

Faculdade de Engenharia da Universidade do Porto



**Media Aggregation: Developing and Applying a
Method to Create User-Centered Aggregators**

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Abstract

Online content aggregators have always been a mainstay in internet users' routines. Serving as a middle ground between user and content, these types of platforms allow staff or their users to curate content into personalized hubs and pages. This filtering simplifies the user experience and serves to streamline the browsing of online content: be it text, image, or video. In this past decade video and streaming content became the frontrunner for the entertainment business. This has been especially pronounced in the videogame industry. Twitch.tv and YouTube are large providers of video and streaming content of this genre. Following a Design Science Research methodology, we developed a method that can guide the creation, development, and maintenance of such platforms. The developed method is then used as the foundation for the redesign of a platform dedicated to the gaming community: Unifyer. Developed by MOG, Unifyer is a web application that works to aggregate gaming content by allowing users to create rooms with their preferred streams and share those rooms to others. This project will then document the process of creating the method and its applied use on Unifyer.

Abstrato (Versão Portuguesa)

Agregadores de conteúdo online sempre foram um componente central na rotina de todos nós na Internet. Servindo como um meio termo entre o user e o conteúdo, esses tipos de plataformas permitem que uma empresa e o seu staff organizem o conteúdo em hubs e páginas personalizadas. Essa filtragem simplifica a experiência do utilizador e serve para agilizar a navegação de conteúdo online: seja texto, imagem ou vídeo. Na última década, o conteúdo de vídeo e streaming tornou-se pioneiro no setor de entretenimento. Isto foi especialmente pronunciado na indústria de video-jogos. Twitch.tv e YouTube são grandes provedores de conteúdo de vídeo e streaming desse gênero. Seguindo uma metodologia de Design Science Research, desenvolvemos um método que pode guiar a criação, o desenvolvimento e a manutenção deste tipo de plataformas de agregação de média. O método desenvolvido é então usado como base para o redesenho de uma plataforma dedicada à comunidade de jogos: Unifyer. Desenvolvido pela MOG, o Unifyer é um aplicativo “webapp” cujo objetivo é agregar conteúdo de jogos, permitindo que os seus users criem salas com seus streams preferidos e compartilhem essas salas com outras pessoas. Este projeto documentará o processo de criação do método e seu uso aplicado no Unifyer.

Dissertation Structure

This dissertation is divided in four chapters. The first will serve as an in-depth introduction to the topics surrounding this project. The second chapter will go through the process of creating the method, followed by chapter three where it is applied. Finally, the fourth and last chapter will show thoughts and conclusion gathered from this project as a whole.

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Chapter I

Introduction

Platforms play an important role as intermediaries [4]. The exponential growth of the internet user base saw with it a parallel increase in online content creation, be it news, entertainment, or raw data. With this growth in volume the need for connecting content creation and consumption slowly started to shift from dedicated websites to media-aggregating platforms [4] [5]. This change comes from a desire to lower the effort of consuming high volumes of information spanning multiple sources, all whilst discovering something new. The development of these platforms has been happening across industries, be it movies, engineering, politics, or gaming. On the gaming front, there have been several new platforms that have cemented themselves as the top aggregators and new ones trying to enter the market backed by big companies such as Microsoft and Amazon. However, the development of these platforms has a multitude of challenges. This research is focused on developing a method to support the development of media-aggregation platforms.

Unifyer is one such platform. Currently in development by MOG TECHNOLOGIES, it looks to be an alternative to viewing gaming related content by aggregating curated gaming streaming and video. After its initial stage of development, it was put on hold and to be reevaluated in its structure and goal.

This project will be developed alongside MOG and aims to redesign Unifyer to better fit the growing market for aggregation platforms in the gaming sphere. To accomplish this, we will first look at media aggregation and develop a methodology for creating and maintain platforms of this kind. Then, to better suit the target demographic research will be done on the gaming sphere to better understand its communities and needs. Finally, this research will be used in conjunction with our developed methodology to evaluate Unifyer and modify it to better fit its intended purpose.

Lastly, this project will revolve around the method and its creation. We found that the method was essential to work because there is very few information online on how to go about creating and managing media aggregation platforms specifically. This can be because of the culture surrounding tech being dependent in the transfer of “know-how”, or because corporations think best to keep their methods to themselves.

Objectives

This dissertation aims to report on three big goals for this project. The first is the research and development of a methodology to create, maintain and grow aggregation platforms for different industries, contexts, and target audiences. For this we intend to:

- Understand the evolution and role that aggregator platforms have online.
- Understand the current biggest aggregators and their communities.
- Understand the context and limitations of the infrastructure of aggregation platforms.
- Research the proper methodologies for developing methods.

- Propose a method to develop user-centered media-aggregation platforms.

Secondly, we intend to apply the developed method on through an instantiation in the gaming sphere and community. For this we applied the method to a platform already under development, the Unifyer platform, from MOG. With this in mind we aim to:

- Study the role of aggregators in online gaming communities.
- Study the role of HUBs for online gaming communities.
- Research and collect data on user preferences when interacting with online gaming media.
- Understand what users' value in aggregation platforms at different levels of appeal.
- Apply our method to the Unifyer platform.

Lastly, with both the method developed and the analysis of gaming community trends and needs, we will shift focus from research to technical development by:

- Implementing new features to Unifyer based on our previous work.
- Redesigning Unifyer features to better reflect our previous work.

Unifyer¹

To better contextualize this project, it is required to better understand the core concept behind Unifyer.

At its core, Unifyer is a streaming and video aggregation platform targeted at the gaming audience. It functions around a two-user type dynamic, where moderators create rooms and curate live and on demand content, and viewers connect and watch the selected content. Moderators have access to a special “create room” mode where they can use drag and drop features to quickly setup screens with multiple media playing at once. As of writing this, media types that can be imported are limited to Twitch and YouTube. When the moderator has finished setting up the room, they can link the URL for anyone to join and watch synchronously together.

Important to note that attached to this publication is a signed NDA that limits exposition on the technicalities behind the platform.

State of the Art

Design Science research and media aggregation platforms

The following state-of-the-art analysis will better contextualize the baselines for this project, as well as set a foundation to work upon for all three before mentioned parts of this dissertation.

Information Systems & Design Science

Information systems (IS) is the study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data [1].

Information systems are implemented within an organization for the purpose of improving the effectiveness and efficiency of that organization. Capabilities of the information system and characteristics of the organization, its work systems, its people, and its development and implementation methodologies together determine the extent to which that purpose is achieved [1].

Design science research is centered around the development and performance of (designed) artifacts with the explicit intention of improving the functional performance of the artifact [1]. Although rooted from IS, design science focuses on the process of iterating upon constructed work to build towards a finalized and functional final product, built by following a developed method. Design is an interdisciplinary and integrative process constituting an intellectual field of thinking and research and a professional field of practice and applied research. Therefore, design research plays one of two roles: the scientific study of the process and the content of design, and the development of methods and tools to enhance the quality of design practice based on the body of knowledge developed by the scientific study [20].

This step-by-step nature of formalizing method and implementations aligns well with our goal of creating a methodology and will be used as core for our foundation.

Defining and understanding media aggregation platforms

With the increase of global interest in media consumption, more and more platforms are created to generate and promote content. This has led to an overwhelming number of possible sources for users' news and entertainment. Online aggregators come in as a solution to lift the burden of both keeping up with numerous media outlets, as well as filtering the content to best suit the user's interests [4]. In addition to this, aggregators server as a powerful source of discoverability, showing related or highly interacted content beyond the regular feed.

The desire for a concentrated place for all the user's interests and news, combined with an ever-sprawling list of new media content tallied to the user's history is pushing content aggregation platforms to rise in popularity for both users and businesses [2].

Knowing that the final goal of this dissertation is the implementation of our developed method to improve MOG's platform, it is important to define the different kinds of aggregation platforms that are relevant to Unifyer's possible future. These can be divided in two types:

Social-Media

Social media are interactive user centered platforms with a focus on sharing information by and for users. Although they can be focused on particular media types (video, image, audio), a lot of them have grown to accept several forms of media formats. [5]

Important to social media is the user's online persona that identifies them to some capacity, be it complex like a user page and post history, or simply a display name. Having and caring about the user's persona is at the core of social media. Different platforms weight the importance of this persona differently, reflecting this by the way they are structured. [12]

Another differentiating aspect between social media platforms is the user's scope. Some platforms prefer to show only the information shared by the user's added connections. The key example here is Facebook [5]. However, Facebook works as a limited aggregator, mostly presenting the user with his/her friends' posts or interactions.

Other platforms function by having the entire user base jointly interacting, be it on a single or sub communities. Reddit is an example of this allowing users to create "sub-reddits" that act as their own communities, albeit open for all to join and participate [6].

Lastly some platforms choose to fuse both styles. This is commonly done by prioritizing the display of information from accounts the users chose to follow, but also use "suggested" content to further expand the user's scope on the platform [5].

A final distinction that is relevant to discuss is how different platforms choose to filter and display the content aggregated by the userbase. Most social media platforms allow the user to react by interacting with the post by rating it. Facebook's likes, Twitter's hearts and Reddit is upvotes all server to help content rise to the top of user's pages [7]. However, behind this cataloging of popularity are sorting algorithms. The importance placed between these algorithms differ from each platform. Reddit for example places a bigger focus on user's votes to determine content's reach and popularity, whilst twitter and Facebook measure impressions and interaction more. The latter system leads to a greater amount of negative content being displayed, but also higher interaction. [12]

Social Media can be chaotic and unpredictable, but its emphasis on global content and discussion make it an ideal place for open ended conversation. Later on, we will explore how different platforms function in the context of gaming communities.

Moderated-Media

Moderated-Media platforms present a very strict user hierarchy. Moderators curate what kind of content they present, and users interact with it in limited ways. Moderated media can be seen primarily in service-based platforms, such as magazine, newspaper or store websites. These services present themselves as a product more than our previously mentioned category.

In sharp contrast with social media [5], moderated media has a scope limited entirely by the admins. With our final goal of redesigning Unifyer, moderated media will probably take a back seat, but we thought the comparison was important to make.

Biggest current social platforms focused in gaming²

Important in the framing of this project is an understanding of the biggest players in the social media game that serve as homes for gaming communities. Although gaming news and happening can take place around many different platforms, we will list the four biggest and most active global platforms that have a focus on aggregation of media.

- **Reddit**

Being the newest “kid on the block” in its rise to popularity, we will expand our introduction to reddit more so than other platforms on this list.

Reddit is a social news aggregation, content voting and discussion online platform. Registered members submit content to the site such as links, text posts, and images, which are then voted up or down by other members. Posts are organized by subject into user-created boards called "communities" or "subreddits", which cover a variety of topics such as news, politics, science, movies, or video games. Submissions with more up-votes appear towards the top of their subreddit and, if they receive enough up-votes, ultimately on the site's front page.

Reddit has grown to such a size that it is becoming the de facto place for discussion for many communities, especially in the videogame industry. Reddit is ability to show organized discussion and ability to quickly share news about topics makes it very appealing for fans of games or franchises to discuss their hobby on the website.

As of February 2021, Reddit ranks as the 18th-most-visited website in the world and 7th most-visited website in the US, according to Alexa Internet, with close to half its population coming from the US. [14]

- **YouTube**

YouTube is the world's most popular video sharing website and requires less of an introduction. Registered users can upload videos for the anyone to watch. As the leading video platform, it naturally attracted video-game creators to it. Communities are regularly formed around uploaders and not just the topics being covered.

² Analysis done in relation to Unifyer

As for gaming, most content creators, be it streamers, players or video creators use YouTube to some extent, and rarely other video platforms, solidifying YouTube as the platform to be on for gaming video content.

- **Twitch**

If YouTube is the place to be for video content, then Twitch is the place to be for gaming livestreaming [14]. Originally a free form livestream platform in the form of justin.tv, twitch has grown to be the most popular platform for gaming related livestreaming over the last 8 years. [15]

- **Twitter**

Twitter is a 'microblogging' system that allows you to send and receive short posts called tweets. Tweets can be up to 280 characters and automatically begin threads around their replies.

With the rise of both “real-life” celebrities and online personalities joining twitter in mass, twitter became the main platform for sharing one’s thoughts to followers. This quickly spread to the gaming industry and we now see twitter being one of the main four ways for public discourse around games and their communities. [10]

Chapter II

Creating a new Method to develop Media-Aggregation Platforms

Formalizing our problem, the goal of this project is constructing a method that allows to look at new and existing media aggregation platforms and have a structured approach on how to go about creating or redesigning the platform in question. We applied this method to MOG's platform, using our results as proof of concept.

In our state of the art, we concluded that using Information Systems and Design Science Research [1] as foundations for the construction of our methodology would be a suitable starting point for laying out the foundations for our method.

The concrete plan is to use the formalization of design science when it comes to using step by step, modular processes to develop a series of iterative artifacts. Essentially, we plan to craft a document that goes over how to analyze both the environment and knowledge base of the industry around which we plan to design our media aggregator and use this analysis to lay down structures based on empirical findings and established research.

By taking Hevner's chart [1] and adapting it we reach the first iteration for our method:

This first iteration follows a modular structure. Each sector and subsector represent an area of interest where data or research can be inputted to better support our iterative output. The goal with a structure like this is to focus first on studying and understanding both the knowledge base and the environment in which the aggregator is set to be constructed upon, and then use those facts to build artifacts that will lead to a final version.

