# Shaping the Digital Content of Mentoring Programs for Women in Informatics: Insights from an Exploratory Study

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Abstract: Gender disparities in Informatics persist as a significant issue, with women facing barriers to entry, retention, and advancement. Mentoring programs hold the potential to improve this issue. Because change demands a collective response, this study explores how to shape the digital content of mentoring programs to support the students, women and men, in an Informatics department. This work builds upon the findings of a focus group study, complementing them by applying a questionnaire to gain insight into students' academic experiences, perceptions of the benefits of a mentoring program, and preferences concerning digital communication platforms. Findings indicate that the digital content of mentoring programs can help in three keyways: providing insights into the job market, shedding light on career and recruitment processes, and offering real-life content. These findings are valuable to departments and mentoring programs that wish to support women in Informatics through the digital content of their websites and social media platforms.

1 INTRODUCTION

In today's fast-changing technological environment, diverse teams are recognised for their creativity, problem-solving skills, and better decision-making (Webb, 2023). Furthermore, increased female participation in the tech sector is one solution to address the shortage of professionals needed for the EU's digital sector to thrive, potentially boosting economic benefits such as GDP per capita (De Luca, 2023). Considering these factors, one would expect a higher participation of women in the technology sector; however, the situation in Europe shows different figures. Despite efforts to engage women in the workforce, their representation in the technology field has seen limited growth over the last decades (Webb, 2023) and women continue under-represented in the field of Informatics across educational and professional levels (Blumberg et al., 2023).

Research shows that mentoring programs positively impact women in Informatics, personally and professionally (Boyer et al., 2010; Aufschläger et al., 2023) namely by boosting women's self-confidence (Happe et al. 2021) and their confidence in their technical skills and leadership abilities (Boyer et al., 2010). Research also highlights that women turn to their social networks and online resources for career advice and guidance (Paukstadt et al. 2018). However, to our knowledge, no study has investigated how mentoring programs can leverage their digital platforms to support women in Informatics better, and the specific content social networks and online resources should provide to support them in their professional journeys effectively.

INSPIRA is a mentoring programme within the Department of Informatics Engineering at the University of Coimbra in Portugal, whose goals are to attract, support, and retain female students, researchers, and academics in Informatics. A prior

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focus group study (Sousa & Silva, 2024) conducted with women from the department explored the challenges they faced, practical solutions to those challenges, and the potential of the INSPIRA mentoring programme and its online presence to support them in their career in Informatics.

The findings revealed that a mentoring programme with content tailored to their needs could support women in Informatics, for example, by offering mentorship and peer support opportunities, providing access to professors who can offer guidance and inspiration, sharing testimonials from former students and graduates, and organising workshops and networking events. The focus group study also found that the mentoring programme could be a valuable resource for navigating academic and organisational issues, such as those related to going on Erasmus and finding the correct instructions and informational resources. However, some of the challenges found though the focus group are not exclusive of women. Furthermore, gender imbalances in Informatics require a cultural change and collective response (Widdicks et al., 2021; Frieze & Quesenberry, 2015).

This study takes a step further, in relation to our previous focus group study, to identify the challenges the department's student community, man and women, faces and determine the types of content that the mentoring programme should provide and whether those contents are better suited for the program's social networks or website online resources. To address those goals, we distributed a questionnaire among students from the department to identify challenging moments and the specific ways in which a mentoring programme and its digital content could be helpful and to understand participants' digital communication habits and use of social media platforms. We also explore whether there are differences between genders.

Having analysed the results of the questionnaire, this study contributes content recommendations for websites and social media of mentoring programs for women organised into user goals, according to Norman's Three Levels of Design (Norman, 2007) and Cooper's Goal-Directed Design (Cooper et al., 2014).

These findings are valuable to departments and mentoring programs that wish to support women in Informatics. The methodology provides a framework that other institutions can adapt to their unique contexts.

2 BACKGROUND AND RELATED WORK

2.1 Women in Informatics

The under-representation of women in Informatics is an ongoing global challenge. Despite progress in promoting gender equality, women in senior roles within STEM (Science, Technology, Engineering, and Math) fields are still limited (Funk & Parker, 2018) and remain male-dominated. According to Eurostat (2024a), from 2013 to 2023, the number of ICT specialists in the EU increased by 59.3%, almost 6 times as much as the increase (10.7 %) for total employment. Nevertheless, in 2023, only 17.4% of the people employed in the EU with an ICT background were women, a percentage that saw a decrease of 1.4 points from 2016 (Eurostat, 2024b). In 2023 in Portugal, only 14,2% of women with an ICT education are employed (Eurostat, 2024b).

