and contribute to their peers’ academic endeavors. Students can post links to their surveys on the portal and respond to surveys from their peers. **Without an active user base that both posts and responds to surveys, the WPI PEP would be impracticable and unviable.**

This marketing plan offers suggestions on how to promote the WPI PEP to the student body. By implementing the strategic marketing initiatives outlined in this plan, we will enable widespread adoption of the WPI PEP and facilitate survey distribution for members of our community.

Competitive environment

The WPI PEP's main competitors are not survey creation tools such as Microsoft Forms, Google Forms, Qualtrics, or SurveyMonkey. Instead, **the portal's competitors are survey distribution channels used by WPI students.** These channels include:



Email



Text messaging



Slack



Discord



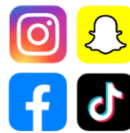
Reddit



Word of mouth



Physical advertisements



Social media platforms



Other peer-to-peer communication channels

While we want to encourage students to primarily utilize the WPI PEP in order to address the challenges associated with sourcing participants from pre-existing group chats—including unwanted clutter, selection bias, and social pressure—students retain the option to use multiple survey distribution channels in addition to the WPI PEP. This means that the competitive success of the portal relies on convincing students to choose the WPI PEP as their preferred method of survey distribution.

Understanding the competitive landscape helps us assess the strengths, weaknesses, opportunities, and threats faced by the WPI PEP.

SWOT analysis

Strengths

- The prevalence of WPI courses and projects that require or recommend peer surveys as a research tool means that **many students would potentially utilize the portal**
- A WPI-affiliated portal has a more **credible** reputation than a third-party website
- Students can use the WPI PEP **along with other means of survey distribution** (i.e., posters, group chats, etc.)

Weaknesses

- Students are **more likely to use the portal to post their own surveys** than to take the time to respond to others' surveys
- The WPI PEP only provides links to existing surveys; it **doesn't allow users to build a survey** on the portal
- The portal's success solely relies on whether it is adopted and **consistently used** by members of the student body

Opportunities

- **Collaborating with faculty members** to incorporate the WPI PEP into course curriculums could increase utilization
- **Integrating the portal with existing WPI resources** such as Canvas or eProjects could streamline the data collection process
- Continuously **improving and expanding** the functionality of the WPI PEP could attract additional users

Threats

- The **accessibility** of other survey distribution channels (i.e., text messaging, email, social media, etc.) may limit utilization of the portal
- Students may not want to respond to surveys unless it **personally benefits** them
- **Limited adoption** of the WPI PEP would negatively impact the effectiveness and sustainability of the portal

Overall, the WPI PEP's strengths and opportunities indicate that the portal has the **potential to become a valuable and popular resource** within the WPI community. Addressing the weaknesses and threats by offering **transparent communication** and frequent **technological updates** will ensure the successful adoption of the portal by the WPI student body.

Target audience analysis

The WPI PEP's target audiences consist of **undergraduate WPI students** and **graduate WPI students**. Although these groups share similar characteristics such as an interest in STEM, their geographic, demographic, behavioral, and psychological traits set them apart.



Undergraduate WPI students

Geographic

- Most underclassmen live on-campus while most upperclassmen live off-campus
- Many are from Massachusetts or New England

Demographic

- Typically between the ages of 18 and 22
- Majority (65%) are male, 35% are female
- 63.6% identify as white, 27.2% belong to minority groups

Psychological

- Interested in STEM
- Fast learners who thrive in fast-paced environments (such as the 7-week term system)
- Most participate in an on-campus club or sport

Behavioral

- Innovative and interested in new technologies
- Prefer collaborative, hands-on experiences
- Display common characteristics of Generation Z: proficient with technology, value authenticity, and seek personalized experiences



Graduate WPI students

Geographic

- Most either live on-campus or commute
- Many (39%) are from outside of the United States, primarily India and China

Demographic

- Typically between the ages of 22 and 29
- Majority (67.5%) are male, 32.5% are female
- 39% identify as white, 14.6% belong to minority groups

Psychological

- Interested in STEM
- Typically exhibit ambition, strong problem-solving skills, and intellectual curiosity
- Many hold research or teaching positions

Behavioral

- Innovative and interested in new technologies
- Display common characteristics of millennials and older members of Generation Z: seek occupational fulfillment and value autonomy

To further understand how undergraduate and graduate students may differ, let's examine some **personas**: hypothetical depictions of individuals within our target audiences. These personas help us understand consumer preferences by **combining target audience traits with a touch of individuality**.