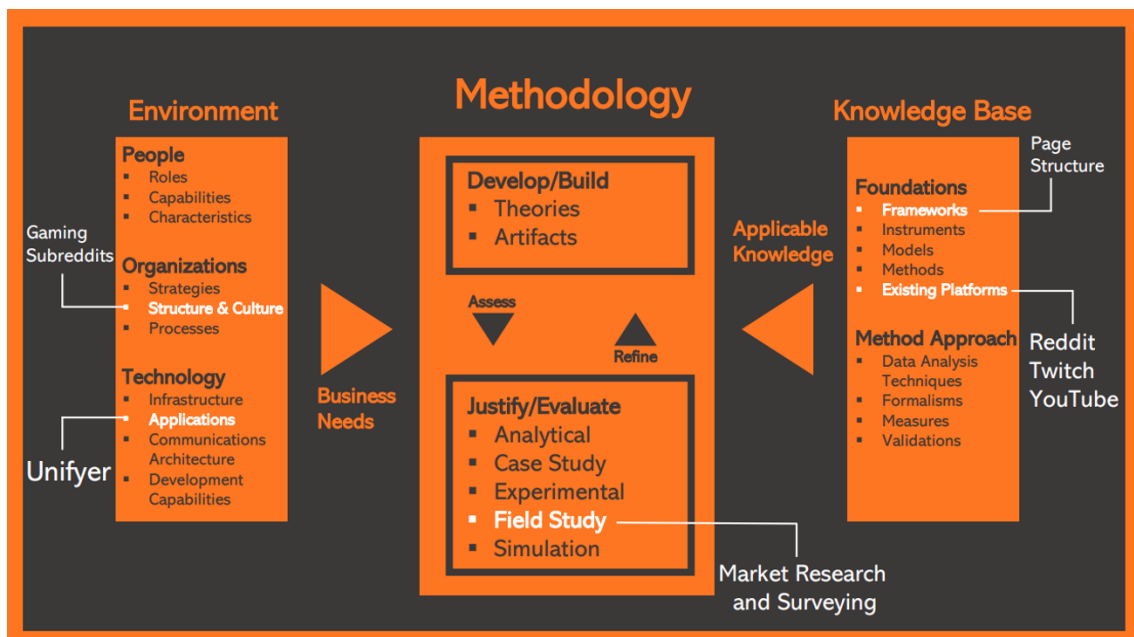


Figure 1: Design Science Research Applied to our Problem

- **Environment:** The industry the media aggregator is set to focus on (e.g.: movies, games, politics);
- **People:** Both users and persons of interest (POI) in the industry;
- **Roles:** What function and relationships users and POI will have within the platform
- **Capabilities:** The options in scope of intractability users have when using the platform
- **Characteristics:** Defining the major traits of users and POI in the Industry
- **Organizations:** Studying both the biggest companies and corporations and the meta structure behind the interlink of existing and established platforms;
- **Strategies:** The planning and execution behind existing platforms;
- **Structure and Culture:** Understanding the bridges built between industry and consumer;
- **Processes:** The steps and structures iterated on to bring product to consumer;
- **Technology:** The state-of-the-art technological solutions implemented;
- **Infrastructure:** The code base and technological resources used for the aggregated platforms;
- **Applications:** The ways in which technology is being applied;
- **Communications Architecture:** The structure behind communication channels and users;
- **Development Capabilities:** Scope and reach for the deployed technology;
- **Knowledge Base:** The Gathering of previous facts and artifacts from the field and industry;
- **Foundations:** The building blocks for both industry and platforms;
- **Frameworks:** the code structures used;
- **Instruments:** tools used in both construction, deployment and utilization of media aggregator platform;
- **Models:** Previously thought of models to follow;
- **Methods:** Previously thought of method to follow when implementing around media aggregators;
- **Existing Platforms:** Current notable media aggregators and the analysis of these following the previously mentioned modules;
- **Method Approach:** How to prove, justify and go about processing together all data;
- **Data Analysis Techniques:** techniques used by aggregator in data analysis and display;
- **Formalisms:** Standardization of techniques or knowledge base;
- **Measures:** Both taken and followed measures around implementation;
- **Validations:** Truth seeking methods and formalizations of such;

All these modules come together to form a set of tools at our disposal to then begin construction of a model for the final method. We will elaborate on how exactly to go about this in future chapters, however the baseline for our method revolves around plugging in the data we collect from surveys, interviews and research into each step and use the complete knowledge base to formalize our method:

With the method constructed, we turn our attention back to Unifyer. Studying the necessary components to be inputted towards the methodology and taking in accounts

from potential users via interviews and surveys, we will reformulate the core for the platform and reevaluate its structure and goals. With this evaluation complete, we can begin looking into getting corporate approval for changes to be prototyped.

Design Science Research

Design science research studies the creation of artifacts and their embedding in our physical, psychological, economic, social, and virtual environments. [1,3]

Good design improves our lives through innovative, sustainable products and services, creates value, and reduces or eliminates the negative unintended consequences of technology deployment. Bad design ruins our lives. In design science, product and system design is addressed by combining analysis and synthesis and drawing from many scientific disciplines. [1]

In the context of this project, design science and its applications in information systems are a robust core from which we build many of our ideas. Central to this line of thinking is the development of methodologies to follow when building products and innovation. It is from this process that we take inspiration to not just focus on Unifyer's redesign, but to also create our own method. Both to guide and prove that our iterating process is following a reviewed guideline. [3]

Developing the method

Design Science shows that any problem can be formalized to ease the process of reaching a desired solution. The goal of creating our methodology is to follow a structured line of thought to then be applied to Unifyer.

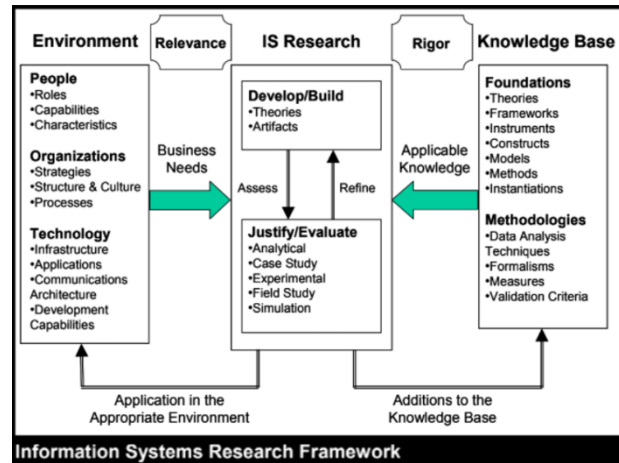


Figure 2: IS Research Flow chart from "A design science research methodology for information systems research."

The initial design of our method saw us draft something very close to the Information Systems Research Framework from the Design Science in Information Systems Research [3] study. This chart represented the putting together of a knowledge base on the environment at hand. This is then used to better interpret how to go about the development of artifacts in iteration. The modularity of this design allows it to be molded to different problems within the realm of the tech industry. This proved to be a solid start to develop a step-by-step method.

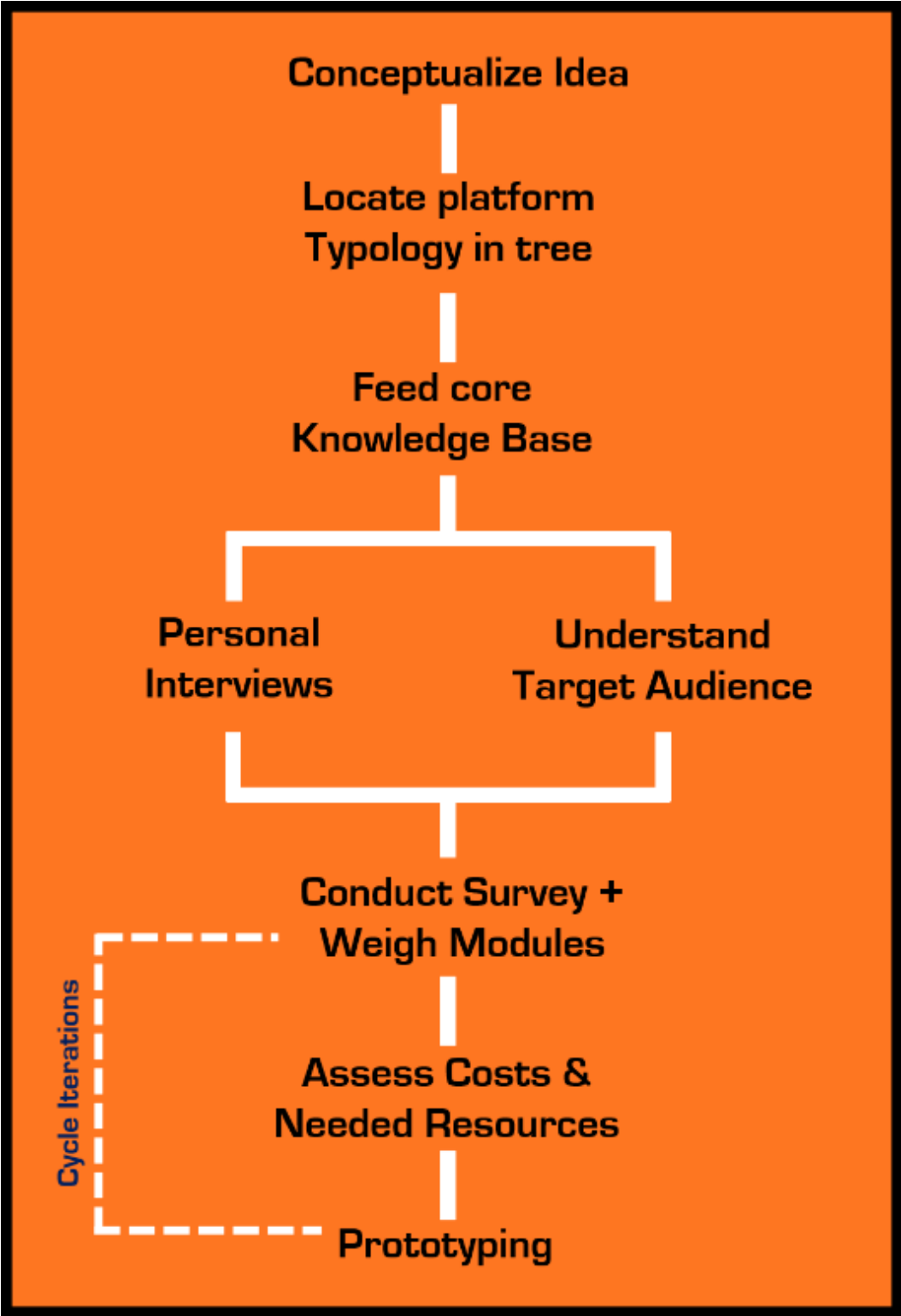


Figure 3: Compact view for our developed method

Method Components

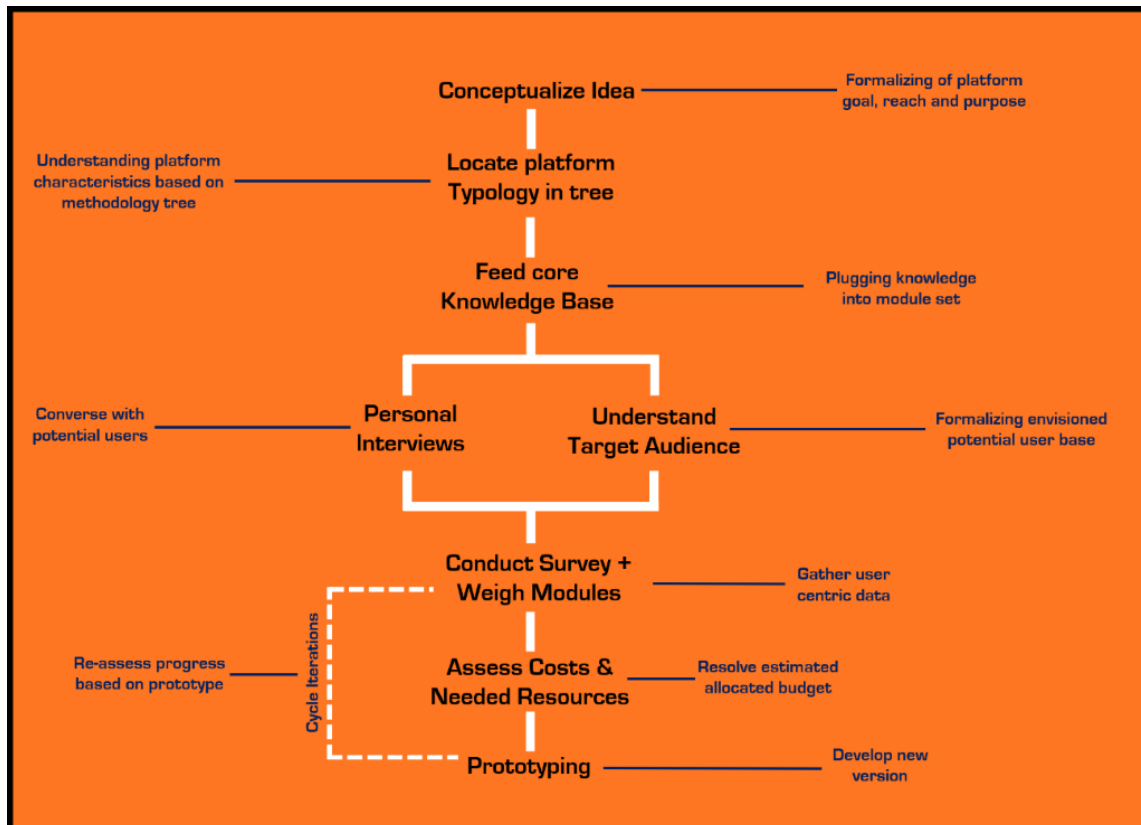


Figure 4: Expanded View for our developed method

This section will focus on detailing how each step of the method functions, with each of those being a separate node in an interconnected guide.

Before moving down its steps it is important to understand what the goal of applying this method is. This method is focused on supporting either the construction of a new media aggregation platform, or the redesign of one.

Each step serves as a tool to guide the user into gathering the correct knowledge to justify design decisions that go into the inception and implementation of features platform. Steps were chosen and placed in their present order based on our experience with both iterating on the method, and previous ventures into platform design. In addition to this, the overarching method has been molded based on the Information Systems Research Framework.

Expanding on this, as indicated by the Design Science documentation:

“The effective transition of strategy into infrastructure requires extensive design activity on both sides of the figure of organizational design to create an effective organizational infrastructure and information systems. These are interdependent design activities that are central to the IS discipline. Hence, IS research must address the interplay among business strategy, IT strategy, organizational infrastructure, and IS infrastructure” [1]. It is this interplay of different sectors, technology and workflow that led to us framing our method in the way that it is, after being iterated on several times.

Conceptualizing

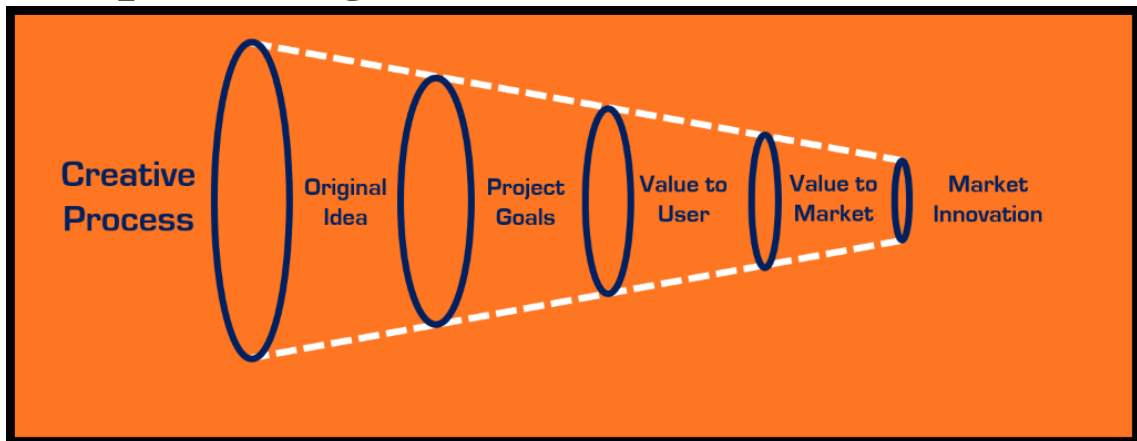


Figure 5: Conceptualize Idea module

The very first step is to conceptualize what the feature complete platform might look like. Although this step is largely outside of the method's reach, we found it appropriate to include it to introduce our concepts at a high level, that is, having it at the very start of the method to best guide to user and setting the methodology as formal.

In addition to this we found that from this step to be a good idea to scout the method ahead using our global diagram³. Knowing the steps ahead helps frame ideas in the mindset needed for projects to more easily be compatible with our method.