The McKinsey report projects a tech talent shortage of 1.4 to 3.9 million tech professionals by 2027 (Blumberg et al., 2023). Women currently hold only 22% of tech positions in Europe; however, increasing the proportion of women in tech to 45% by 2027 could close Europe's talent gap and potentially boost GDP by €260 billion to €600 billion. Women's underrepresentation in tech is particularly troubling because the roles with the lowest female participation are expected to see the highest demand in the coming years. For instance, women constitute 19% of the software engineering and architecture workforce; they only comprise 10% of cloud solution architects and 13% of Python developers—two of the most in-demand roles (Blumberg et al., 2023). Where no single solution has been found to address these imbalances, interventions could enable women in tech to thrive at work, give women a reason to stay in tech, ensure women are in tech roles that matter, and address STEM drop-off in university, namely through mentoring (Blumberg et al., 2023).

2.2 Mentoring for Women in Informatics

Mentoring programs are touted as one approach to addressing the gender gap, broadening participation, retaining students, and supporting women's success in computing (Boyer et al., 2010; Aufschläger et al., 2023). There are several types of mentoring, including formal and informal mentoring, as well as peer and group mentoring (Aufschläger et al., 2023), however mentoring typically involves a relationship

where a more experienced person gives strategic advice to facilitate the academic, professional, and personal development of another, less experienced one (Meschitti & Lawton Smith, 2017).

Petean and Rincon (2024) studied mentoring programs in Austrian and German universities to support women in STEM, particularly in the graduate and early career stages. They highlighted that effective mentorship relies on customised approaches tailored to mentees' goals, strong leadership support, and institutional backing. Critical factors for success include fostering supportive, reciprocal mentor-mentee relationships and providing personalised access to resources and networks through matching and outreach efforts like training workshops and webinars to emphasise networking and knowledge sharing.

Singh and Basu (2021) established a mentorship programme at a high-research US university aimed at reducing the gender gap in tech and enhancing diversity in computing. The initiative paired female undergraduate CS students with corporate mentors for career guidance, including resumé critiques, mock interviews, and arranging workplace visits. Interviews with mentees revealed that the programme positively impacted both personal and professional aspects of mentees. Personally, the programme fostered a sense of belonging, boosted confidence, and helped mentees connect with role models. Professionally, the programme motivated participants to continue to pursue a career in computing, expanded their network, and exposed them to career opportunities.

The Computing Identity Mentoring (CIM) (Boyer et al., 2010) was implemented in three U.S universities and aimed to bolster students computing identity to improve retention rates among computing majors and develop their technical and leadership skills. Results of a survey showed that participants reported greater technical skills, improved computing knowledge, confidence in leadership, and commitment to computing careers compared to non-participants. The CIM mentoring model also benefited both mentors and mentees, where mentors received training, took on leadership roles in mentoring and service projects, and mentees benefited from educational and social support.

While Petean and Rincon (2024) emphasise programme flexibility and the importance of a customised approach, Singh and Basu (2021) showed how mentoring with corporate mentors impacted students' personal and professional spaces. Boyer et al. (2010) show how mentoring can impact students' perception of their technical and leadership abilities

in computing. These studies underscore the benefits of mentoring to improve gender balance in Informatics, however, they also stress that mentoring should be tailored to the specific institutional and cultural contexts, underlining the need for further research and methodologies to determine the specific need mentoring programs, which this paper seeks to provide.

2.3 From Programme Design to Digital Content for Women

There is a variety of aspects that need to be considered when designing a mentoring program. Aufschläger et al. (2023) studied how mentoring programs need to be designed to contribute to reducing the gender gap in Informatics. Through analysing 13 empirical studies carried out between 2013 and 2022, the authors identified 21 factors, that they organised into three types of aspects, to consider when designing mentoring programs for women in Informatics: relationship aspects such as emotional, moral and psychological support in achieving career and family goals; content-related aspects that include having a mentor as an advisor, and creating opportunities for professional exchange; and organisational aspects such as time management and setting up a predefined structure and activities within the program.

