Hypermediation Functionalities in Digital Platforms for Collaborative and Social Interaction

Eliza R. Oliveira[1][a], Oksana Tymoshchuck[1][b], Eveline R. Sacramento[2][c], André C. Branco[1][d], Daniel Carvalho[1][e], Luis Pedro[1][f], Maria Antunes[1][g], Ana Almeida[1][h] and Fernando Ramos[1][i]
[1]*DigitalMedia and Interaction Research Centre, University of Aveiro, Aveiro, Portugal*
[2]*Institute of Ethnomusicology - Center for Studies in Music and Dance, University of Aveiro, Aveiro, Portugal*

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Abstract: The purpose of this article is to identify how Mobile Apps/Platforms have promoted Hypermediation Processes, establishing functionalities that enhance hypermediation. This determines how it improves interactions and audience engagement with online media content, allowing the user to not only be a passive spectator but also actively participate through the interaction provided by the system. Considering that the hypermediation concept is still not widely established, a theoretical introduction is presented, aiming to define it. To map the hypermediation traits, we conducted a systematic literature review to identify functionalities that enhance hypermediation in current mobile apps/platforms. It comprises articles from Scopus and Web of Science databases, published between 2016 and 2021. Further, the research strategy used keywords in English and Spanish, and it was made in accordance with the PRISMA Statement. A total of 29 articles were analysed to identify hypermediation functionalities that play a relevant role in fostering communication and engagement in collaborative and social interaction contexts. Simultaneously, this article discusses how hypermediation can be understood in the CeNTER platform scope as an example of a digital platform for community-led initiatives. This study's results made it possible to identify the functionalities of hypermediation that are essential to promote community initiatives and local development.

1 INTRODUCTION

The development of mobile apps/platforms has led to new forms of social interaction and sharing of collaborating spaces, which promote the production, distribution, and aggregation of information in online environments (Stuckey & Arkell, 2006). In this sense, apps/platforms allow the dissemination of information through connections between individuals with common interests, promoting the collaborative construction of knowledge and community-based innovation (Gunawardena et al., 2009).

In this context, Scolari (2008) proposes the concept of "hypermediation" that seeks to broaden the notion of mediation beyond the relationship between subjects and the media, including the digital environments' new configurations, which is an extension of the mediation presented by Martín-Barbéro (1987). According to the author, hypermediation does not consist of a medium but of exchange, production, and symbolic consumption in a technologically interconnected environment, characterized by many subjects, media, and languages (Scolari, 2008). Scolari (2015) still mentions that new communication is created through

[a] https://orcid.org/0000-0002-3518-3447
[b] https://orcid.org/0000-0001-8054-8014
[c] https://orcid.org/0000-0003-0839-4537
[d] https://orcid.org/0000-0002-6493-6938
[e] https://orcid.org/0000-0003-0108-8887
[f] https://orcid.org/0000-0003-1763-8433
[g] https://orcid.org/0000-0002-7819-4103
[h] https://orcid.org/0000-0002-7349-457X
[i] https://orcid.org/0000-0003-3405-6953

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hypermediation, which generates innovative connection conditions in digital media, allowing a new use or additions to the language used, and new social or communicative practices, in new scenarios.

Distinct works (López & Masjuan, 2019; Martínez-Rolán, 2019) used the following definition coined by Scolari (2008), which is generally recognized as a set of socio-technological processes and experiences. These authors emphasize the transdisciplinary character of hypermediation and highlight that hypermediation is a new condition of communication and interaction in digital media. In addition, some pivotal hypermediation features and characteristics of hypermediation are digitalization, user-generated content, multimedia, interactive user-interface, reticularity, hypertext, prosumer, and transmedia (Scolari, 2008, 2015).

Thus, digital communication trends can provide the ideal conditions to promote connectivity participation producing changes in the social context (Silva, 2017). Hypermediation processes enhance communication and collaboration between people, community-led initiatives, entities and provide innovative solutions that promote the territory's development (Carvalho et al., 202l; Branco et al., 2022).