³ Figure 4

Platform Typology Tree⁴

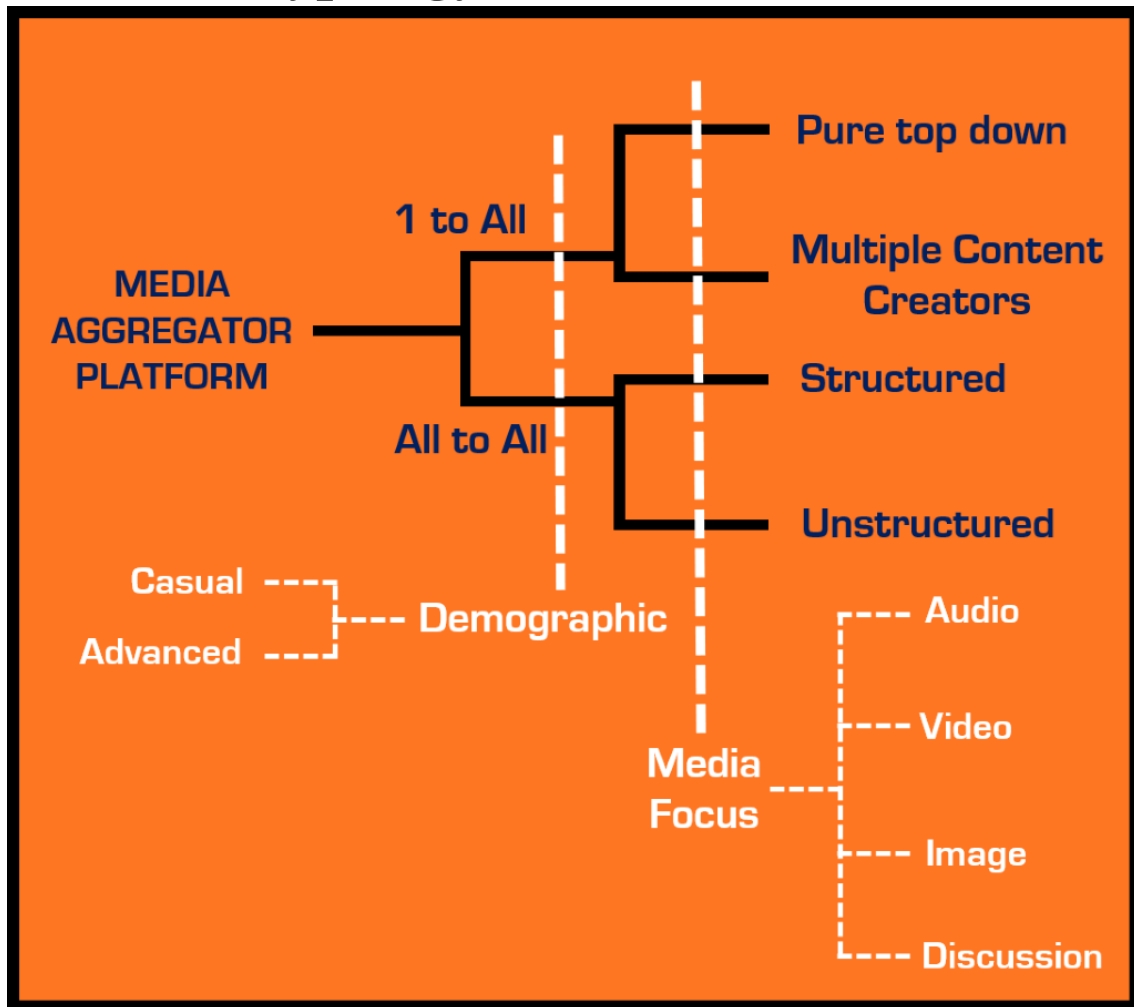


Figure 6: Typology module

Before moving forward with structuring a plan to continue work on the platform, it is important to define the typology of the media aggregator in question. This step helps us better align our goals regarding the fundamental structure of what we're creating or modifying [4, 8].

This step was envisioned during our state-of-the-art research where we noticed a lack of conversation around platform typology. The concept of a typology tree is not frequently seen, and we find it a straightforward way of framing the concepts for each platform type.

The first stem of the tree separates media aggregators in two base forms, one to all and all to all.

1 to All: Media aggregators that focus on distributing media in a hierarchical fashion, with one or more main sources of content providers aiming to produce or gather media to be seen by their audience.

⁴ Typology brackets based on [2, 5, 6, 8, 10, 11, 12]

1 to All platforms can be further split into two different types:

Pure top down: Platforms with a single entity curating what the end user consumes, such as Newspaper websites, paid media services like Netflix, and personal blogs.

Multiple Content Creators: Aggregators that allow multiple users to produce content. To note that the majority of platforms of this kind allow all users to become content producers, but the overwhelming majority of users choose to only consume and not upload media. These platforms may also curate what Examples are YouTube.com, Twitch.tv and Spotify.

All to All: Media aggregators where all users can equally share media content to be seen by the entire user base. Moderation can be either done by platform admins or by the community.

The second stem presents two new options continued from the previous selection. Let us look at the choices for 1 To All first.

Pure top down platforms: Characterized by having a sole top entity that controls what all people browsing will see. This framework however does not limit the number of people publishing content to the platform, but does specify that all content, independently from who creates it, is curated by the top entity. Example of this are newspaper websites, TV stations and both personal and corporate Websites.

Multiple Content Creator Platforms: In this case there is no sole entity governing what gets published. Media platforms of this kind are open to a greater number of content creators and give each one control over what and when to upload. Although in most of these platforms any regular user can become the uploader/creator, it is important to note that it will always be set up to serve most non-creators with what the few creator users supply. Examples of this would be YouTube, TikTok and Spotify.

Following from the second branch of All to All platforms we can choose from Structured and unstructured

Structured All to All: Platforms that allow users to talk about topics but focus on presenting this discussion in an organized manner. Old internet forums started the trend of present discussion by threads, and this basic structured has been iterated in many different ways. Examples of this are reddit, Twitter or Tumblr.

Unstructured All to All: Less organized platforms that have more fringe use. The most typical use for them would be online chat rooms. These structures are rarely scalable and an increased number of users generally leads to more widespread chaos and difficulty in moderation (if any exists). Important to note that these platforms are now mostly seen as integrated parts of bigger, more organized platforms, especially chat rooms to accompany discussion or an online feed.

Implication of media platform typology on design and Infrastructure⁵

1 to All – Pure Top Down: Design should make it obvious to users that they are the consumer. Although some iteration may exist, typically in the form of a comment section to generate engagement, the platform should present itself as a service. Infrastructure wise, managing the database for all content is straight forward as its growth is predictable by the solo publishing entity.

1 to All – Multiple Content Creators: Other than presenting itself as a platform to display content from many different users, discoverability is an important part of how content should be presented. A common downfall of these platforms is that they make it hard for new and up and coming creators to get their turn on the spotlight, so for the health of the platform, both big and smaller creators should be highlighted. Infrastructure wise, and this trend will continue for the other types as well, expansion for storage will be the biggest limiting factor, as the volume and type of content upload can vary wildly, and so can the growth of the platform.

All to All – Structured: From the age of internet forums, we can draw a lot of lessons when it comes to design. All to All platforms need to look and feel like there is active discussion surrounding every post. Engagement is crucial for these platforms and should be maintained with proper algorithms to sort what users see. These can be ones that prioritize newer submission first, where the most recent posts get pushed to the top (e.g., Classic Web Forums); Voting algorithms where users actively vote on what comments and posts they like best and those are the one highlighted (e.g., Reddit.com); And finally, engagement type sorting where posts and comments with the most replies or activity get pushed to the top (e.g., Twitter). To note that different topics can benefit from different types of algorithms, as for example engagement sorting methods seem to push “socially negative” or “disliked” content to the top as is the result of society engaging more with what it perceives as “wrong”. Like the previous type of aggregator, infrastructure must be built to allow for an ever-increasing backlog of posts and live traffic.

All to All – Unstructured: Design wise these websites can be more experimental and should only take this framework if it truly fits their theme and goal. Similarly, their infrastructure can vary immensely depending on their objective, as they are mostly compacted into features of the other three aggregator types.

⁵ Typology brackets based on [2, 5, 6, 8, 10, 11, 12]

Feed Core Knowledge Base



Figure 7: Knowledge Base module

As we develop our ideas it is key for our research to be well supported. For this to be the case our method presents this step to gather all information pertaining to technical and environmental research. In addition to that, it is also important to begin listing what our final product might look like in terms of features and technical modules. In short, these steps are focusing around gathering as much data and analysis as we can into a single self-contained dossier.

There are then two main stages for completing this step of the process.

Step one - technological knowledge base: Here we list technology, frameworks and infrastructure used in similar or past projects so that we can better have a scope of the technicalities of our project. Details such as what our server structure should look like, how to store user credentials, or even personal research about the inner workings of similar platforms should be considered.

Step two - environment and people: We follow suit but now focusing on the environment and people surrounding the industry we are trying to break into. A large part

of understanding how to build our platform comes from understanding the people who not just will use it, but those who interact with its encompassing industry. This module then focuses on collecting information surrounding the culture of people and organizations related to the field in which we want to deploy our solution in.

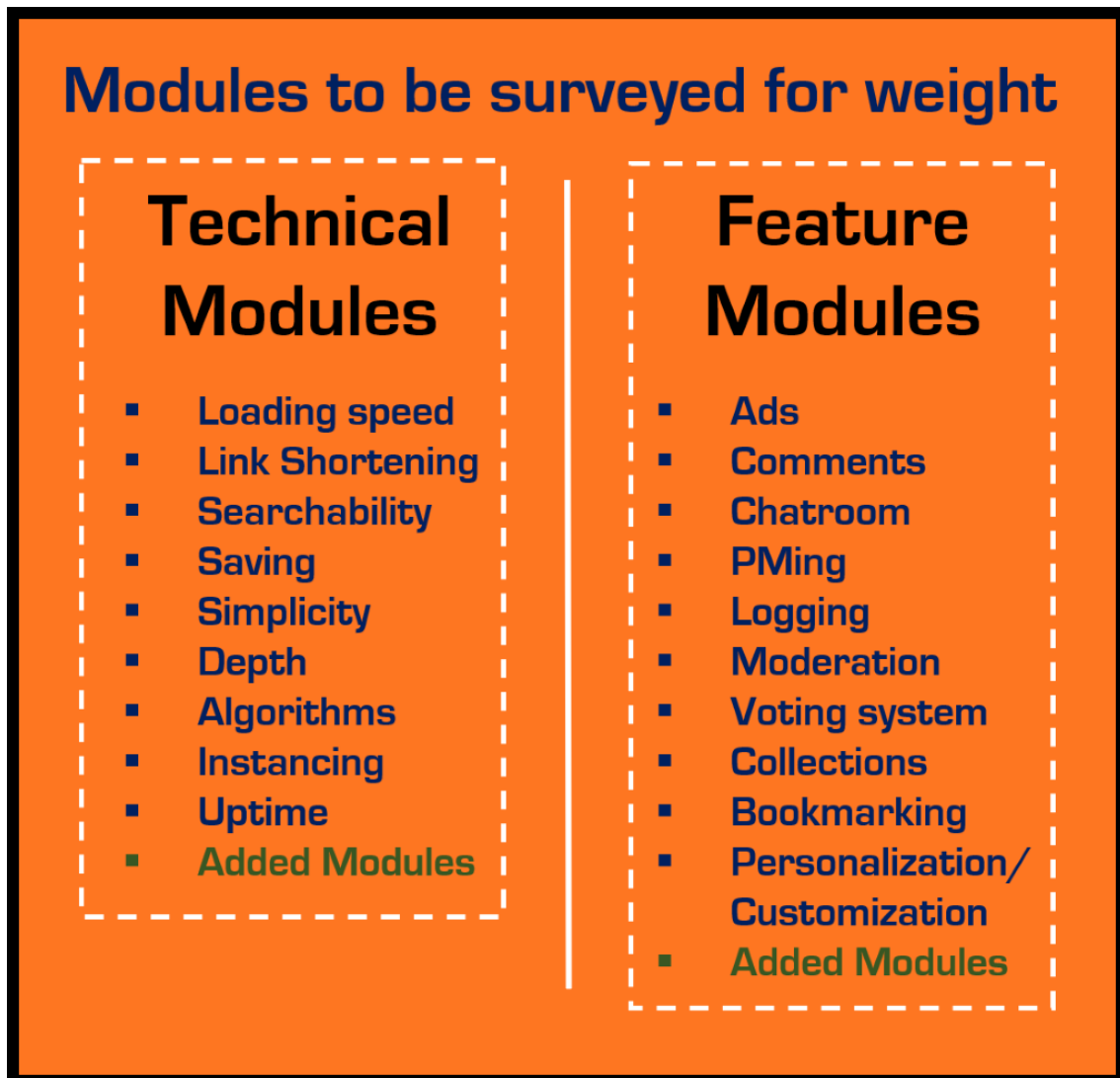


Figure 8: Features sub-module

Finally, we arrive at our last two modules. Whilst the previous two were focused around building a knowledge base, these new ones aim to collect a list of features that we want to implement into the project. Also, in contrast, these two modules are going to be, in addition to our interviews, a source for our survey question where we will ask participants to rate how importantly they rate each feature to be for the overall final product.

Interviews

Knowing your target audience is important. To better understand if our goals are aligned with the people who will be using our platform, we need to understand their needs. For this, qualitative research tools such as interviews are useful. These interviews serve to:

- Speak directly to potential users;
- Fundament our ideas with users outside the company;
- Understand what future users like and don't like about similar platforms;
- Evaluate priorities of features;
- Understand participant's media consumption patterns;
- Build the basis of our survey;
- Deciding the survey's questions.

Fundament our ideas with users outside the company was always key. We found that it was necessary to consult with people outside the development cycle to breed fresh ideas into the project. Therefore, whilst internal feedback is important, it is important to value input from people from different backgrounds that are not linked to our company. Also key was understanding what future users like and don't like about similar platforms. Whilst leveraging our contact with potential users we found it important to ask people about the specific aspects that they enjoyed or were annoyed with when speaking about similar platforms to the one we are developing. This is especially useful when developing the survey, as we will cover next.

Whilst querying participants about specific features they enjoy or would like to see added we can also ask about what they would prioritize to be added. This step helps us better understand what features users prefer over others and can better help us prioritize development of said features to be tested first.

Very relevant to our interviews is to, on top of understanding what users want and do not want, or what they prefer vs find unappealing, understand their backgrounds as consumers of media. Asking about their present and past ways of browsing media online can help paint a better picture of the type of users that might want to use our platform.