While Aufschläger et al.' (2023) study enables an understanding of how mentoring programs need to be designed to cater to the needs of women in Informatics, the types of contents they could benefit from in their careers is unclear. Paukstadt et al. (2018) conducted a focus group study with female students on career guidance websites aimed at young women in IT to understand how online platforms could meet women's needs. Participants showed a preference for concise and relatable content featuring female role models, along with visually appealing layouts that encourage interaction. Based on these findings, the authors developed five design recommendations for platforms targeted at women in IT: provide engaging content featuring relatable female role models; develop serious mini-games linked to real IT tasks for hands-on experience; offer an online test to help young women identify their strengths and interests in IT careers; use gender-specific language, content, and imagery; and present selected IT careers in detail with interactive examples to aid in understanding job roles. Paukstadt et al. (2018) provides valuable guidance, however these are not enough to determine the types of contents and the specific platforms where those contents should be made available nor how these enable women to address their multi-level goals.

3 APPROACH AND METHODS

3.1 Prior Work

This work builds on the findings of a focus group study (Sousa & Silva, 2024) conducted with women from the Department of Informatics Engineering at the University of Coimbra in Portugal. That study explored the challenges women face in their academic journeys in Informatics and how a mentoring programme and digital media content could effectively address and support women in overcoming those challenges.

The findings revealed that a mentoring programme could support participants by offering mentorship and peer support opportunities, facilitating access to professors who can offer guidance and inspiration, creating tailored digital content through a website, and supporting specific challenges. Specifically with regards to the types of content that the mentoring program's website and social media platforms could provide, this study concluded that digital media could include testimonials and success stories, guidelines and academic support, informational resources, networking and contact information, events and workshops, and online courses and links external resources. However, this focus group study did not clarify whether other students in the department experienced the identified challenges, how the mentoring programme website and social media could support the student community, or how the student community engaged with social media.

3.2 Goals, Instruments, and Procedures

In the scope of the INSPIRA mentoring programme of the Department of Informatics Engineering of the University of Coimbra, in Portugal, this work sought to determine the types of content that could support the department's student community and the specific digital platforms those contents should be made available. Four research questions (RQ) guided this study: RQ1 - What challenges do students, regardless of gender, face in their academic journeys? RQ2 - To what extent do students perceive a mentoring programme as beneficial? RQ3 - How can the online presence of a mentoring programme serve as a supportive tool for the entire department? and RQ4 - How do students from the department engage with social media?

To address the RQs mentioned above and drawing on the findings of the focus group study (Sousa &

Silva, 2024), we distributed a questionnaire in February and March 2024, among a convenience sample of current and alumni students from the department. We sought to involve students from all areas of study offered in the Department (i.e. Informatics Engineering, Design and Multimedia, and Data Science) and who were at different stages of their academic journey, from BSc to PhD or had recently completed their degrees. Participants volunteered to take part and were reached through WhatsApp groups and word of mouth.

The questionnaire was distributed through LimeSurvey, was anonymous to ensure confidentiality and encourage participation, and was organised into four sections: participants' sociodemographic data, academic journey, mentoring programs, and digital communication preferences. The first section included six questions and gathered information on gender, age, academic qualifications, current degree and year, previous degrees, current job, and alignment of current job with their field of study.

The second section asked whether participants' initial expectations for their degree had been met and about experiences of feeling lost or out of place. This section also included questions on what would have been useful in moments of feeling lost and out of place, if participants had considered dropping out and why, and to what extent participants considered themselves informed about possible academic/industry career trajectories.

The third section focused on mentoring programs and gauged participants' perceptions of the benefits of mentoring programs and their potential impact, specifically in providing peer support, training through workshops and round tables, and information on key academic and career moments, either provided though a website or through social media.

The last section sought to understand participants' digital communication habits and asked about their use of social media platforms, frequency of use and purpose, and which platforms they considered more effective for accessing mentoring programme content.

3.3 Data Analysis

The analysis of the results followed the sections of the questionnaire. Closed questions were analysed using descriptive statistics, graphs and a comparative analysis to examine responses of male participants against female and non-binary participants, as well as current students and alumni students. Open-ended questions were analysed using affinity diagrams to

identify the main and recurring themes mentioned by participants, aiming to create concise and objective lists of topics and opinions. For the analysis, we also compared results among genders.

The results of the questionnaires were then analysed together with the findings of the focus group study (Sousa & Silva, 2024) to establish a list of goals and requirements for the digital content of the mentoring programme and determine the specific platform/s the contents should be featured. The list of goals was structured according to Norman's Three Levels of Design (Norman, 2007) and Cooper's Goal-Directed Design (Cooper et al., 2014).

According to Norman (Norman, 2007), the human emotional system has three interconnected levels: visceral, behavioural, and reflective. The visceral level involves instinctual emotions expressed automatically and without conscious control, and that refers to users' first impressions of a design and how they perceive a product and the feelings it evokes. The behavioural level related to deliberate actions, where users unconsciously develop strategies to achieve their goals efficiently, which is crucial for product use and the overall user experience. Lastly, the reflective level, which involves conscious thought, reflection, and learning and includes users' reflections about the product before, during, and after use.