As part of this study, a prototype of a CeNTER mobile app was developed, which aims to facilitate communication and collaboration between different agents (citizens, community-led initiatives, public and private entities) involved in the innovation processes of the territory (Oliveira et al., 2022).Within the scope of this study, community-led initiatives are defined as "(...) a group of people who share affinities and, voluntarily, develop joint actions, in a physical and/or virtual environment, in the context of a territory and produce, repurpose and share information relevant to the development of that territory" (Silva et al., 2020 p. 48).

The project team sought to understand how hypermediation can be applied in the context of community-led initiatives and what functionalities are recommended to promote these initiatives. For this purpose, the team carried out a systematic review to understand how apps/platforms implemented features to promote hypermediation processes (Oliveira et al., 2021). Moreover, this article presents how hypermediation is included in the scope of the CeNTER platform, providing a concrete example of this concept.

2 METHOD

The systematic review focuses on exploring the practical concept of "hypermediation". It was conducted using Scopus and Web of Science databases, since they offer the highest coverage of studies within the field of Social Sciences (Mongeon & Paul-Hus, 2016). The research strategy used keywords, both in English and Spanish and was made in accordance with the PRISMA Statement (Liberati et al., 2009).

To identify eligible studies, this systematic review was conducted in the category of multidisciplinary sciences of technologies, business, and social sciences. Articles should be written in English and Spanish and published in the last five years, i.e., between 2016 and 2021. This choice was justified because it was intended to study the most recent apps/platforms. The investigation was carried out through the Scopus and Web of Science databases, using the following keywords: ("app " OR "application" OR "software" OR "platform" OR "system") AND ("hypermediation" OR "mediation") AND ("consumer" OR "producer" OR "prosumer"). Three researchers participated in this process. A total of 4 cycles of searches were made between January and March of 2021 (Figure 1).

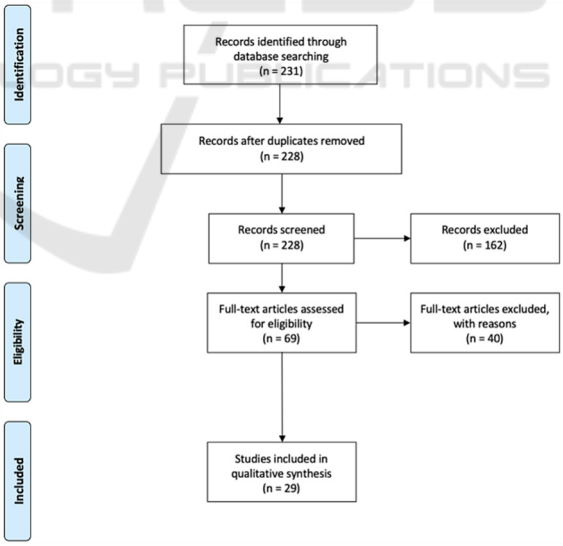

Figure 1: PRISMA flow diagram of hypermediation promoting mobile apps/platforms.

The inclusion criteria for the eligible studies were as follows: (i) articles or book chapters (blogs, entire books, and abstracts were excluded); (ii) being open access articles or book chapters; (iii) being published between 2016 and 2021; (iv) presented as original

documents; (v) approach implementation of app functionalities that provide and enhance hypermediation processes; (vi) have expressions "mobile platforms" or "applications".

All articles that did not address the previously mentioned keywords were excluded from this review. This study selection proceeded as a final refinement, to find results that make it possible to answer the following questions: i) What mobile apps/platforms were found in this review? ii) What types of mobile apps/platforms were found? iii) In which fields of activity, they were applied to? iv) What are the main found functionalities that promote hypermediation? v) Considering the review findings, how is the hypermediation process reflected in the scope of the CeNTER platform? All studies that were not available for review or that were in duplicate were excluded.

This systematic review was made with the support of WebQDA (https://www.webqda.net/). The data collected from the manuscripts was organized and summarized using different descriptors in the software.

3 RESULTS

The presentation of results is organized according to the research questions addressed in the previous section. For the systematic review, an appendix has been published with tables and a tree of codes, which can be found in the following URL: https://zenodo.org/record/7545004#.Y8bFfOzP0Wo.