Using the Interviews to build the Survey

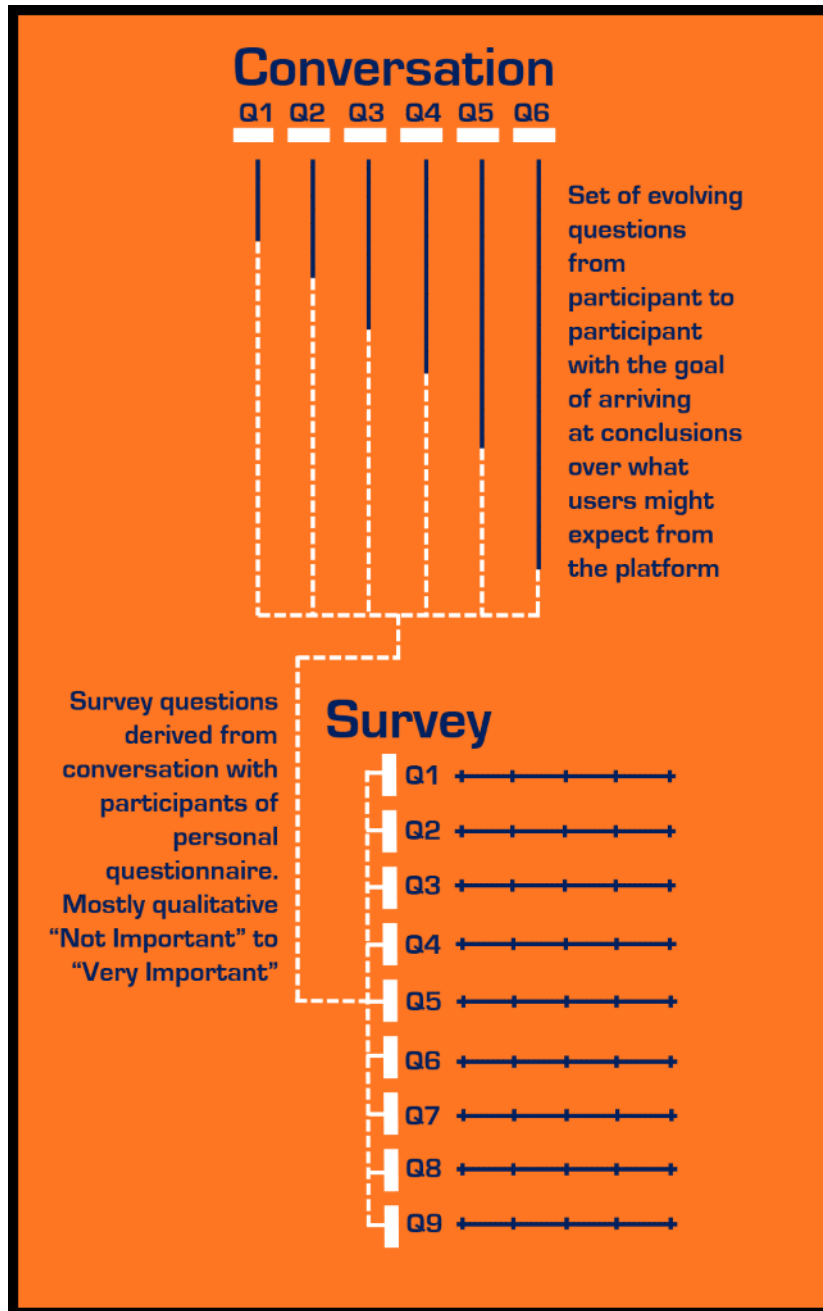


Figure 9: Taking Interview data into Survey

There are two main goals with the interviews, the first is to better understand what users want from our platform features wise. The second is to take the interactions we had with participants and use that as a steppingstone to build the survey form. Whilst we address the survey later, the results from our interviews should be used to guide us when deciding what to ask the public in the form. Questions that were divisive in the interviews have a better opportunity to be understood when asked to a wider audience. Similarly, questions that were very one sided in their responses can be verified by asking to a larger survey population.

Whilst developing the method we researched on how to best prepare them in a structure that gets us the desired results. This module was also based on Qualitative interview research [3] and Qualitative interview in business [9].

It is important to note when drafting the interview that, from our experience, the best content comes not just from the participants answering the questions but also from the insights that come with the conversation. Questions should then take in account the more conversational aspect that the interview has (in sharp contrast to the survey). The first couple of questions should be simple and to the point to ease the participant into the flow of conversation. This is a good opportunity to ask the participant about their hobbies and how they consume media online.

Following this the questions can cover a wide range of topics. Reminder that the goal for these interviews is to understand the position our potential users have regarding features based on their habits.

With the interviews concluded we found that the best way to analyze the results was to categorize all the data question by question and do a quick write up about overall reactions about each question, as well as writing on the general feel that participants had towards our questions and the topic overall.

Survey

The survey will cover the largest number of people. Questions for the survey should be based off of two factors: Our conversations with the participants of the interviews; and topics we want to see tested that we do not yet have enough data to analyze.

As we will see next, part of the reasoning for performing the large-scale survey is to better understand where the priorities of our target base lay. With this in mind there should be two types of questions.

The first are multiple choice questions that ask about general habits relative to the medium for our platform, such as preferred websites of a similar kind or number of times the users access them per week. These questions help both better position our user base and help smooth the participant into the survey.

Second are questions with a *Likert scale* [13], querying participants on how much they like or dislike a feature or detail. These should be asked relative to the technical and features module that were identified previously in the method. We will use the answers give to weight how much future users prioritize each individual module. For example, we can ask “How important do you think chatrooms are for a positive experience”; And allow the user to answer anywhere from “Not important” to “very important”. Every answer can be distilled down to a one (1) to five (5) scale, and then inputted into the formula we will present in the next chapter.

Module weight in and question structure

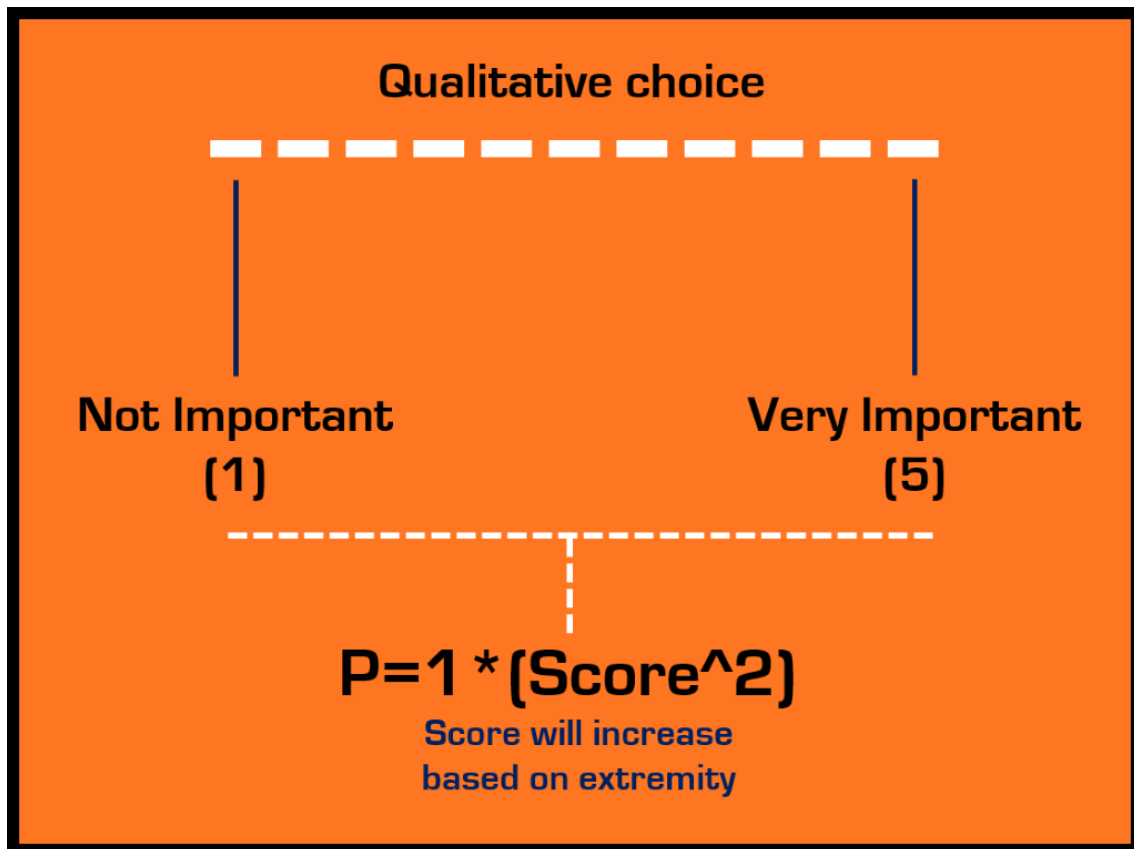


Figure 10: Weighting answer scores

This method uses a point scale system to assess the importance given by survey participants regarding individual features. We therefore want to build our questions in a way to accommodate for this. Questions should then have two types: Qualitative scaled questions regarding features; and yes or no/checkmark questions regarding habits. The formula used takes in the average answer and will give it a point importance. The more skewed towards one side it is, the more extreme the point will be, ranging from 1 to 25.

Gaming websites focused on streaming and video should allow for comments or chat *

1 2 3 4 5

Not Important ○ ○ ○ ○ ○ Very Important

Figure 11: Answer scale example

Qualitative questions should be presented as on a scale from negative to positive opinion (e.g., Not Important – Very Important).

Assessing Costs

Assessing costs is the final step before the Prototyping phase. In general, this step is mostly offloaded to different departments but it still important to have it be a part of the overarching workflow as changes in how small or large budget can be will always have a sizeable impact on scale and the number of features possible.

Prototyping

The final phase of our methods involves the construction of a functional prototype, the complexity of which can vary depending on the scope of the project. More important than the prototype itself is the feedback loop we get from development and testing.

Prototyping must take in account both infrastructure and design. Beginning with infrastructure it is best to stick to the precedents of previous project at the company. This ensure both that the project will be compatible with previous endeavors and that coworkers can more easily assist with support in development. Additionally, unless the technology requires a shift to different environments, continuing with well-known systems and coding structures ensures less time is spent in either research or training.

Design wise it is key to sketch out rough drawings of what the platform should look like. However, in project where they are left with rough ideas and more textual description, a large amount of time is spent in creating assets and arranging them in ways that do not always translate to what the original idea had targeted.

With a working prototype complete, it' is now important to loop around to the feedback component of the method to assess how much progress was made. Feedback then, both internal and external, is key to understand how and what to iterate on.

This loop should continue until the product is ready to finally enter a “beta” stage where it can be opened up to more people external to the company.

Chapter III

Applying the method to Unifyer redesign

Unifyer deep dive

Unifyer is a professionally crafted gaming media aggregator built using MOG's *Zgaming* toolset to be a competitor to "multi-stream" websites like multitwitch.com. Its main functionality is allowing a host to create a room with multiple livestreams or YouTube videos being played simultaneously in separate panels, all within the same screen. This host can then link the room to viewers, and they can enjoy all media in synchronous fashion. In addition to this it is also possible to embed the chat boxes accompanying these livestreams.

The current state of Unifyer

Unifyer was developed in house at MOG until summer 2019. It was at this point I personally had the time to experience it and give my feedback. Since then, my thoughts have remained largely the same, but I have, in parallel to my work on this thesis, been rewriting my opinions about the platform and where to take it.

Main Issues with Unifyer's original design

- Declining Popularity of multi-stream

The popularity of multi-stream websites has never been high in comparison to the number of users browsing regularly. Although it has its advantages in limited case scenarios such as e-sports of join streams, its frequent that the organizers already make use of in-built features to show multiple streamers' points of view, which leads us to our next point.

- Twitch Squad Streaming

Unifyer's original goals was to service the twitch and YouTube streaming userbase with a way to easily have multiple streams on the same screen at once. Shortly after Unifyer reached a more robust stage, Twitch launched Squad Streaming [15], their own, fully integrated, multi-stream watch feature.

This is undeniably a major hit to Unifyer's current philosophy, and more reason to push for the redesign. Although Squad Streaming does not include mixing streams from other platforms such as YouTube, with most of livestreaming for gaming (and rapidly other industries) happening on Twitch, it is clear that Unifyer's original goal is much less viable.

- Limited Media Sources

Unifyer, despite being built on top of *Zgaming*'s reboots library of embedding tools, only currently supports twitch and YouTube embedding.

- Popularity of multi-stream

Multi-stream solutions, especially outside of twitch’s own squad streaming, are not generally sought after by the public [14].

- Twitch “Purple Screen of Death” [16]

As a final negative point against the original design, Twitch has recently changed its approach to embedding. We will dive deeper into this further along the project, but in short twitch has decided to hamper with embeddings of its streams by interrupting broadcasting with a large pop up that redirects users to twitch and away from the platform embedding.

This is naturally a detriment for the current twitch-centric design as it would now not only be competing against twitch’s own multi-stream implementation, but also having viewers redirect back to the source.

Conceptualized redesign

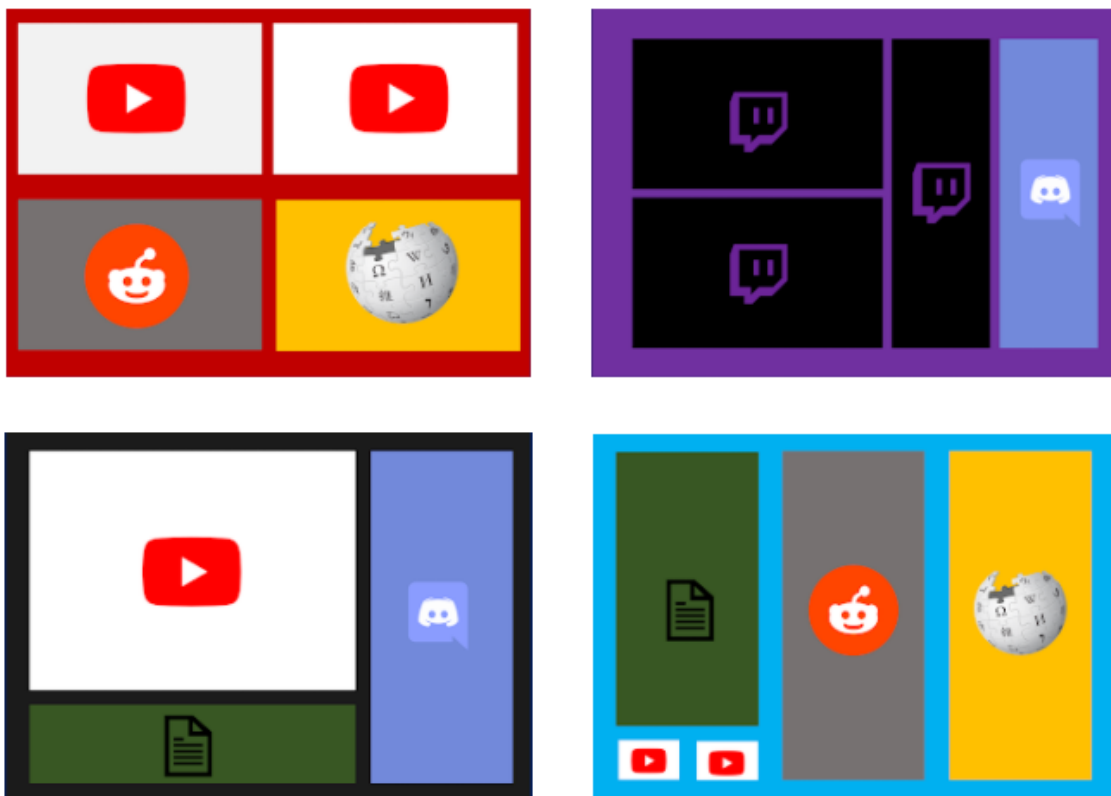


Figure 12: Different post redesign Unifyer page mockups

With both its shortcomings and already built infrastructure in mind, the redesign plans to shift Unifyer from a multi-stream platform to a quick HUB for online communities. Using Zgaming’s toolkit as its technological basis, this Unifyer 2.0 would maintain the caster-viewer relationship but now serving as more of a moderator-viewer relationship. Moderators from online communities of different topics can set up a single page with many different media widgets, ranging from YouTube video to Twitch livestream, or from reddit posts to text list boxes. Community leaders or moderators can then link to

those pages to quickly get new or returning users to speed with what is going on with that community or topic.