Cooper's Goal-Directed Design framework builds upon Norman's emotional processing levels to types of user goals (Cooper et al., 2014) and introduces experience goals, which relate to visceral processing and focus on how users want to feel, emphasising emotional responses; end goals, which are associated with users' behaviour and refer to what users aim to accomplish; and life goals that pertain to reflective processing and encompass complex sentiments, ambitions, and plans that reflect the identities users aspire to achieve.

The list of goals, features, and platforms that we present in section 4.2. followed the work of Norman and Cooper to ensure that the goals met not only functional needs but also resonated with users' emotional levels.

4 RESULTS

4.1 Questionnaire

This section presents the results of the questionnaire. It first describes the participants to then examine their

academic journeys, focusing on the specific moments when they felt lost or considered dropping out of their degree (RQ1). Then, it looks at participants' perspectives on the benefits and potential impact of a mentoring programme (RQ1-2). Finally, it focuses on the participants' digital communication habits, identifying which social media platforms participants use the most and for what purposes (RQ4).

4.1.1 Participants

54 current students and alumni answered the questionnaire, 30 males (M), 23 females (F), and 1 non-binary (NB) individual. As displayed on Figure 1, 24 participants were students at BSc., MSc., and PhD. Levels, from all the degrees offered by the department[1], with a higher number of participants from the design and multimedia degrees, which is also the degree with the larger percentage of women in the department. 30 participants were former students of the department, with a variety of professional positions: Full-Stack Development, Software Development, Entrepreneurship Management, Graphic, Digital, and Communication Design, Product Design, Data Analysis, UX/UI Design, Machine Learning, Software Engineering, Consulting.
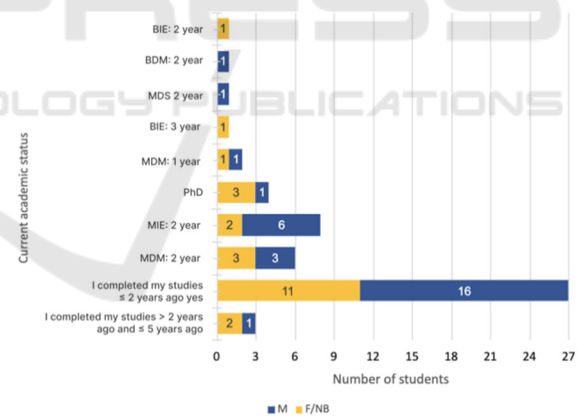

Figure 1: Participants' year of studies at the time of answering the questionnaire.

Concerning the participants who were engaged in academic studies, four reported pursuing a doctoral degree (F/NB – 3; M – 1); 17 indicated that they were enrolled in an MSc. program, eight (F/NB – 2; M – 6) in the MSc. in Informatics Engineering, six in the in the MSc. in Design and Multimedia (F/NB – 3; M – 3), one and data science (M – 1); and three

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[1] BSc. in Informatics Engineering (BIE), BSc. in Design and Multimedia (BDM), MSc. in Informatics

Engineering (MIE), MSc. in Design and Multimedia (MDM), MSc. in Data Science (MDS).

participants were pursuing a BSc. in Informatics Engineering (F/NB – 2) and design and multimedia (M – 1) (Figure 1).

27 participants (F/NB – 11; M – 16) had completed their studies in less than two years and three (F/NB – 2; M – 1) in over two years (Figure 1). 12 (F/NB – 7; M – 5) completed BDM and MDM; seven students (F/NB – 2; M – 5) had completed the BEI. Four students (F/NB – 1; M – 3) completed both BEI and MDS, and four students (F/NB – 3; M – 1) had completed MDM. Two students (F/NB – 1; M – 1) completed the BDM. One student had completed MDS (M), another BIE and BDM (F/NB), and another BIE and MIE (F/NB) (Figure 2).
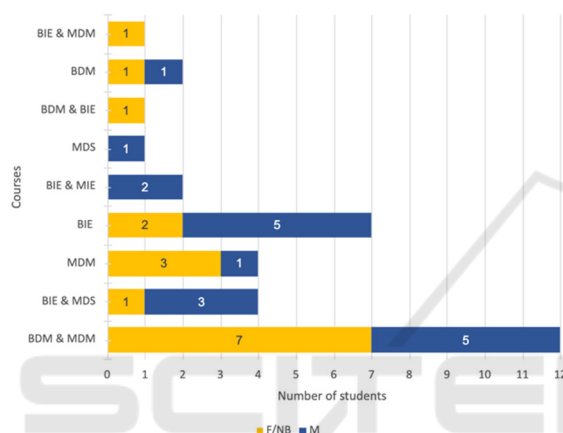
Figure 2: Former students' degrees.