From the research, 1348 potentially eligible articles were found, with 228 results obtained in Scopus and 1120 in the Web of Science. After filtering the data according to the date range, subject area, and keywords, it was possible to obtain 231 results, 130 from Scopus and 101 from Web of Science. After removing duplicates (three articles), results not addressing hypermediation, apps/platforms have been discarded (162 articles), remaining 69 articles. To conclude this refinement process, all the results that address mediation processes, but do not promote hypermediation, were excluded (40 articles), obtaining 29 articles addressing apps/platforms that can facilitate communication, interaction, and collaboration in contexts of community-led initiatives. The refinement process for obtaining the mentioned results can be seen in Figure 1.

A tree of codes of the hypermediation categories was created in Appendix 1 from the research questions. The following subsections show the main findings transcribed from the researched table and summarized for this review (Appendix 2). Those articles fundamentally address apps/platforms that have functionalities to promote hypermediation.

3.1 Mobile Apps/Platforms with Hypermediation Functions

In the first phase of the analysis, all mobile apps/platforms that appear in the selected papers were identified. The objective of this phase was to identify in which apps/platforms the phenomenon of hypermediation occurs, considering the definition of the term by Scolari (2015). Table 1 shows the names of the apps and platforms found and the number of selected articles mentioning each. According to Table 1, 49 results were found in 29 articles. Thus, some articles addressed more than one app/platform. Facebook (mentioned in 10 articles, i.e., n=10), Twitter (n=7), WeChat (n=5), WeiBo (n=4), and Amazon (n=4) were the most frequently mentioned apps/platforms in the selected articles. These apps/platforms are mentioned frequently due to their popularity, with an emphasis on social media.

Table 1: Names of mobile apps/platforms and number of occurrences among the articles.

Application/Platform name	QTY
Facebook	10
Twitter	7
WeChat	5
Amazon	4
Weibo	4
Google/ Google Play	3
Airbnb	3
Apple/ iTunes	2
Instagram	2
Netflix	2
YouTube	2
Others (38)*	1

*= AlertaBlu, Bestcreativity, Bird, BlaBlaCars, Blue Bikers, DianPing, Dodgeball, eBay, Fitbit, Gopillar, Grindr, GrubHub, Happn, Home Away, Hulu, JD, Lyft, ODR, Onde tem tiroteio (OTT), PCW, QQ, Rent the Runway, Seamless, Shout, Spotify, Starbytes, Swarm, Taobao, Tinder, TripAdvisor, Turo, Twago, Uber, WeWork, Witao, Xiaozhu, Yik Yak, and Zoopa.

Kim (2019) addresses the rapid growth of users of social media around the world, with two-thirds or more adult internet users or smartphone owners using social networking websites. The same author also reinforces the popularity of social media through the facilitation of the consumption, production, and sharing of information, which grew in user-generated

digital content, and led to an increase in digital prosumers, i.e., users who simultaneously produce and consume digital content. Pan (2020) mentions that many governments have integrated social media accounts to interact with the population, even in China (WeChat, Weibo). In the remaining findings, 38 apps/platforms were found, each mentioned by only one article. These less frequently mentioned apps/platforms present different functions and utilities than the most frequent findings, such as Facebook or Twitter. This can be seen, for example, in the study by Rise et al. (2019), which addresses platforms such as Zoopa, Twago, Starbytes, Bestcreativity, and Gopillar, which are used only for crowdsourcing, allowing the connection among people with the specific skills.

The papers helped to identify apps/platforms with hypermediation functionalities that play a relevant role in fostering communication and engagement in collaborative and social interaction contexts. For instance, platforms such as Facebook, Youtube, Instagram, and Twitter provide means for communities to articulate and exchange ideas to promote local events and services, fostering the process of territorially based innovation (Drakopoulou, 2017; Kim, 2019). Other platforms (e.g., Airbnb, Weibo, Uber, eBay, and Amazon) boost property and services advertising, helping to promote tourism and the economy in various locations (Levy & Gvili, 2020; Morewedge et al., 2021).