It is of our opinion that Unifyer in its current form faces too many shortcomings and is not well placed to compete vs alternative solutions. With our developed method we will explore how we can apply the plans for our redesign into a working prototype, working alongside MOG.

Framing Unifyer's Typology

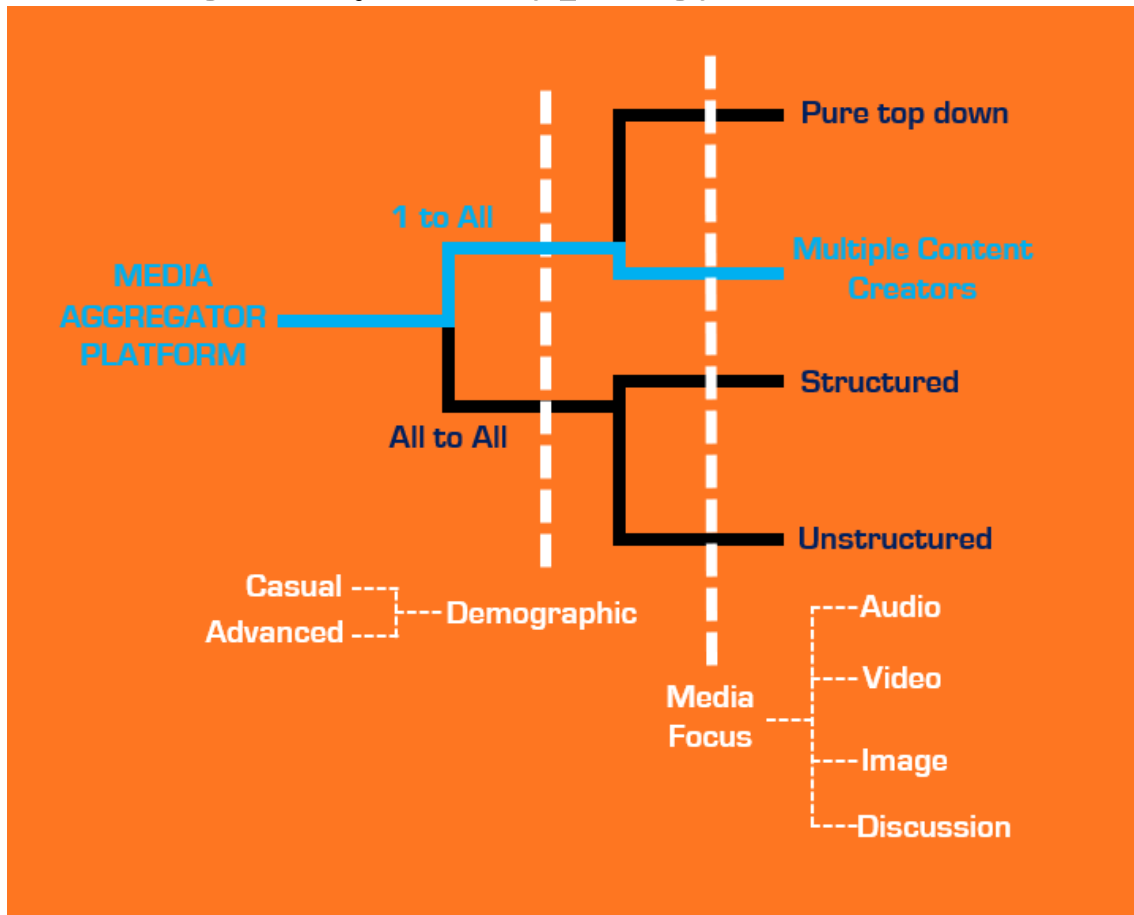


Figure 13: Unifyer 2.0 Typology

Our method presents a choice tree for guiding the user to better categorize the type of platform they aim to build. Let us analyze each branch in accordance with what we plan to prototype for our redesigned platform.

Unifyer is of course, at its core, a media aggregator platform. Following our branching tree, we can categorize it as either “1 to All” or “All to All”. As mentioned before “1 to All” platforms are set up for one person or a small group of people to curate the content that many others see. Unifyer was already following this mechanism and the redesign does not seek to change it. “All to All” platforms are more inclined for public discourse. What Unifyer want to be is a pipeline that community leaders can use to guide members of said communities towards information, and to follow that structure it must be constructed an “1 to All” platform.

This has ramifications on both design and infrastructure. From a design standpoint Unifyer must make it obvious that the viewer is just that, a viewer with no control over the interface. This can be achieved by having a compact design and keeping visual noise and clutter to a minimum. As for the backend, and especially considering this as a prototype, we can focus more on design aspects and the lack of need for user input significantly reduces complexity.

Moving on to the first decision in our target demographic, we want to build Unifyer for both Casual and Advanced users. For more casual users the value that Unifyer value is obvious. It gives them an easy way to discover where to go next for the hobby or interest they are looking for. Nowadays communities make it as easy as possible to be found by others, but the sheer volume of others doing the same makes it complicated to navigate such a cluttered “sea” of options. It is even the case that the overarching community for a hobby or interest is spread across multiple different social media platforms, and that’s exactly where Unifyer can come in to aggregate them all.

For more advanced users, it is important to note that Unifyer’s role is not just a main HUB for a topic, but for sub-interests of that topic. So, for advanced users, they might want to learn about a new particularity about their community, and a Unifyer can be built to show all there is to consume about it online.

Although designing a platform for both casual and advanced users is ambitious, we believe our concept for the redesign can fit into its multi-demographic role.

Similar to our previous analysis for the target demographic, our media type focus can be very outreaching. Being an aggregator for many different social media platforms means that Unifyer must be ready to pull content from a variety of different media types, from video to audio to text. The most important piece of information we can gather from our decision here is that for all media types to be in focus there needs to be a solid infrastructure that can work with all of them simultaneously. Making it all seamless and responsive for both the viewer and creator will certainly be challenging, but doable.

Finally, we must distinguish between “Pure top down” and “Multiple Content Creators”. Pure top down signifies that, although there can be more than one person working on creating content for others to consume, there is a single overruling entity that controls the final output. This is not the case with Unifyer. It will certainly have the aspect of one person controlling what many others see (thus our choice for it being “1 to all” before), but each Unifyer instance is individual in its control from each other.

Therefore, Unifyer’s redesign will unequivocally be setup as a “Multiple Content Creator” type. Design wise this might have the biggest implications in the future and sustainability for the platform, as discoverability will be a key issue, and something we might tackle in future work. Infrastructure will have to be set up to scale with demand, but with today’s modularly expansive cloud solutions that scale based on live demand, this should not be a concern.

With the typology for our idea and prototype finalized, we can conclude that Unifyer must focus on delivering the correct tools to the few that wish to guide the many to better understanding their communities.

Building out knowledge Base

Cooperating with MOG gave us the advantage of having a lot of the research already completed for our Technological and Environment modules so we won't go into too much detail, other than the following paragraph.

Technologically, MOG's Zgaming infrastructure gave Unifyer a unique positioning. Zgaming's set of developer tools allow for quickly building online media platforms utilizing a multitude of react ready modules, be them media or otherwise focused. Other competing platforms with a multi-stream focus, were at the time not professionally crafted. This meant Unifyer was technologically ahead in both delivery and presentation, boasted by a greater array of features.

Our features modules are where the biggest focus was placed. In our planned redesign we mention significant changes, and this is the perfect opportunity to list the ones we want to trial for our prototype:

Discord Implementation

Discord is the most popular chatting software for gamers as communities use it to exchange direct, instant messaging between their members. For our HUB focus to be viable, discord integration must be implemented in our new pages.

Resource Linking

Many communities in and out of gaming have detailed guides, lists or general text-based resources that are a core part of their introduction to new and returning members. The ability to display these alongside video and stream media is also critical.

Personalization

Customizable Unifyer pages are an important part of our development. Each page must have the ability to present its community's identity with it.

Reactive, Smart Loading with Pre-fetching

Alongside a redesign in visuals, we also want to trial react based pre-fetching to Unifyer, where the entire code for our prototypes is loaded at the same time, so the user has every media file ready to go right after loading the page all at once.

Target Audience

Unifyer old demographic was simply “young gamers”. With the redesign, we now want to target community leaders. Unifyer's success will be dependent first on people adopting it as a platform to aggregate content for their preferred topics. Although its largest user base will be people with no interest in building their own pages, Unifyers must be created first to then be shared and so our initial focus should be on creators, community leaders, and all those who can benefit from this. When this “creative” minded population starts to use the platform with the purpose of being shared to others, we can then expand our target audience to everyone who might be interested in discovering thing directly through Unifyer. This means growing our discoverability inside our landing pages and let as many people know about our compact all-encompassing design.

The Interviews and Survey

Following the method both interview sessions and a more widespread survey were planned and realized.

Scripting the Interview

The goal with the interviews was to better explore what users felt frustrating with their current experiences with media aggregators so that we can better steer Unifyer into being a more attractive product. Each interview was conducted online and lasted for approximately ten minutes. Participants were picked from both gaming and non-gaming communities with a balanced mix of different backgrounds and nationalities. All interviews were recorded, and the data gathered written down to be analyzed later. Length and pacing where decided after consulting “Qualitative personal interviews in international business” [9] (as well as [3]). In total fifteen interviewer were made to people of different backgrounds, ages, and nationalities, where about half were interested in gaming.

Questions began with asking about the participants age, hobbies, and media consumption (what shows they watch and what games they play, if any). We felt it was relevant to ask about hobbies and interests in media as both a way to later link interest in gaming areas to specific likes and dislikes and their platforms of choice, as a smooth introduction to our conversation.

With introductions done, we moved onto asking what their idea about a media aggregator is and what media aggregation platforms they use in their day to day. We ask both which ones the participants used for leisure, and for information as we valued the difference.

Focusing more on gaming we follow up by querying if the participants enjoy live content, what their degree of focus for it is, and the same towards playing video games.

The second part of the interview focuses on likes and dislikes about specific platforms. The platforms included were YouTube, Reddit, Twitter, Facebook,

Instagram, TikTok and Tumbler. Participants were asked about which of these platforms they used and then to talk about their positive and negative experiences with them.

Finally, we asked participants about if they would construct their own media aggregator what they would focus on.

Analyzing Interview Results

Data gathered from the interviews was interesting. We were fortunate to have had participants who were both from very different backgrounds and were genuinely interested in talking to us about their media use. Presented now are the main conclusions from looking back at the recorded answers to our questions:

- **Users really do not like ads.**

Every single participant, when talking about their preferred media platform, made sure to note that ads were problematic when they showed up, how they showed up, and most importantly how often they showed up. Going into specifics, participants noted that ads tended to be too frequently shown when browsing YouTube and Twitch. Both these video platforms show ads at the beginning of opening a video or stream, and whilst the media is playing (in YouTube's case only if the video is longer than 5 minutes). Participants acknowledged that their enjoyment of the platforms was hurt by the frequency and "unskipability" of the ads but were okay with it as they saw no alternative to YouTube and Twitch for videos and live streaming, respectively.

With ads being a major part of potential revenue for most platforms[], for Unifyer we will have to keep in mind user's disdain towards ads.

- **Amount and Diversity is king**

On their accounts for most platforms when asked about the positives most (60%) participants noted that the large amount of varied content is what kept them interested. Websites like reddit and YouTube were said to be the main source of entertainment for participants, and as such they valued being able to browse many different types of media. Adjunct to this the ability to subscribe to content creators on YouTube and to join subreddits on reddit was thought to be a very positive part of the experience.

- **Too much moderation = Bad moderation**

Of the users who used websites where moderation was a hot topic (reddit, YouTube, twitch), most (60%) noted that this negatively impacted their trust for the platform. Moderation type is dependent on the typology of the platform and can be either entirely centralized by the company running it, or additionally expanded to community members. Our participants noted that they felt like heavy moderation was happening more now than ever, and that they preferred if less restriction were implemented.

- **Ease of Access and Navigation is important**

A large percentage (80%) of participants explained that the easy-to-use nature of their favorite platforms was a positive aspect that they enjoyed. Being able to without hassle browse and discover new content, alongside powerful search engines to find new content they might enjoy was something repeatedly commended by participants.

Constructing the Survey

For our survey platform we chose to use google forms as it is widely adopted and easily configurable. After the interviews we knew that what we wanted to focus on was justifying our proposed changes originally brought forward in our conception phase. Distribution was initially slow resorting to online forums like reddit and survey trade specific websites but was then greatly expanded by using our university web mailing list to a much larger crowd.

The survey was comprised of four sections, the first two asking about the media consumption and online browsing habits of the participant, and the latter focusing on qualitative questions about specific features. The redesign is taking the approach of blending forum-based discussion with video and livestream media. However, we also asked about the feature set of each of these media types separately, and so have created two sections instead of one in relation to qualitative questioning. Let us go over each section:

Our first section we explain to the survey taker what to expect and begin questioning about his online habits. With the redesign in mind, we wanted to understand how people browse online for gaming content, namely what platforms they prefer. Considering this we ask first about time per week spent on watching videos vs livestreams. Unifyer has video as its main component so it was important for us to understand user's time spent on this media type. Part of the redesign sees the addition of a text box for quick resource listing, so we also ask how users interact with written text.

The second part of the survey is specific to gaming. Here we try and collect data on what platforms people prefer for talking to online friends and their interests in streaming. Unifyer's streamer-viewer dynamic made it important for us to ask about how comfortable people felt watching or streaming live video. Also, of note is that we question whether people watch more than a single stream at the same time. This is relevant as Unifyer original design aimed to primarily be a multistream setup.

Finally, it is the last two section we ask qualitative questions on a 1-5 scale where 1 represents "Not Important" and 5 stands for "Very Important". Our goal here, following the methodology, is to weigh how much participants value certain features over others. Since livestreaming and video content differs significantly from written forum discussion (even when both are centered around the same hobby), we decided to query about participants priorities in separate sections. The first covering streaming and video platforms such as YouTube and Twitch, and the second on Forum discussion websites such as reddit or Tumblr.

Releasing the survey

The survey was spread out over a week in two main populations. The first was reddit through posting on several different subreddits. Replies from reddit made up about one fourth of our total. The second was FEUP's webmail listing. In the title for the survey it was not specified what the query was about as to not attract only people interested in gaming. As to the diversity of the people answering from FEUP, we understand there will be a larger than average tech bias, but then again those patters are also observable

in Unifyer’s original target audience (young gamers). The survey was open for one week after which it was closed for new replies, totaling 175 final submissions.

Overall, we were pleased with both the number of replies and the makeup of the population providing them.