4.1.2 Academic Journey

In response to whether their initial degree expectations had been met, participants generally gave positive answers (Figure 3). Out of 54 responses, 20 participants identifying as female or non-binary and 22 male participants agreed that their expectations were met.

29 male students and 24 female or non-binary students reported feeling lost or out of place during their academic journeys. The multiple-choice question highlighted key challenges they faced, such as difficulty deciding what to do after a bachelor's degree (F/NB – 16; M – 12), navigating job applications (F/NB – 14; M – 14), choosing a field for a master's (F/NB – 9; M – 15), creating a CV or LinkedIn profile (F/NB – 13; M – 10), a lack of guidance on career paths (F/NB – 10; M – 8), deciding whether to pursue a PhD (F/NB – 6; M – 6), understanding PhD programs (F/NB – 3; M – 3), and managing PhD application processes (F/NB – 2; M – 1). When asked for any additional challenges or moments of feeling lost, four participants expressed

concerns about time management skills, difficulty choosing a topic for their MSc. dissertations, and difficulty deciding what to do after finishing high school.
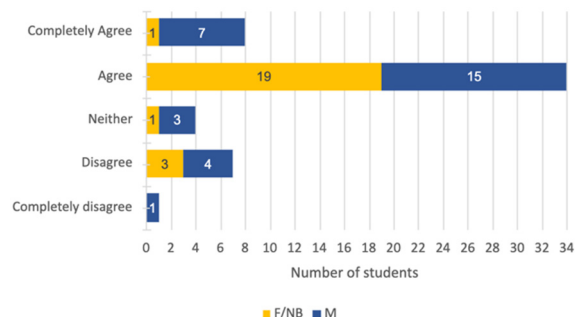
Figure 3: Degree expectations.

In examining factors that could have supported students during difficult moments, participants expressed a lack of consensus on the notion of "realising they were not alone" (F/NB - 16 positive 7 negative, M – 11 positive 13 negative), but there was general agreement that activities offered by a mentoring programme would have been beneficial, as shown in Figure 4. Female and non-binary students were more positive about using digital resources to navigate key moments (1 negative response), and male students were less inclined to find them helpful (14 negative responses). When asked to suggest additional factors that could have been helpful at moments of feeling lost, participants said it would have been good to:

- Gain Work Experience: Encourage students to pursue work experience after their undergraduate studies to explore the various areas within Informatics more deeply.
- Get Exposure at High School: Increase awareness among high school students about higher education and the diverse career opportunities available.
- Integrate Internship Programs: Incorporate internship programs into both undergraduate and master's degree curricula to provide students with practical experience.
- Offer Short-Term Internships: Provide opportunities for short-term internships, such as summer programs, to supplement academic learning.
- Meet Diverse Role Models: Emphasise the importance of diverse role models in design fields such as graphic design and animation, rather than solely in technological areas, to inspire students.

- Organise Career-oriented Workshops: Organise workshops focused on portfolio development and strategies for effectively submitting portfolios to companies and universities.
- Implement Mentoring Programs: Establish mentoring programs to offer career guidance and support in CVs that align with individual interests.

When participants were asked if they felt informed about potential career paths in academia and industry, as well as the steps needed to pursue those paths, 12 women and non-binary individuals expressed disagreement or uncertainty. This indicates a lack of clarity about these options and emphasizes the need for more exploration and support in this area.
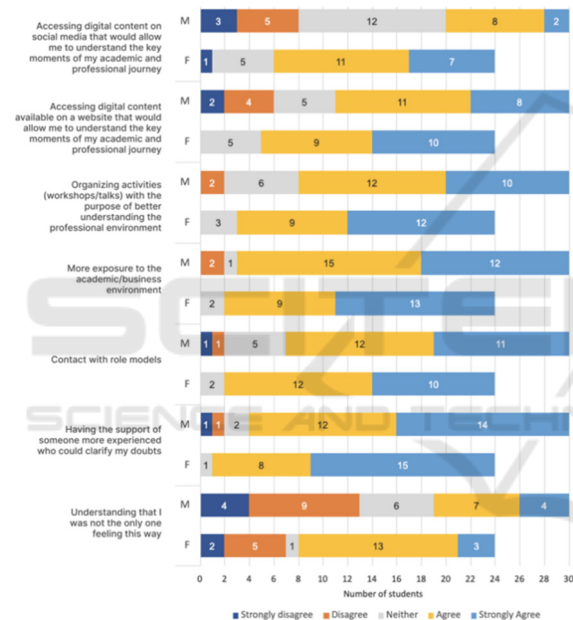

Figure 4: Factors that could have supported students.