The Busy Senior

Name: Jacob

Gender: Male

Age: 21

Hometown: Haverhill, MA

Year and Major: Senior computer science major

- Very involved on campus, including a varsity sports team, a fraternity, and multiple clubs
- Trying to spend as much time as possible with his friends before graduation
- Conducting a survey for his HUA seminar about WPI students' favorite musical artists

Jacob uses the WPI PEP to reduce the time it takes to distribute his HUA survey. Now, he has more time and energy to focus on his friends and on-campus involvement!



The Learning Freshman

Name: Anya

Gender: Female

Age: 18

Hometown: Orlando, FL

Year and Major: Freshman civil engineering major

- Overwhelmed by the transition to college, especially all of WPI's websites and resources
- Tends to ask a lot of questions
- Currently taking a GPS where her team wants to survey fellow WPI students about their recycling habits

Anya is initially apprehensive about trying out the WPI PEP. She decides to attend an informational session about the portal, where the presenter answers all of her questions. Now, Anya feels confident that the WPI PEP is just what her team needs to distribute their survey!



The Helpful TA

Name: Lucy

Gender: Female

Age: 23

Hometown: Albany, NY

Year and Major: Graduate robotics engineering student

- Recently earned her bachelor's degree in robotics engineering from WPI
- Used the WPI PEP to distribute a survey for her IQP
- Works as a teaching assistant for an undergraduate robotics course, where the students must conduct a survey to determine their design

Lucy shows her students the WPI PEP and explains how it can help them distribute their surveys just like it helped her during her IQP!



The Group Leader

Name: Krish

Gender: Male

Age: 26

Hometown: Bengaluru, India

Year and Major: Graduate data science student

- Tends to be an early adopter of new products, especially technology
- Takes on the "leader" position in group projects
- Currently working on a project with 3 older students who do not keep up to date with WPI news

Krish introduces his group mates to the WPI PEP, which they had heard of but were not very familiar with. After hearing Krish's explanation, the group is on board with using the portal to distribute their survey!

Goals and objectives

The following goals are meant to guide the marketing strategy and tactics of the WPI PEP. Each goal is accompanied by corresponding objectives that offer clear benchmarks for success and direction.

Goals	Objectives
1. Get students to post surveys to the WPI PEP	1A. Publish at least 6 new advertisements per term
	1B. Collect at least 8 student testimonials and pieces of user-generated content (UGC) per year that highlight the benefits of the WPI PEP to use in advertising campaigns
	1C & 2C: Form a WPI PEP Student Ambassadors organization to promote the portal among the student body
2. Get students to respond to surveys on the WPI PEP	2A. Increase survey participation by 50% using tangible rewards
	2B. Ensure that 70% of students respond to at least 1 survey per term by the end of the WPI PEP's third year
3. Enable professors to be advocates for the WPI PEP	3A. Educate professors on how the WPI PEP works and how to best assist students with the portal
	3B. Partner with at least 2 professors of research-intensive courses (i.e., GPS or ID 2050) to integrate the WPI PEP into the curriculum
	3C. Platform at least 2 professors to showcase their survey-related research per year

Marketing tactics

Goals 1 & 2: Get students to post and respond to surveys on the WPI PEP

Advertising and awareness campaign

The advertising and awareness campaign will consist of messages, infographics, and videos explaining the WPI PEP, highlighting the portal's beneficial aspects, or encouraging students to post and respond to surveys.

Advertisements for the WPI PEP should emphasize its value to all students, whether they post surveys, respond to surveys, or both. For survey posters, the value of the WPI PEP resides in its role as a centralized platform for reaching fellow students and garnering survey responses. For survey respondents, the portal's value lies in assisting their peers with research and contributing to academic initiatives across the student body.

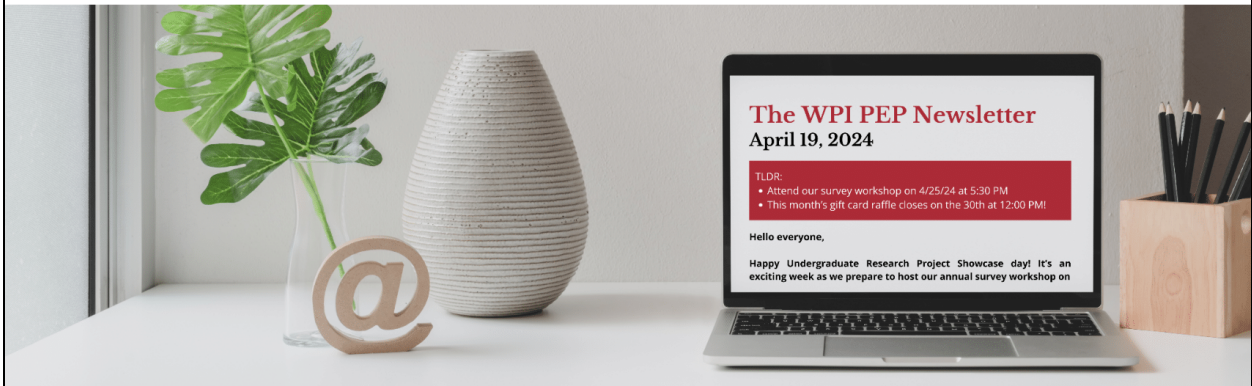
Channel:

- Email (sent to all WPI undergraduate and graduate students)
- WPI's social media accounts: Instagram, Facebook, X (formerly Twitter), and TikTok
- Signage posted on bulletin boards and screens throughout campus, especially high-traffic areas such as Unity Hall, the Campus Center, and Innovation Studio

Consistency:

- Email: 3 issues of the biweekly "WPI PEP Newsletter" per term
- Social media: 2 new posts per term—the WPI PEP Team should aim to create content that can be posted on at least 2 social media channels
- Signage: 1 new physical or digital poster per term

Goals 1 & 2: Get students to post and respond to surveys on the WPI PEP



WPI PEP Newsletter

The WPI PEP Newsletter will be a biweekly newsletter sent to all undergraduate and graduate students. The newsletter will provide useful information and tips about the portal, highlight surveys that need responses, promote the monthly raffle and any upcoming informational seminars or events, and showcase student testimonials and user-generated content.

Channel: Email

Consistency: Every other week

Goals 1 & 2: Get students to post and respond to surveys on the WPI PEP



WPI PEP Student Ambassadors

The WPI Student Ambassadors program should consist of highly involved students who will promote the WPI PEP to the student body. Ambassadors will assist with organizing, promoting, and running promotional events and developing content for advertisements.

The program should be open to all WPI students. To recruit ambassadors, the program will be advertised to students via email, WPI social media accounts, and signage around campus. Students will be able to apply to join the organization by filling out a form. The form will consist of the following questions:

1. What is your grade level? (First-year, sophomore, junior, senior, or graduate)
2. What clubs and organizations are you involved with on campus? Please include if you currently or previously have held any leadership positions.
3. Have you used the WPI PEP to post or respond to surveys before? If so, what for?
4. Why are you interested in becoming a WPI PEP Student Ambassador?

Based on form responses, at least 10 ambassadors should be appointed to ensure sufficient representation across student communities. Ambassadors should be encouraged to promote the WPI PEP, table-sitting sessions, and live events to their peers and members of organizations that they are a part of as much as they see fit.

Channel: N/A

Consistency: Ambassador meetings will occur once per week

Goals 1 & 2: Get students to post and respond to surveys on the WPI PEP



Table-sitting sessions

WPI PEP Student Ambassadors will set up a booth in the Campus Center or by the fountain to promote the WPI PEP and answer any questions about it. Free snacks, merchandise (including WPI Superfan t-shirts and WPI PEP stickers/pens), and informational flyers about the portal will be offered to attract students who pass by.

Channel: N/A

Consistency: Once per term

Goals 1 & 2: Get students to post and respond to surveys on the WPI PEP



Live events

The WPI PEP Student Ambassadors will work alongside the WPI PEP team to organize live promotional events. Ambassadors should be encouraged to brainstorm creative event ideas that may entice students to attend. Examples of possible events include guest speaker sessions featuring professors or researchers who have conducted interesting surveys, workshops on how to optimize surveys, or interactive sessions on survey analysis techniques. Free snacks and merchandise (including WPI Superfan t-shirts and WPI PEP stickers/pens) will be offered at these events to attract participants. Informational flyers with details about the WPI PEP should be available to attendees.

Channel: N/A

Consistency: Once per term

Goals 1 & 2: Get students to post and respond to surveys on the WPI PEP



Informational seminar for students

This seminar will teach students about the purpose and benefits of the WPI PEP, show them how to use the portal to post and respond to surveys, and answer any of their questions.

Channel:

- In-person live session accompanied by a PowerPoint presentation (an online option should be available via Zoom)
- A recording of the session will be sent to students via the WPI PEP Newsletter and accessible via the WPI PEP

Consistency: Once per academic year, preferably in A term

Goal 2: Get students to respond to surveys on the WPI PEP



Gift card raffle

Every time a student responds to a survey on the WPI PEP, they should be entered into a monthly raffle. Each response should count as one raffle entry to encourage students to respond to multiple surveys for a greater chance of winning. Prizes will consist of \$25 gift cards to stores and services that are popular among college students, such as Starbucks, Dunkin', Amazon, DoorDash, Uber, Target, and Chipotle. At the end of the month, one winner will be selected and highlighted in the WPI PEP Newsletter. The gift card raffle will commence in September and end in August, so there will be 8 raffles per academic year.