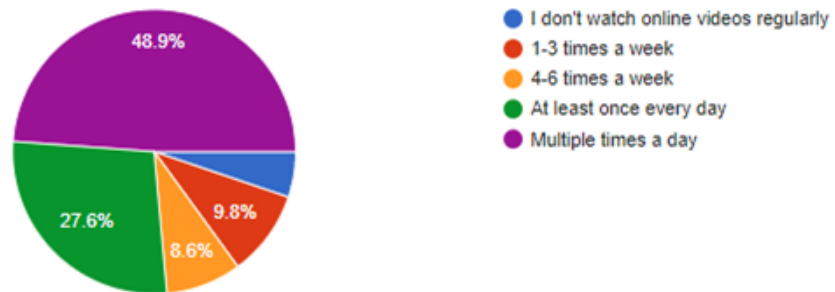
Analyzing Survey Results

The online survey focused on shorter but more numerous questions. We’ve organized them here by topics and will analyze the first two groups of questions relating to overall online browsing.

Survey Section 1: Online Viewership

How often do you spend per week watching online videos (Youtube, Newsreels, etc)

174 responses



How often do you spend per week watching livestreams (Twitch, Youtube)

174 responses

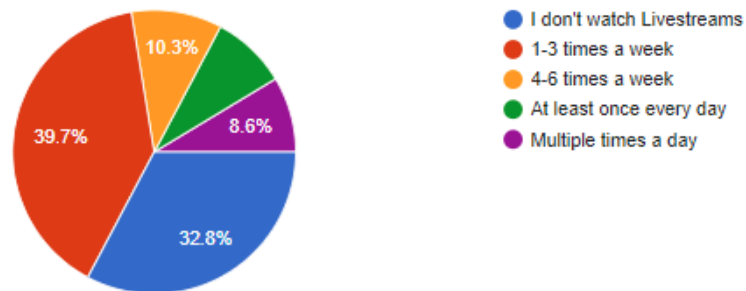


Figure 14: Survey Questions group 1

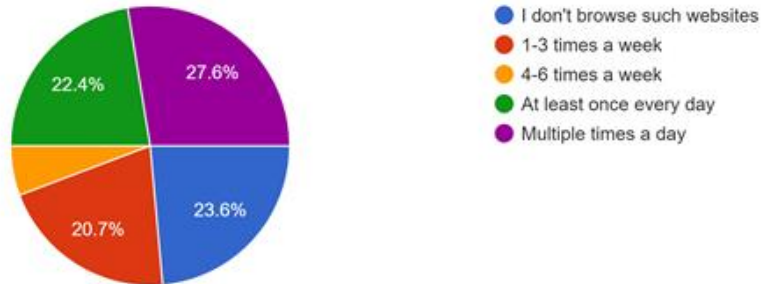
Live streaming media was the major focus of Unifyer and we wanted to understand how often people tuned into them and our results matched our sources [A Systematic Review of Literature on User Behavior in Video Game Live Streaming]. The same can be said for online video watching.

Regarding how often people browse online in general we found our results to be like other surveys and will look towards our survey data as balanced. [22]

Survey Section 2: Weekly Habits

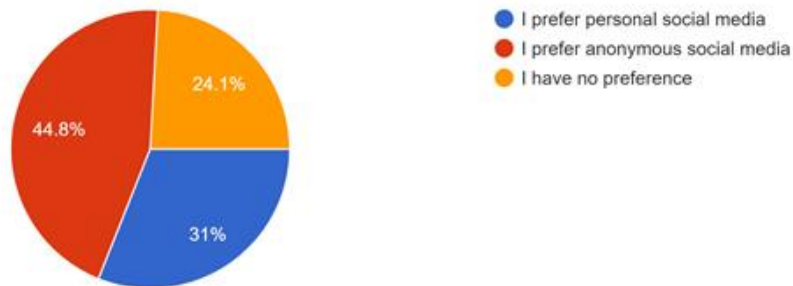
How often do you spend per week browsing anonymous social media websites (Reddit, News Websites, Tumblr, Forums)

174 responses



Do you prefer personal social media websites (facebook, instagram) over anonymous social media websites (reddit, tumblr)?

174 responses



How often do you spend per week browsing personal social media websites (Instagram, Facebook, Tumblr, Forums)

174 responses

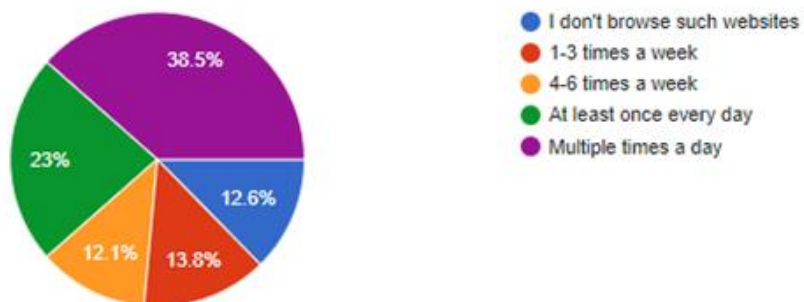


Figure 15: Survey Questions group 2

Anonymous and personal social media are distinguished by how users are displayed. In anonymous social media websites like reddit or tumblr, users can assume a new identity with no link to their personal life. In contrast, personal social media puts emphasis on the users being representing themselves as their real person.

The difference between the two is stark and greatly influences how users interact with the respective platform [21].

When asked about their preferences, we saw that the majority of users prefer to browse anonymous social media. Whilst these were the results we were expecting, we believe it not to be because of the anonymity provided, but because of the content these platforms present. Anonymous social media is less focused on personal stories and more towards topics and interest of its population. For gaming especially, other than for content creators, there are little incentives to use personal social media as a way to browse for gaming news. This was what we expected, but it is important data to support our future conclusions.

Survey Section 3: Preferred Aggregators

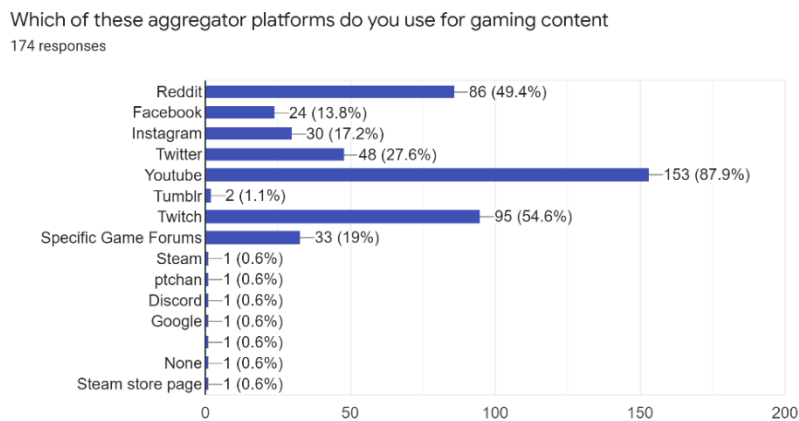


Figure 16: Survey Questions group 3

Unifyer’s redesign is aiming to allow several different types of media to be integrated. Therefore, it was especially important to us to know which ones to prioritize. The most used platforms are reddit, YouTube, Twitch and Twitter. In my original analysis of Unifyer back in 2019 I listed exactly these platforms as what should be targeted for integration and our results here indicated that to be accurate.

Survey Section 4: Ads

How do you feel about online ads

174 responses

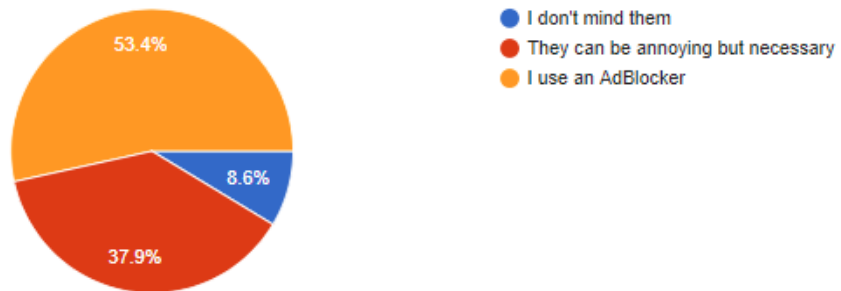


Figure 17: Survey Questions group 4

Although ads and monetization are not a major component of our research, we thought it was interesting to ask about how users felt about them especially with how vocal our first personal question participants were towards them. Survey takers we are clear in their dislike toward ads like the views from our personal questionnaire participants, mainly showing annoyance towards websites that used algorithms to target specific ads tailored towards the user. [20]

Survey Section 5: Videogames as a Hobby

Do you play videogames?

174 responses

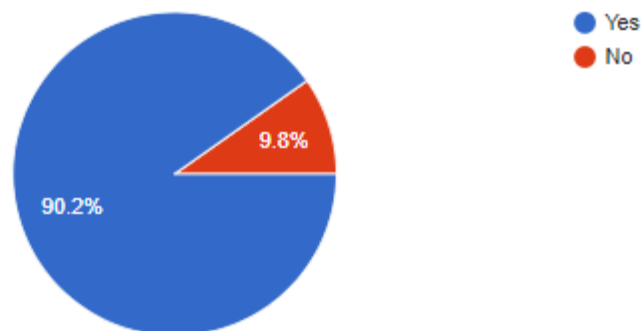
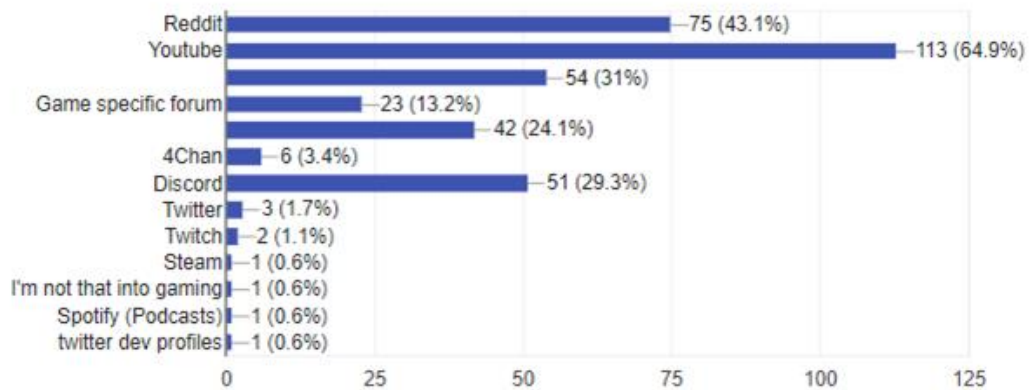


Figure 18: Survey Questions group 5

Simple yes or no question to garner what type of population we were dealing with. Gaming can take many forms these days and with the younger demographic that we targeted this was an expected result.

Which of these platforms do you use to follow news about gaming or specific to a game

174 responses



How do you participate in gaming communities (Reddit, Twitch, YouTube, etc.)

139 responses



Figure 19: Survey Questions group 6

The next set of questions set out to find where people went to for specifically gaming news. Results here were similar to our previous question about platform preference.

More importantly we find that over half of users do not interact by leaving comments or reacting, taking a more passive approach by simply browsing without engaging directly. Of the rest of participants, only 13% say they “regularly engage in commenting and chatting”. This was surprisingly low from what we were expecting.

In general, there seems to be a divide around the middle of people who choose to engage with their media and others that prefer to “lurk”. It will be important for us to take both sides into account with the redesign.

What platform do you use the most to talk to gaming friends
174 responses

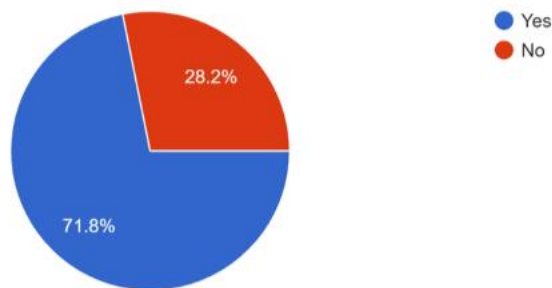


Figure 20: Survey Questions group 7

Discord has had a monumental ascend into being the most used platforms for gaming communities to talk both one to one, for both small and big groups. [20]. The idea to integrate discord was mentioned before in original redesign document, and the results seen here only point toward it being a priority.

Survey Section 6: Live Online Content

Do you enjoy watching live gaming content
174 responses



How would you describe yourself as a livestream viewer
174 responses

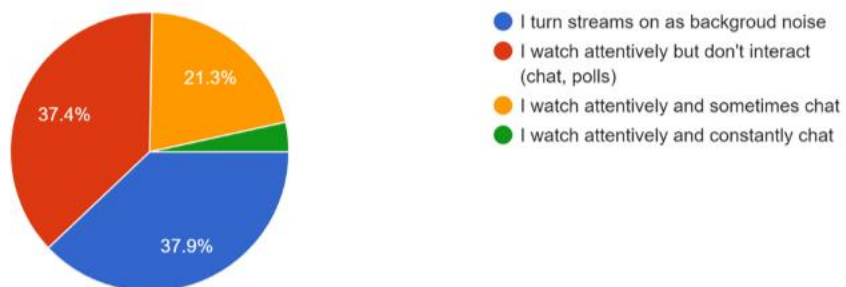


Figure 21: Survey Questions group 8

Here we start off with another simple yes or no question. Whilst most of our participants showed to enjoy live gaming content, the percentage that does not is still large enough to be relevant.

Regarding engagement our results were similar to our previous question about social media interaction where the majority of users prefer to enjoy content without participating in the discussion. There is, however, a sharp contrast here. In our social media question, we asked about actively participating by commenting, whereas here interaction in chat can be much less complex. Interesting to see the slight difference between people being more comfortable commenting in more “discussion” focused social media than in a freer form, more casual that is livestream chat rooms.

Do you watch more than one stream at a time?

175 responses

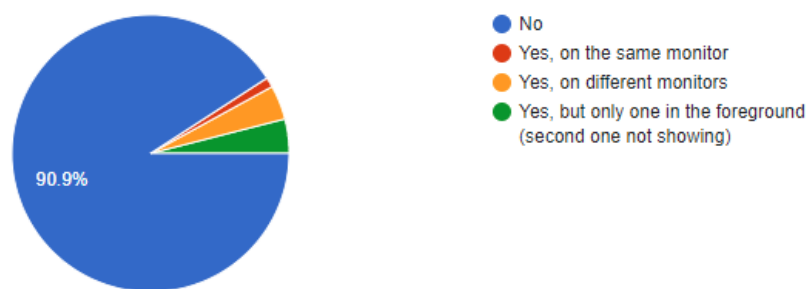


Figure 22: Survey Questions group 9

“Do you watch more than one stream at a time?” A simple question that reveals a flaw with Unifyer that was brought up when studying Unifyer and originally thinking of our redesign.

For online video, users want to either have it as background noise or as a source of entertainment/learning material. None of these scenarios gives itself well to multi-watching. However, live streaming presents new opportunities where watching multiple streams at the same time can be productive. It could be that a big event is taking place and having multiple livestreams up at the same time can ensure that the person looking for the most up to date news is getting it. In the realm of gaming, it is very common for several streamers to get together and stream the same experience, each from their perspective. For the viewer it can be fun to have multiple viewpoints simultaneously to take in the moment from every angle.