3.2 Classification of Mobile Apps/Platforms with Hypermediation Functions

The research team identified eight app/platform types: i) marketplace for e-commerce websites or sales between consumers; ii) SNS for social network websites that incorporate hypermediation functions; iii) message service for apps/platforms that provide exchange messages for users as the leading service, but also with other additional services; iv) apps/platforms for research purposes with tailor-made software; v) apps/platforms of streaming services that offer on-demand online content; vi) customer opinion sites with word-of-mouth via consumer-opinion (identified seven times); vii) crowdsourcing as sourcing for goods or services; and viii) territorial customization for apps/platforms (Bezerra, 2017; Xie, 2021; Yin, 2020).

Table 2 presents the app/platform classification, 13 articles focus on social network sites, nine are related to customer opinion sites, seven studies talk about marketplaces, another four focus on message services, and four papers are about streaming services. The greatest number of social network occurrences, as Scolari (2015) said, demonstrates a profound mutation process since the diffusion of the WWW, with the explosive combination of social networks and mobile devices, as well as the emergence of new cultural production/consumption practices. Mobile apps/platforms regarding crowdsourcing, territorial customization, and research purposes have been less reported.

Table 2: Classification of mobile apps/platforms and number of occurrences.

Application/Platform classification	QTY
Social network sites	13
Customer opinion sites	9
Marketplace	7
Message services	4
Streaming services	4
Developed for research purposes	1
Crowdsourcing	1
Territorial customization app/platform	1

3.3 Fields of Activities of Mobile Apps/Platforms

Considering the types of apps/platforms found, it is important to understand in which activity fields they are applied (Table 3). Some articles highlighted Marketing platforms that facilitate sharing information among small shoppers, thereby generating electronic word-of-mouth (eWOM), which drives social commerce online (Levy & Gvili, 2020; Pan, 2020).

Table 3: Activity fields and the number of occurrences.

Activity field	QTY
Marketing	13
Politics	6
Entrepreneurship / Business	6
Tourism	4
Health and Well-being	4
Culture	1
Smart Cities	1

In the Entrepreneurship/Business field, for example, the authors Li and Wang (2020) discuss the relevance of trust mechanisms in the sharing economy, like the peer-to-peer accommodation models used by Airbnb and Xiaozh. Hu et al. (2018) presented how online vendors and consumers are learning from each other, and how online reviews, prices, and sales interact among each other.

3.4 Main Functionalities in Mobile Apps/Platforms

Table 4 presents the apps' hypermediation functionalities implemented, as well as how many selected articles mentioned each functionality. It is highlighted that the users of these apps/platforms mainly resort to functionalities that promote the creation and sharing of content (n=14). Those functionalities work as visible stimuli to users that act as content generators, consumers, i.e., prosumers. Another functionality that also had several occurrences was the possibility to post or comment on a topic in social apps/platforms (n=12 incidences), also highlighting the act of repost, so the user shares content from the creation of others. From the set of functionalities, the ones with the fewest occurrences were the voting polls, the number of views/users, and the algorithms for grouping content (n=2) which, despite their relevance for quantifying and valuing contents (e.g., a video is popular if it has many "views"), were not identified as the most cited. Thus, these hypermediation functionalities allow people to effectively connect, determining matchings based on objective criteria, like the interests or the participants' location.

Table 4: Functionalities found in mobile apps/platforms and number of occurrences.

Functionalities in mobile apps/platforms	QTY
Create and share content (from a content creator or by someone else)	14
(re)Posting/comment	12
Scoring/rating (inc. number of likes/retweets)	10
Recommendations/suggestions	9
Collaboration functions - Social groups, events, etc	9
Chat	6
Review	4
Algorithm to filter and display information according to the users' preferences	3
Algorithm to group content (e.g., hashtag)	2
Number of views/users	2
Voting Polls	2
Others (9)*	1

*Others: each one of the 9 functionalities were mentioned in only one article: Form, wizard, or other filling process; "order by" function; third-party promotion (e.g., avatar creation and slogan insertion); ease of use to write a message; micro target messages to specific individuals; filtering content to reach non attentive audiences; display of tracked/motivational information; profile creation notification and bookmarking.