4.1.3 Potential Impact of a Mentoring Program

Participants were asked whether a mentoring programme that facilitated contact with individuals with a similar background would have helped during moments of feeling lost in the academic journey and whether the website or the social media presence of a mentoring programme featuring workshops, talks, and information on key academic and professional moments would have helped provide support in their academic and professional journeys? (RQ3) While 12 male participants expressed indifference about these activities and their benefits, those identifying as women and non-binary individuals acknowledged the

value of the activities organised by the program (Figure 5).

4.1.4 Digital Communication

Answers about participants digital communication habits show that Instagram and WhatsApp are the most frequently used social media platforms among respondents, with participants accessing them more than twice a day (Instagram: F/NB – 22; M – 20; WhatsApp: F/NB – 18; M – 21). Instagram is primarily used for staying informed about news, chatting with friends, enjoying art and recipes, engaging with thematic content, finding entertainment, seeking inspiration, sharing work, and professional networking. WhatsApp is used for personal and professional communication, chatting with family and friends, organising events, and taking part in group discussions.
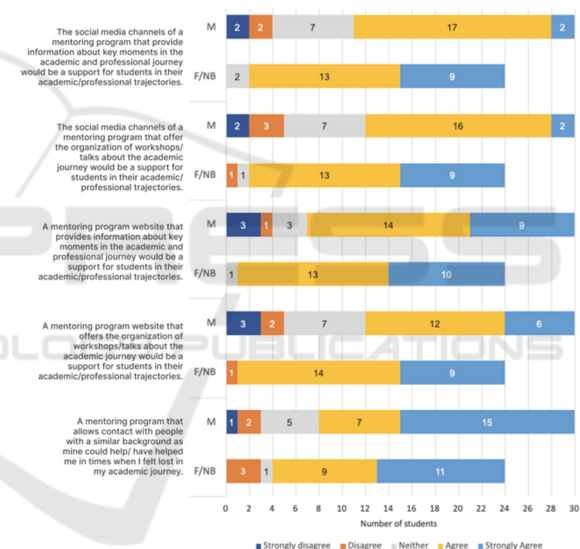

Figure 5: Benefits of a mentoring programme.

Regarding the most effective social media platforms for accessing mentoring programme content, participants most frequently chose Instagram (F/NB – 13; M – 7), followed by the program's website (F/NB – 7; M – 10), LinkedIn (F/NB – 2; M – 6), YouTube (F/NB – 0; M – 4), and WhatsApp (F/NB – 2; M – 2). When asked to suggest effective methods for accessing content from a mentoring program, 4 participants proposed traditional methods such as posters and physical flyers; LinkedIn to discover content and establish connections; public spaces or incorporating programme promotion into academic settings; and leveraging platforms like TikTok and Spotify. Additionally, participants

recommended newsletters and FAQs or forums to facilitate ongoing engagement and support.

Regarding the types of content that could be featured on the mentoring program's website, to support all students in the department, regardless of gender (RQ3), participants said it would be valuable to provide information on how to apply for the mentoring programme (F/NB – 21; M – 25); how to connect with role models (F/NB – 21; M – 18); video testimonials (F/NB – 18; M – 19); FAQs about academic and career paths (F/NB – 24; M – 27); and templates for CVs and LinkedIn profiles (F/NB – 19; M – 27) (Figure 6). Additionally, 6 participants provided suggestions for content that they would expect to find on a mentoring programme website:

- Activities within the programme itself,
- Mentors' biography and background;
- Topics to explore related to career advancement;
- Discussions of whether to continue their studies or directly enter the job market;
- Guidance on job search platforms and interview techniques;
- Informative content, such as videos or posts featuring real-life experiences; and
- Advice on building a strong and balanced portfolio.