However, even with all the opportunities livestreaming presents when compared to regular videos in regard to multi-watching, it is clear from our results that viewers are not, in large, looking for that experience. This further justifies our push to shift Unifyer’s focus away from being a multi-screen platform.

When looking for game news or information, what media type do you prefer
139 responses

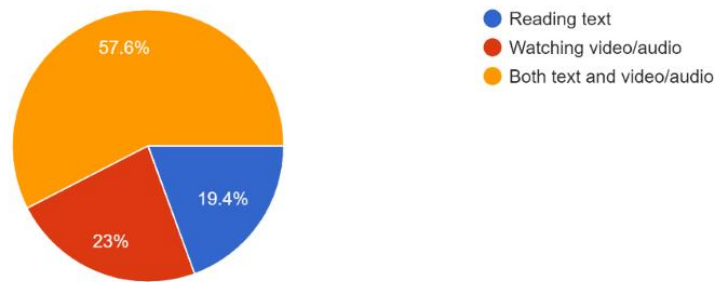


Figure 23: Survey Questions group 10

Regarding what type of media our users prefer it is clear that both text audio and video are widely enjoyed by most users.

Would you consider streaming online? (Twitch, YouTube)
143 responses

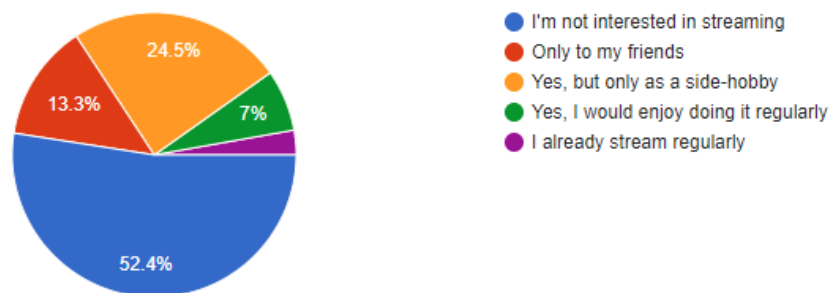


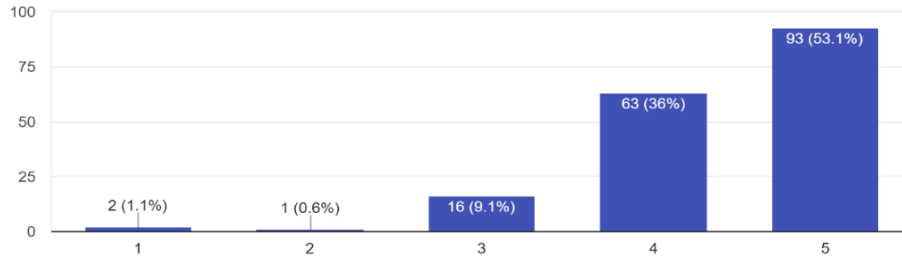
Figure 24: Survey Questions group 11

Finally, we must keep in mind that Unifyer's still has a creator-consumer mechanic to it, and that people need to be interested in actually setting up their own rooms. Whilst in the topic of game livestreaming we asked about how people felt about streaming and it is clear that a large enough part of the survey takers enjoy broadcasting to either friends or the world. This bodes well in accounting for people to be willing to set up rooms Unifyer rooms in the future.

The last two sections of the survey had us collect data on what users felt were more or less important features of gaming websites. This segment of the survey was conducted on a 1-5 qualitative basis. We have distinguished the five most prominent features that users voted on:

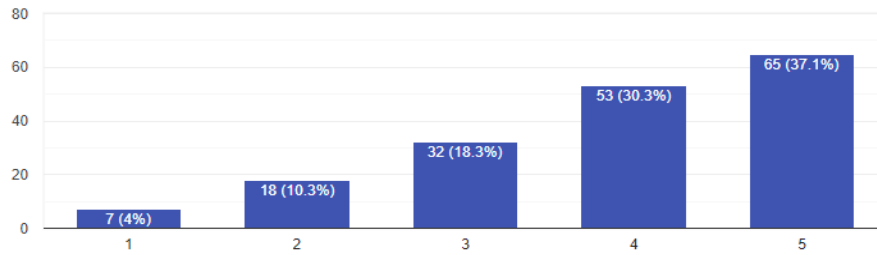
Gaming websites focused on streaming and video should be simple to browse

175 responses



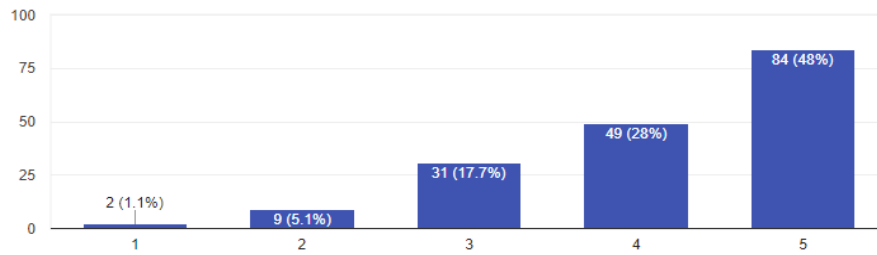
Gaming websites focused on streaming and video should be moderated

175 responses



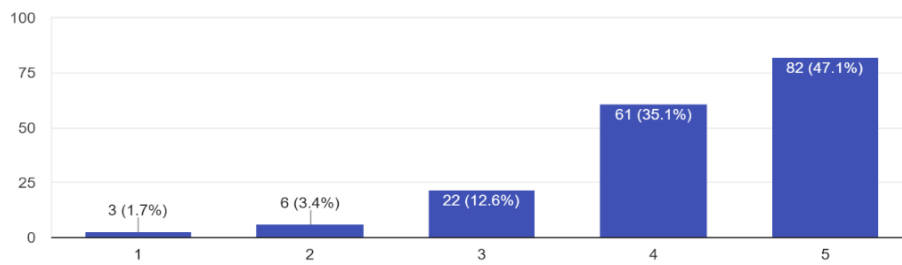
Gaming websites focused on streaming and video should allow for comments or chat

175 responses



Gaming discussion websites should allow embedding (linking media like youtube videos)

174 responses



Gaming websites focused on streaming and video should load quickly

175 responses

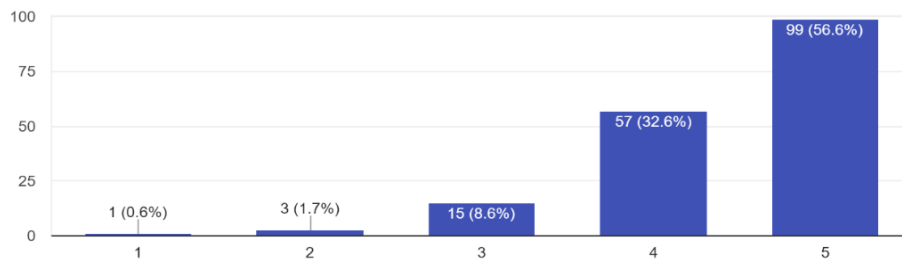


Figure 25: Survey Questions group 12

Conclusions from the Survey

Using our formula, we were able to see that these five features were heavily voted on by our participants to be of great importance to the website.

Question Topic	AVG	Point Score
Simplicity	4,3943	19,3
Chat	4,1657	17,4
Embedding	4,2	17,6
Load Time	4,4286	19,6
Moderation	4,0286	16,2

Figure 26: Survey questions formula analysis

Simplicity: Our prototype must show a redesign of visual noise. Participants noted that the website should be simple to navigate. Our HUB design falls well into this as we want it to be a quick and easy tool to use.

Chat: Live interaction is something users feel is important. Whilst a dedicated chat room for each Unifyer page seems like an exaggeration and goes against our “in and out” approach, we think the implementation of a Discord widget to be a fine addition that nicely “checks” the chat features.

Embedding: The ability to have content linked to another page is a core part of Unifyer and already and one we only plan to expand.

Load Time: Loading more than a few embeds at once can be quite the chore, so to work around this we might need to use a pre-loading method like the ones seen on more modern reactive websites.

Moderation: Our redesign aims to continue a caster-to-viewer experience and seems already well aligned to respect the vote for moderation.

Prototyping

With our goals set it was now time to take the final step in our method and take all our knowledge and project it into a prototype. Our plan was to originally work alongside MOG to develop on top of the previous Unifyer. However, at this point one a half years after its original development, there were very little members still working at the company with any knowledge of the internal working of the software. Key dependences had either been disconnected or updated past the point of it being possible to reboot the original code in any sort of reasonable time. With all this in mind we opted for both creating our own prototype and testing out new widgets on MOG's infrastructure that powered the original Unifyer.

With the community aspect in thought, we wanted to show with this prototype that almost any topic can be made into a Unifyer. In specific we choose a strategy in the game chess to build the theme around, The Alekhine's defense.

To follow suit in MOG's development environment it was suggested by them that we use React to code the website. React is an open-source, front end, JavaScript library for building user interfaces or UI components. On top of React we used NextJS [19]. Next is a layer on top of React, but built on it, to better facilitate workflow and organization of our pages.

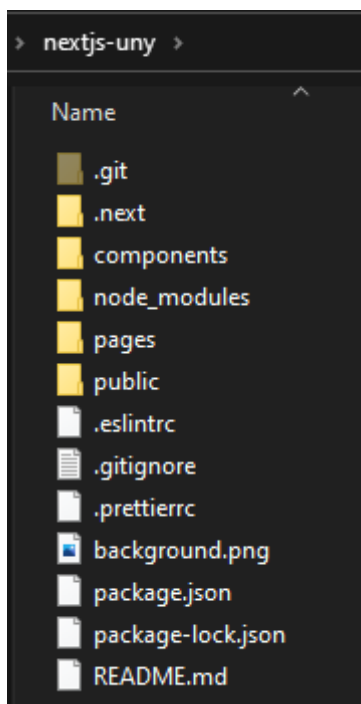


Figure 27: NextJS file structure

React has the advantage of easing the process of building pages from scratch, as there are many assets that can be used from the get-go. For this project however, we planned to keep everything simple from a design and prototyping standpoint, so we used very little prebuild code.

A big advantage of Next.js that we were particularly excited to try out was quick loading. Next.js websites load the entire website before showing the page. Although our prototype was a single page, we are going to be running a great number of embedded. With Next's loading technology we should be able to get a quick and responsive page, independent of the load or number of Widgets we place on the splash page.

The basic structure for the website was designed to be compact. React was useful here with its boundary and margins tools and we quickly got to work on implementing the more complicated widgets, the first of which we wanted to get working was YouTube.

Video Embeds

For YouTube we worked with its developer API to pull the video source and integrate their player into the site. Following the advice of more experienced Next.js developers we built each widget type on a different file, and then loaded it alongside all its

dependencies to the main page. With everything set, YouTube's API lets us pull any video and play it with their player, along with any custom size we choose to display the video with. In classic HTML and CSS development, we would have to use CSS to position and style each component. Since we were using react, we could edit our YouTube players right on the main page file.

After the first YouTube embed was operational, we got to positioning it according to some early designs and added two more embed below it.

The second widget we got to work on was twitch, and this is when we ran into a new issue. [16]. For the past couple of years Twitch.tv has been at the top of the online livestreaming market [17]. Being the top platform for video game streaming by a large margin, in combination with being powered by Amazon's wealthy capital, has led to twitch's executives to be more lenient in pushing anti-consumer features to the website with hopes to expand their monopoly; The latest of which is their new anti-embedding popup. Until about a month before the writing of this thesis it was possible (and easy) to embed twitch's player onto any website. The new policy makes it so there is a chance for one of two things to happen when a twitch stream is embedded in an external platform:

1) Redirecting Pop Up



Figure 28: Intrusive Twitch Pop-Up

Upon loading an embedded stream it is possible for a pop up to show on top of the video-player, covering a significant portion of the stream. This information can be dismissed.

2) “Purple Screen of Death”

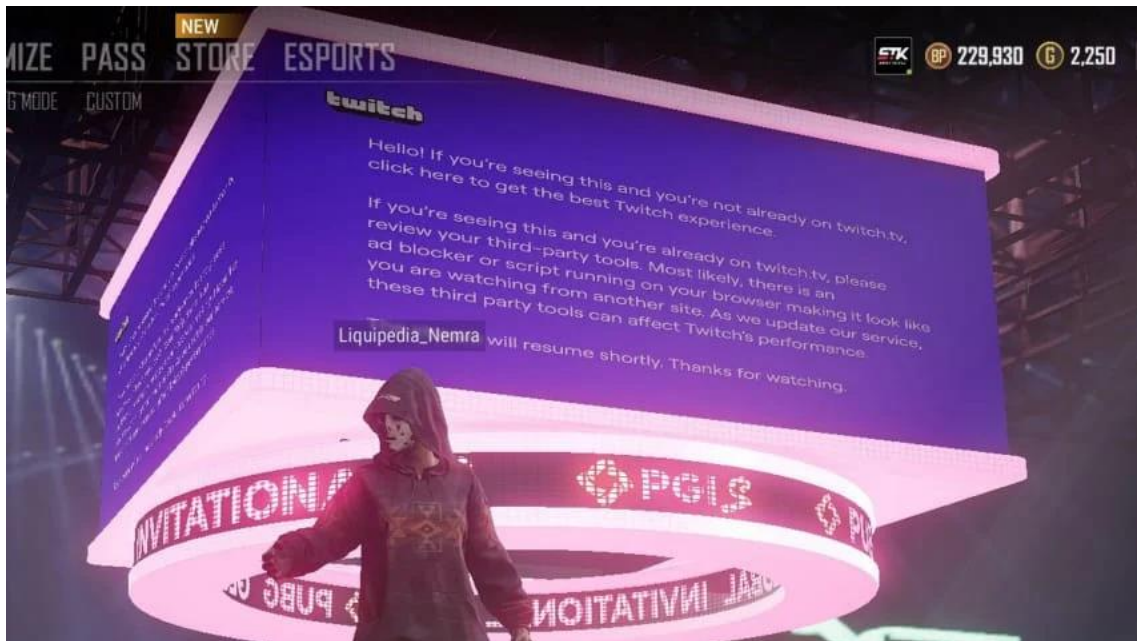


Figure 29: Twitch Purple Screen at a live e-sport Tournament

The alternative to the pop up is a more obstructing image telling the viewer to go directly to twitch.tv. Unlike the previous notification this screen cannot be clicked out of or dismissed, rendering the stream unwatchable.

Both these intrusions serve to keep twitch streams on twitch. The platform is heavily reliant on a sense of community, and measures such as these are implemented to further that agenda.

Another reason for their implementation is to combat ad blockers. In addition to playing from embeds, these pop up, noticeably the second one, can be played when the user has enabled an ad blocker. In our survey it was noted that 53% of participants used some sort of ad blocker on their browser, and other studies [18] seem to indicate that a large part of the online population also uses them. For twitch, a video game-oriented platform, it is expect that users are even more likely to use ad block due to tech-savviness and the frequency at which ads are played.

Overall, even with all this in mind, for our prototype we did implement a twitch widget. Pulling the necessary info from their API as similar in practice to how it worked for our implementation of YouTube, but as soon as we got it running it were hit with the “Purple Screen of Death”. This, amongst other “anti-consumer policies” laid down by Twitch in the past couple of years made it so we design the prototype without using the, now frankly broken Twitch addon.