Furthermore, hypermediation functionalities facilitate the processes of exchange of information/resources and collaborative construction of new knowledge, being pivotal for the promotion of innovation processes. These functionalities have also the potential to boost commercial exchanges as, for instance, improving direct/indirect communication, providing product/services recommendations, collaboration with the creation of events/initiatives, and allowing the sharing of those experiences (Li & Wang, 2020; Mathmann et al., 2017). The functionalities constitute more concrete implementations of the hypermediation concept defined by Scolari (2008), playing a relevant role in promoting communication, participation, and collaboration in community initiatives.

4 DISCUSSION

This systematic review sought to find studies exploring the functionalities that promote hypermediation through apps/platforms that play a relevant role in fostering communication and engagement in collaborative and social interaction contexts. Furthermore, this review allowed us to understand that recent articles have been studying concrete and specific hypermediation functionalities, such as Sharing content, Scoring/rating, or Algorithm to group content (e.g., hashtag). The presence of several features common among the different apps/platforms confirms the transversal and transdisciplinary character of the hypermediation process coined by Scolari. Some examples of these similar features are Networks/Reticularity, Multimedia, Hypertext, and User-generated content, among others (Scolari, 2015).

Moreover, hypermediation functionalities are often used in recent apps/platforms, such as Airbnb, Uber, and Lyft, which present characteristics that allow users' involvement in the creation, sharing, evaluation of content, and presence in voting pools. In this sense, the users experience immediate and personalized responses, which is determinant to provide them to feel emotionally connected, resulting in a higher social presence in the online environment (Tang & Hew, 2019).

Therefore, the functionalities identified in apps/platforms constitute implementations of Scolari's hypermediation functionalities. For instance, the Prosumer functionality, proposed by Scolari (2008), is related with creating and sharing content, identified on some apps/platforms (Kim, 2019; Drakopoulou, 2017; Yin, 2020; Morewedge et al., 2021). In this case, the user actively participates in the creation of texts, consumption, and production sharing. Although not mentioned by Scolari, these

functionalities play an important role in hypermediation, as they contribute to a complex network of social processes of production, exchange, and consumption. Additionally, the high incidence of articles that mention recommendation algorithms, which are widely used by apps/platforms that recommend content according to the user's preferences, reveal that the evolution of digital technologies provides an increasing availability of functionalities used as hypermediation enhancers (Yin, 2020; Bezerra, 2017).

This review was crucial to expand our knowledge about the concept of hypermediation, enabling the verification that hypermedia is ubiquitous in people's lives daily. Hypermediation contributes decisively to interpersonal communication and the construction of social relationships, as it is the key factor through which language exchanges and constructions take place, through different media and in a network format, fostering new realities in several areas of life (López & Masjuan, 2019). Mobile apps/platforms that use functionalities that enhance hypermediation have an impact on the development of local economies, to also promote community initiatives. Furthermore, apps/platforms on the scope of the sharing economy mobile (Airbnb, Uber, Lyft, etc.) benefit themselves with several hypermediation functionalities, such as user comments and feedback between apps/platforms or inside social networks (Morewedge et al., 2021), showing how intensive is the use of hypermediation on the consumer market.

This study also clarified the intense and increased use of hypermediation functionalities in current apps/platforms, mostly used to enhance human-machine interaction and make their relationship easy, useful, and valuable for human beings. The synthesis of all the information obtained in this study allowed us to understand that hypermediation functionalities facilitate the sharing of information and resources; increase the visibility of initiatives and entities; promote interaction, cooperation, and collaboration among different users. Therefore, hypermediation has the potential to promote networks that benefit populations' involvement and innovation processes in society, contributing to a region's innovation.

5 THE CENTER MOBILE APP

Figure 2 presents some examples of the CeNTER mobile app interface. Its main screen has a grid with six primary tabs: Initiatives, Events, Entities, Volunteers, Resources, and Highlights, which act as starting points to the app. When opening a tab, the user finds the information in a carousel mode, with cards representing the different content units.

These cards have essential information (e.g., image, date and time, location) and can be manipulated with gestures such as swiping (e.g., to discard or to save as favorites). Furthermore, the interface footer includes other feature options, such as profile, ideas, saved, notifications, and new content creation. The first image refers to the main screens of the prototype, with the event tab being expanded and presenting the options to see the location on the map, add a new event and search for a particular event. The CeNTER app prototype presents an organized modular structure based on local development agents and on initiatives that carry out specific activities, interconnected by hypermediation dynamics.