Channel: The gift card raffle will be promoted in advertisements (including the WPI PEP Newsletter), table-sitting sessions, live events,

Consistency: Once per month

Goal 3: Enable professors to be advocates for the WPI PEP



Informational seminar for professors

This event will teach professors about the purpose and benefits of the WPI PEP, show them how to assist students with the portal, and answer any of their questions.

Channel:

- In-person live session accompanied by a PowerPoint presentation (an online option should be available via Zoom)
- A recording of the session will be sent to professors via email and accessible via the WPI PEP

Consistency: Once per academic year, preferably in A term

Goal 3: Enable professors to be advocates for the WPI PEP



Professor partnerships

The WPI PEP Team should partner with professors of research-intensive courses, such as the Great Problems Seminar (GPS) or ID 2050, to integrate the WPI PEP into the course curriculum. This may involve teaching the students about the WPI PEP during class or requiring students to post a survey for the course to the portal. To develop these partnerships, the WPI PEP Team should reach out individually to GPS professors, ID 2050 professors, or any other professors who may be willing to participate via email.

Channel: Undergraduate and graduate courses

Consistency: Seek out at least 2 partnerships during the first year and an additional professor each year that follows

Goal 3: Enable professors to be advocates for the WPI PEP



Professor research spotlights

For live events that include guest speaker sessions, the WPI PEP Team and the WPI PEP Student Ambassadors should reach out to professors who are either familiar with survey design, distribution, and analysis or have conducted an interesting survey. Platforming WPI professors emphasizes the importance of surveys within the community and may attract students who admire these professors.

Channel:

- In-person live session in a lecture hall with at least 100 seats (an online option should be available via Zoom)
- A recording of the session will be sent to students via the WPI PEP Newsletter

Consistency: At least once per academic year

Implementation controls

Contingency plans

The following contingency plans address the most plausible **potential obstacles** that would necessitate deviations from the intended marketing plan.

Low initial adoption rate during the first year: Although it is unlikely that the WPI PEP will be an instant success, we expect at least 10 surveys will be posted on the portal per month during its first year (excluding A term and summer months). If that is not the case, additional marketing efforts should be implemented:

- The “WPI PEP Newsletter” should become a **weekly** publication
- Conduct a **survey** to collect feedback about the WPI PEP to determine how the portal can be better presented to the student body
- Explore offering **incentives for posting surveys**, such as a separate gift card raffle
- **Increase** the amount of promotional signage around campus and promotional social media posts

Low faculty engagement: If professors are hesitant to promote or integrate the WPI PEP into their courses, **personalized outreach efforts** can be made to address their concerns and demonstrate how the portal can facilitate the survey distribution process. This may include utilizing **testimonials** from students or members of the WPI PEP Student Ambassadors program. Additional resources for professors, such as a **dedicated WPI PEP newsletter for faculty members**, should also be implemented.

Technical issues: If the WPI PEP experiences an unexpected and prolonged technical issue, **promotional activities should be paused until the issue is solved**. Major updates on the portal's state should be communicated via the WPI PEP's landing page.

Itemized budget

This budget represents the expected **annual cost** for the WPI PEP marketing campaign. The WPI PEP team should be allotted the total cost (\$1,446.50) each year to ensure effective promotional outreach.

Initiative	Item	Cost per item	Quantity	Total cost
Printing (physical ads)	Poster	\$0.60	40	\$24.00
	Informational flyer	\$0.30	75	\$22.50
Raffle	Gift card	\$25.00	8	\$200.00
Live events	Food & merchandise	\$200.00	4	\$800.00
Table sitting	Food & merchandise	\$50.00	4	\$200.00
Total cost:				\$1,446.50

Schedule

The following Gantt chart outlines when promotional tasks should be completed. "Year 1" represents the first year that the WPI PEP is made available.

Task	Year 1							Year 2				
	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May
Write WPI PEP newsletter			█	█	█	█	█	█	█	█	█	█
Send WPI PEP newsletter			█	█	█	█	█	█	█	█	█	█
Design new posters	█	█	█		█		█		█			
Print and hang new posters			█		█			█		█		
Gift card raffle				█	█	█	█	█	█	█	█	█
Select raffle winners				█		█	█		█		█	█
Recruit student ambassadors			█	█	█							
Meet with student ambassadors			█	█	█	█	█	█	█	█	█	█
Table sit				█			█		█		█	
Plan live event				█	█	█	█	█	█	█	█	█
Live events					█		█		█		█	
Plan informational seminars	█	█	█	█								
Informational seminar for students				█								
Informational seminar for faculty					█							
Organize professor partnerships	█	█	█									

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