Discord Widget

With YouTube and Twitch out of the way we moved on to what we believed to be the biggest addition in terms of potential impact for Unifyer: Discord.

From an outside perspective, implementing discord seemed like an easy task. The official website showed how to go about fetching all the needed information from the

API, and how to make it work seamless with HTML code. However, things for us were a bit more complicated.

Discord provides their own widget to be embedded on any website. This works by having admin access to the discord server we want to target as the one being linked, copying an HTML string, pasting it and *voilà*. However, in our case, despite the widget showing and being displayed in the correct proportions, we had no connection to our server. All we saw as an empty shell that pointed to nothing.

Upon some investigation and playing around with potential solutions, we decided to change the way in which the API was receiving the data for the widget by wrapping everything into a component. Luckily for us this solved the problem, and our test discord server was showing up correctly, and so was the list of online members.

With this this completed we had implemented the basis for the modular design. Before beginning to move everything to its place according to flush out design, we added one final text module.

With our prototype functional we can reflect on our initial goal. To redesign Unifyer to be a simpler, more user-centric community HUB for quick access to information. One thing we wanted to achieve was a compact design. Most websites and social media take the entire screen to display a swarm of information. With the redesign we wanted users to enter the page and immediately understand that they are looking at a community created page that links to many resources. Unifyer is not trying to be the end all be all platform that most other social media strive for. Unifyer is but a vessel, a tool used by community managers to guide new or existing users to all the different ways for them to interact *with* that community.

Unifyer doesn't ask for a log in or any of the user's information. It simply exists as a curated landing page to show you where to go next. With our compact, simple and straight forward design we believe to have achieved what we aimed for in creating Unifyer as a user-centric community HUB for quick access to information.

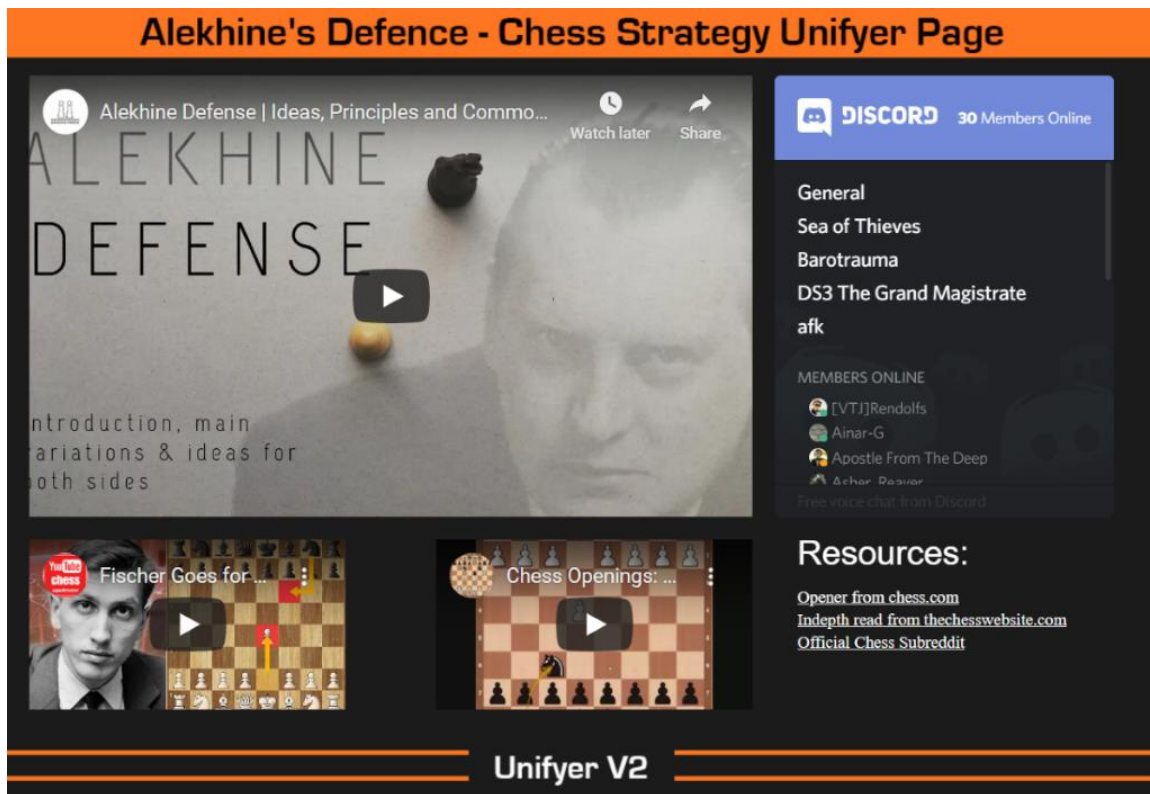


Figure 30: Our developed Functional Prototype

MOG's Zgaming.

A key part of MOG's infrastructure, *Zgaming* is a set of tools developed inhouse by MOG to be the backbone of new developments by the New Media department. The original Unifyer took a lot of components from Zgaming and built on top of them.

At its core Zgaming is a framework where different embeds can be drag and dropped to a screen. This screen is then turned into a digital "room" where media can be shared in sync with anyone who joins.

Zgaming is important to the scope of this project for two reasons: Experimenting with new tools, and their compatibility with MOG's systems.

Part of the goal with developing our prototype was testing how well we could have new widgets running along each other. Discord for example was something never implemented by MOG in their projects. A lot of Zgaming's infrastructure works on top of React and should therefore be highly compatible with the tools we implemented with our prototype. To test this, we used the code for our new discord widget and adapted it to run on as a Zgaming embed. With almost no code modification it was running and proves the important point that the changes we developed for our prototype can easily be replicated in MOG's systems.

All this is extremely relevant given how well used to most people working at the media team are to Zgaming and shows that our prototype can be translated to a product using MOG's own tools.

Chapter IV

Feedback from MOG

The most important piece of feedback that we sought to receive was from MOG employees that previously worked in the project, including both those who oversaw its creative and technical development. To gather this data a form was setup. Unfortunately, of the original team behind Unifyer, only three employees were still at the company, but their insight is just as valuable none the less. Of these three we have the project lead, main graphical designer, and a senior programmer.

The form starts with an informative diagram to quickly bring the person answering up-to-speed with our developments.

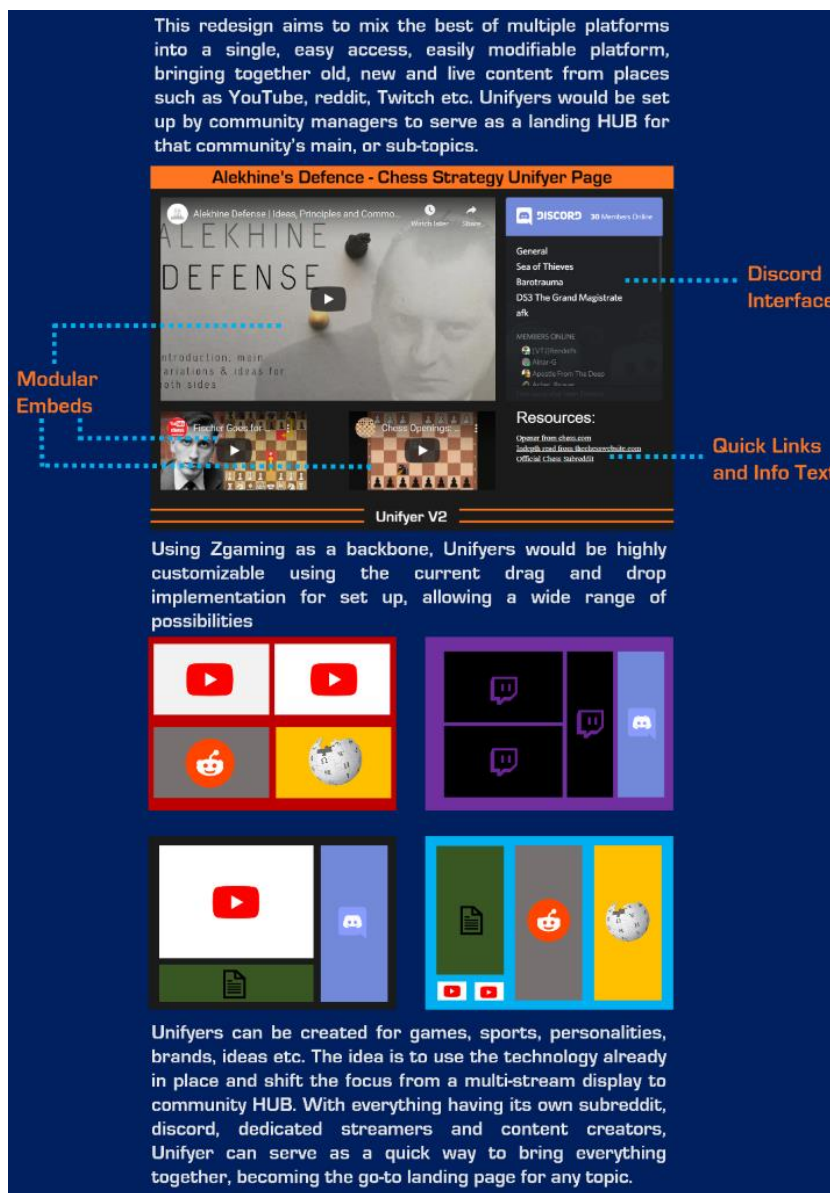


Figure 31: Image shown to feedback participants

Shown in the diagram is a screenshot of our working prototype with a text overlay to better explain each component, explanatory text for what the redesign has in mind, and finally 4 examples of other modular representations the software can be presented in. We asked six different questions and compiled all the answers.

Question 1: "What are your thoughts on shifting theme from multistream to community HUB?"

- **Answer 1:** Seems like a good idea as it adds a new level of interactivity and a sense of community to the platform.
- **Answer 2:** As i am seeing this, the proposal does not seem to be a change, but rather an addition of functionality. Aggregating various forms of content from various platforms allows unifier not only to extend the possibilities of story telling but also to allow the possibility of having multiple content (be it video, text, etc.) in one screen.
- **Answer 3:** Aggregating content from multiple sources (not limited to video streams) has been part of the vision of Z-concept's derived projects (e.g. Unifyer) since day 1. Community HUB is a use case, mainly targeting the gaming community, where the above naturally happens. It is a natural evolution (multi-stream -> community hub) of the feature set, although I won't pose it as "shifting" but instead as "enriching" the feature set and consequently allowing multiple use cases.

Question 2: "Based on your previous experience with Unifyer, do you see this new direction as a positive?"

- **Answer 1:** Yes, it might generate a wider range of business opportunities.
- **Answer 2:** From my point of view, these new theme increase the value of the platform, both for managers and viewers of the platform.
- **Answer 3:** Yes its positive, although as aforementioned I won't see it as a new direction (meaning change in direction).

Question 3: "The original design was heavily focused on Twitch. Since then they have both implemented their own in-built multistream system (squad streaming) and have begun blocking embedding of their streams. With this in mind, do you think the redesign does well to focus away from being twitch-centric?"

- **Answer 1:** Yes, the more innovative, the better.
- **Answer 2:** The original design was focused on gaming content. Twitch and Mixer (at that time) were the main platforms for that. However, if unifier

really wants to get users to reach the platform, then it must offer users more than the twitch does, otherwise users do not need to switch platforms. So, yes, I think the platform should focus on aggregating content and use twitch as one of the possible aggregators and not as the aggregator.

- **Answer 3:** The original design was not Twitch centric, it included Twitch, Youtube and Mixer and the ability to add more sources as time goes by. Yes Twitch limitation/blocking poses a challenge that needs to be addressed with usage of alternative sources and/or inclusion of new ones.

Question 4: "Do you see the redesign as having more potential than the original Unifyer?"

- **Answer 1:** If implemented correctly, yes.
- **Answer 2:** As i said before, the sucess of the platform needs to give more than any aggregator. If i only am able to see twitch content, ill go to twitch, if am only able to see discord channel, ill be in discord. If i am able to, see the twitch channel, read the discord channel e maybe get real time twitts in only one screen, thats a good place to be in it.
- **Answer 3:** Taking in consideration that the redesign gravitates around adding more aggregation sources that are intrinsically related with the gaming community and that relate well with the way this community interacts, yes I would say its potential would increase.

Question 5: "Do you think Zgaming's current infrastructure is well suited to develop in for this redesign?"

- **Answer 1:** I do.
- **Answer 2:** I think it is. It just seems necessary to create/add some "brigde logic" to support some of the aggregators listed above, just as it is currently done with twitch, youtube and others ...
- **Answer 3:** Not sure what is meant by "Zgaming's current infrastructure"... although if the question is about its architecture then yes it is fairly well suited.

Question 6: "Any other feedback"

- **Answer 2:** I don't see it referenced above, but I think it's important for the unifyer to keep the possibility of conference in screen

Feedback Analysis

Overall, we were happy to see that feedback was so positive. The shift in direction from multi-stream to community HUB is a radical change, but seeing it praised by the original developers further shows that the concept is well suited to move forward. One of the biggest takeaways from the answers is a belief that the new features can be seen as an addition to the overall scope of the project. This is in line with us believing the redesign to be in line with realistic development, as it would be largely taking from the original in both design and infrastructure. This is reinforced in our fifth question, where it is agreed that Zgaming's tools are well suited to fit the new additions.

As noted by the replies, the implementation of multiple types of media is mentioned as an important part of Unifyer's future success, if it is offering all these features simultaneously and seamlessly. Finally, it is noted that the move away from just the previous media sources and gaming focus will lead to more a more successful product.

Conclusions and Future Work

Media aggregation is something a lot of people inadvertently experience every day. The websites we visit in search of news or entertainment are finding ways to fuse both together and every couple of years we see shifts in what new platforms and communities generate the most traffic and influence in the online ecosphere.

Our research led us to design science and information systems research. From that basis we thought to create a method we could follow to guide not just our platform redesign, but other new and old media aggregators. Creating this method was an iterative process. Systems like these are normally kept internal to companies, so we focused on our design science knowledge to mold its workflow into a proper, step by step, modular method where each step helps guide the process of flushing out an idea into a final prototype.

All this was on the back of our minds when MOG approached us with the opportunity to work alongside them in redesigning their new aggregation platform, Unifyer, and so, this entire project began off a thought about how to add the most value to an already existing platform.

Using the proposed method, we took what we thought was the right direction to go with Unifyer's future as our starting point. Step by step, one module at the time, we collected and analyzed data to transform an idea into a demonstrable prototype ready for the company's feedback, and whilst their response shows the methods immediate success, its true value lies in its reusability.

Our biggest hurdle within the project was the time gap between its start and the beginning of MOG's internship. This led to our demonstration of the method to be one folded, so one way we would like to expand our work would be by further utilizing our development method for other platforms, both new and old. In addition to this, the method was aimed at a gaming audience. Further research could approach other mediums or explore more than one topic at the same time. In addition to this, we would like to include a section of how business rules would affect development at the beginning and throughout our method.

Overall, we are happy with our work and its evolution. Unifyer's redesign being well received shows the method was a valuable tool; One that can continue to create and sustain user centric media aggregation platforms in the future.

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