In the CeNTER app context, hypermediation functionalities provide the app with dynamic elements, for example, sending useful notifications to its users that encourage its utilization, boosting a greater interaction with the platform.

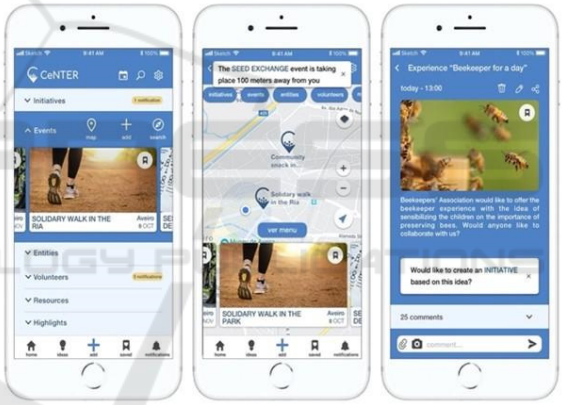

Figure 2: Screen samples of the CeNTER prototype app: (a) main screen, (b) map screen with a notification banner, and (c) screen suggesting the creation of an initiative based on an idea (from left to right).

Notifications are constituted by messages, alerts, and warnings sent by the app to its users considering their interests and option settings (Figure 2). Further, proactive parameters are also encouraged, such as the "Ideas" section, which proposes the birth and publications of innovative ideas for local community development. The option to create and share the users' contents, not only in the CeNTER app, but also among different social networks, consolidates the prosumer proposal identified as one of the hypermediation features by Scolari (2008, 2015).

Recommendations are sent by the app to its users and can be content-based (implicitly captured by user clicks, by user profile configuration, etc.) or

collaboration-based (explicitly captured by user feedback scoring or rating, etc.). Recommendations and suggestions are determined by Algorithms, as well as the users' preferences are based on the analysis of the entities/users' profile, and history of participation in similar events. Such hypermediation functionalities may occur proactively, providing suggestions on participation in events nearby the user location. Other hypermediation functionalities presented are collaboration, content creation and sharing, and scoring/rating functions. These can promote the generation of networks among different users. In addition, hypermediation functionalities related to the prosumer category will encourage people to share their content/ideas, evaluate their experiences participating in an event, evaluate volunteers' work, etc.

In addition, the CeNTER app does not seek to replace existing digital platforms but to facilitate easy connection with them. For example, the app will allow the users to share their initiatives and events on social networks, such as Facebook, Instagram, and other existing apps, through an internal link that enables the association among different networks to foster and facilitate the prosumer actions and sharing processes. to promote interactions among local development agents, facilitate communication and collaboration, benefit from existing mediation strategies and encourage joint creation of new ideas and activities. Finally, the wrap up of the CeNTER apps' hypermediation functionalities allow us to identify that this platform can promote a network, social interaction, exchange and consumption processes that take place in an environment characterized by a large number of social actors, media technologies and technological languages. These functionalities properly match the hypermediations' definition and the characteristics presented by Scolari, consolidating the term and the hypermediation process at the CeNTER project.

6 CONCLUSIONS

This study's development allowed the project team to design a proposal for a set of features that must be present in implementing the CeNTER app to foster the hypermediation process. It is essential to mention that the researchers had the specific focus on hypermediation functions that are crucial to promote community-led initiatives, encourage interactions, and involve new agents in the innovation process of the territory. The project team hopes that these features will allow the CeNTER app to take a proactive role in streamlining innovation processes in the territory.

We can identify some limitations that can stimulate future work. The review used only two databases to retrieve potential eligible studies – Scopus and Web of Science, which may have omitted relevant research. Another limitation concerns the time interval. In this study, articles before 2016 were excluded, which reduced the number of achieved functionalities. This choice was justified because it was intended to study the most recent apps/platforms. We hope this paper provides a better understanding of the strategic potential of hypermedia's functionalities for developing digital solutions aimed at community-based initiatives.

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APPENDIX

An appendix has been published with tables and categories trees of codes, which can be found in the following URL: https://zenodo.org/record/7545004#.Y8bFfOzP0Wo.