4.2 Digital Content and User Goals for Mentoring Programmes

By iteratively connecting and analysing the findings from the focus group (Sousa & Silva, 2024) and the questionnaire responses, we developed a structured list of requirements that prioritise user needs for the online presence of the INSPIRA mentoring programme (Table I). The list of goals was organised according to Norman's visceral, behavioural, and reflective levels (Norman, 2007) and Cooper's experience, end, and life goals. In design, Norman's levels and Cooper's goals combine to shape the overall product experience, influencing users' perceptions, interactions, and thoughts about the product (Cooper et al., 2014). Requirements concerning how the user wants to feel, e.g., connected with role models, were classified under Experience goals. Requirements about what the user wants to do, e.g., learn how to structure a CV were classified as Behavioural goals. Requirements regarding who a user wants to be, e.g., a better time manager, were classified as Reflective goals.

For each user goal, Table I indicates whether that goal was derived from the previous focus group study [FG] or the finding of the questionnaires developed in

this study [Q]. Because Instagram and the program's website emerged as the preferred platforms among participants, these are the channels included in table of user goals to illustrate how the goals can be operationalised.
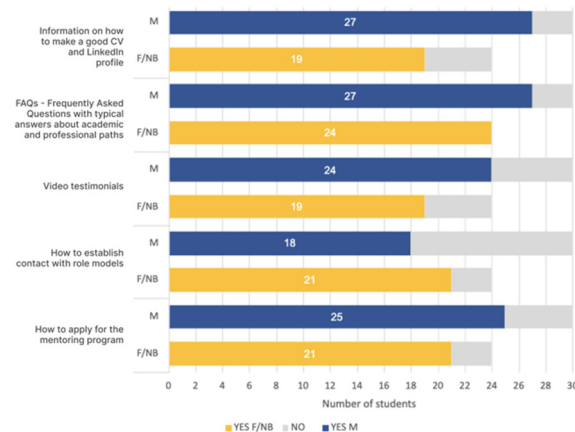

Figure 6: Content for a mentoring program website.

Table I, the first and second columns, lists the goals the mentoring program digital channels can address. The third column maps user goals and associated content to the website's pages and the features required for their implementation. The last column outlines the types of social media posts that align with each user goal and how to address these on social media. Some user goals are presented on both the website and Instagram posts to keep consistent and clear messaging across the program's platforms, which may help boost engagement and satisfaction within the target audience.

5 DISCUSSION AND FUTURE WORK

This study investigated the challenges faced by students from an Informatics department throughout their academic journeys and the types of content that could support them. It also sought to understand participants' social media preferences to determine the most suitable digital platforms to make content available. The findings of this study culminated in a set of tailored digital content and user goals for the digital platforms of INSPIRA, a mentoring programme for women in Informatics. In doing so, this study not only identified what types of content are helpful for a mentoring program for women in Informatics but also outlined a possible methodological approach for identifying user-goal-oriented content.

Table 1: Website features and social media posts based on the user goals.

User Goals		Website Page and Features	Social Media Posts
Visceral Design (Experience Goals)	Connect with knowledgeable individuals/role models with diverse backgrounds [FG; Q]	*Homepage & Activities page* - Videos/ Text-based content with testimonials & Calendar event	Videos/ Text-based content with testimonials
	Understand Erasmus process and new partnership establishment between universities [FG]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Find inspiration in the Department environment, as a designer [FG; Q]	*Activities page* - Calendar Event	Instagram posts redirecting to other pages/activities within the Department
	Gain awareness of the Department's degrees and its procedures [FG]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Have a sense of belonging in a new and predominantly male-dominated environment [Q]	*Activities page* - Calendar Event	—
	Understand the criteria for choosing optional courses in the MSc. degree [FG]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Understand the masters' dissertation process and advisor selection [FG; Q]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Understand what a doctoral degree is, its requirements and advisor selection [FG; Q]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Understand how to choose a doctoral degree proposal [FG]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Understand procedures for entering the Job Market or Academic world [FG; Q]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	Instagram posts with tips/testimonials & redirecting to other pages
	Relate to common questions of students [FG]	*FAQs page* - Form to collect student's questions and allow subsequent analysis	—
Behavioural Design (End Goals)	Learn to structure a CV/portfolio [FG; Q]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	Instagram posts with tips & redirecting to other pages
	Access a visually appealing website tailored to students' needs [FG; Q]	—	Instagram posts with tips & testimonials
	Be able to choose a master's programme by having clear guidance [FG; Q]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Discover the repository of old theses [FG]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	—
	Learn about job search platforms and interview techniques [Q]	*FAQs page* - Drop down with text-based content & Redirecting to external sources	Instagram posts with tips/testimonials & redirecting to other pages
	Access INSPIRA Mentor Information [Q]	*Mentors page* - Text-based content	—
	Access informative content on real-life experiences [Q]	*Homepage* - Videos and Instagram posts with testimonials	Videos & text-based content with testimonials
	Access INSPIRA activities [Q]	*Activities page* - Calendar event	—
Reflective Design (Life Goals)	Enhance time management skills [Q]	—	Instagram posts with tips & testimonials redirecting to other pages
	Learn about the possible career paths [FG; Q]	*Activities page* - Calendar event	Instagram posts with tips & testimonials
	Decide between the Job Market or the Academic world [FG; Q]	—	Videos/ Text-based content with testimonials

Our previous focus group study (Sousa & Silva, 2024) suggested that a mentoring program could support participants by offering mentorship, peer support, tailored digital content for websites and social media, and assistance during specific challenges. This study complements those findings, revealing that male students also experience challenges. Additionally, this study indicates that students' key challenges are linked to the need for more guidance on career paths, job applications, and post-degree decisions.

Additionally, the study contributes to our understanding of the solutions that female, non-binary, and male participants believe can be helpful and how a mentoring program could support addressing those needs. It also highlights the type of digital content that would be most effective for the program's online presence and which social media platforms to focus on based on the participants' preferences of use. Our findings indicate the need for a combination of social, educational and career support, confirming the need for structured mentorship with guidance on both professional skills

and personal development, as highlighted by e.g. (Singh & Basu, 2021) (Aufschläger et al., 2023).

Similarly to Singh and Basu (2021), our study highlights that building a community – in this study, on platforms like Instagram and LinkedIn – could foster a sense of inclusion and belonging. Moreover, our findings underscore the importance of digital media and the creation of an online community where participants feel informed and connected. Based on participants' responses, future programmes might explore additional online platforms to maximize engagement in mentoring initiatives.

Our findings align with and expand on the recommendations made by Paukstadt et al. (2018). Participants in our study also showed a strong interest in role models and content reflecting real-world experiences. Additionally, this research's insights highlight the interest in making available CV templates and FAQs.

This study does have limitations. Responses were from current and alumni students and having more responses and perspectives from current students could have enriched the results. However, despite their recent graduation, these former students provided insights into their complete academic experiences. Furthermore, we were looking to find challenges experienced across their degrees, so alumni's insights were as appropriate as those from current students, except for problems that could have possibly been recently resolved.

Male participants tended to exhibit a neutral stance on the activities of mentoring programs and their benefits. Conversely, women and non-binary individuals acknowledged the helpfulness of a mentoring programme and the importance of its online presence through its website and social media. That male participants had less favourable opinions is not surprising as the mentoring programme is targeted at women and that could have impacted their points of views. This also can suggest that gender may influence perceptions on mentoring, opening a gap for further research to close by researching how mentoring programmes can further be adapted to overcome these gender-based barriers. Because this study focuses on participants from one single Informatics department limits the generalisability of the results to other departments. This relates to the preliminary nature of the study, nonetheless, other departments could adopt the approach we followed to identify the specific needs of their departments namely by running focus groups, distributing questionnaires, and organising their results into goals and design website features and social media content that align with the objectives of their mentoring programs. Although this study does not include statistics on the gender gap in IT outside of Europe, we present studies from the U.S. that emphasize that this is a global issue. Singh and Basu (2021) focus on initiatives to reduce the gender gap in tech, while Boyer et al. (2010) explore strategies to improve retention rates among computing majors by strengthening students' computing identities. The fact that such studies are being conducted in the U.S. highlights the significance of this issue. Therefore, departments beyond Portugal and Europe could also benefit from adopting the framework we propose.

6 CONCLUSIONS

Mentoring programs and their online platforms can be valuable tools to support students, researchers, and academics in Informatics. This study examines how the content of the mentoring program's platforms can be a support for the students of an Informatics department, as well as the social media the programme should focus on based on the student's social media engagement and their preferences regarding primary communication and information channels. The themes that constitute that content, are knowledge shared by experienced individuals and role models in the ICT area; information on degrees and procedures within the Department of Informatics Engineering; common questions asked by the student community in the department; career path options; recruitment procedures, including documents such as CVs and portfolios; tips on how to foster a sense of belonging in a male-dominated field.

This study contributes to existing knowledge on mentoring programs in Informatics by presenting a research methodology framework that other programs can use to enhance their support for specific student communities. It provides a list of user goals for mentoring programme platforms and outlines how each goal can be effectively addressed, either through a website or social media. Additionally, the study contributes to the development of initiatives designed to reduce gender disparities in Informatics through mentoring programs, such as INSPIRA, to establish a more inclusive support system for women in Informatics.

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