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Pragmatic versus Hedonic: Determining the Dominant Quality in User Experience for Professional and Leisure Collaboration Tools

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Abstract:
As collaborative technologies become integral in both professional and leisurely settings, especially during the rise of remote work and digital communities due to COVID-19, understanding the user experience (UX) factors is critical. This study aims to explore the differential importance of these UX factors across professional and leisure contexts, leveraging the widespread use of collaboration tools for an in-depth analysis. The objective of the study is to identify and assess key UX factors in collaboration tools, and to quantify their differential impact in professional and leisure settings. Our research underscores the nuanced role of context in evaluating User Experience (UX) factors' importance in collaboration tools, with significant variances observed across professional and leisure settings. While some UX factors, including accessibility, clarity, and intuitive use, maintained universal importance across contexts and tools, others—specifically dependability and efficiency—contradicted assumptions of being universal "hygiene factors", demonstrating the complexity of UX evaluations. This complexity necessitates a differentiated approach for each context and collaboration tool type, challenging the possibility of a singular evaluation or statement.

1 INTRODUCTION

Collaborative technologies, encompassing online platforms and specialized software, have emerged as integral components of the contemporary digital landscape. These tools facilitate seamless communication and synergistic collaboration among team members, regardless of geographical barriers. The labor market is in a state of evolution towards spatially dispersed teams and adaptable work environments, underpinning an augmented relevance of distributed collaboration tools.

In the wake of the recent COVID-19 pandemic, the necessity and potential of remote collaboration has been heightened, with implications stretching beyond the confines of professional domains to permeate private spheres. Digital communities within the hobby and leisure sector have witnessed considerable growth, and personal interactions have increasingly transitioned to virtual spaces.

User experience is widely recognized as a multifaceted concept (Boy, 2017). A quality user experience typically demands that a product be easy to learn, efficient in its use, and provide a sense of control, supplemented by attributes such as aesthetics, enjoyment in usage, novelty, and appeal. The first set of criteria is commonly classified as aspects of pragmatic quality, while the latter set represents hedonic quality aspects (Hassenzahl, 2001). Alternative terminology often employed to distinguish these two classes of

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quality criteria includes usability goals as opposed to user experience goals (Rogers et al., 2023).

ISO 9241-210 provides a notable definition of user experience (ISO9241-210, 2020). In this context, user experience is characterized as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service". Consequently, user experience is viewed as a comprehensive concept, inclusive of all emotional, cognitive, or physical responses related to the actual or even merely the presumed use of a product, shaped before, during, and after the utilization. An alternate approach involves defining user experience as a collection of distinct quality criteria (Rogers et al., 2023). These encompass traditional usability aspects such as efficiency, controllability, and learnability, as well as non-goal-oriented or hedonic quality aspects (Hassenzahl, 2001) such as stimulation, enjoyment in use, novelty, emotions (Norman, 2007), and aesthetics (Tractinsky, 1997).

The significance of UX factors can notably differ contingent upon the particular use case (Meiners et al., 2021) (Hinderks et al., 2020) (Schrepp et al., 2023). In professional contexts, it is often perceived that pragmatic quality holds greater importance than hedonic quality. To scrutinize the validity of this notion, we selected collaboration tools as our object of evaluation due to their pivotal role across both professional and leisure contexts. These tools present a unique opportunity to discern the comparative influence of pragmatic and hedonic qualities in diverse use-case scenarios.

In this paper, we conducted a study with five distinct software systems used in both professional and leisure settings. The objective of this study revolves around the research question:

RQ: *How does the importance of pragmatic and hedonic factors of User Experience vary between professional and leisurely contexts in software systems?*

This paper is structured as follows: Section 2 briefly summarizes the related work. Section 3 presents the research methodology of our study. Section 4 outlines the results and key findings of our study, as well as the answers to our research question. Section 5 discusses the meaning of the findings and the limitations of our study. The paper ends with Section 6, with conclusions and ideas for future work.

2 RELATED WORK

Hassenzahl et al. (Hassenzahl et al., 2010) expanded the understanding of User Experience (UX) by investigating pleasurable experiences with technology from the perspective of universal psychological needs such as competence, relatedness, popularity, stimulation, meaning, security, and autonomy. In their study, they collected over 500 positive experiences with interactive products like mobile phones and computers. As expected, a significant relationship was found between the fulfillment of these psychological needs and positive affect. Stimulation, relatedness, competence, and popularity emerged as particularly salient needs.

The experiences collected were categorizable based on the primary need they fulfilled, and qualitative differences were observed among the categories in terms of the emotions involved. Interestingly, need fulfillment was strongly linked to perceptions of hedonic quality (the pleasure derived from product use), but not as strongly to pragmatic quality (perceived usability). This supported their notion of hedonic quality as a 'motivator' and pragmatic quality as a 'hygiene factor.'

An important aspect of their study was the consideration of attribution, i.e., the belief that the product was responsible for the experience. They found that the perception of hedonic quality as a reflection of need fulfillment depended on this attribution. These findings suggest that user experiences are not solely about functionality or usability, but also hinge significantly on the extent to which products fulfill users' psychological needs.

Tuch et al. (Tuch et al., 2016) conducted a thorough investigation into the impact of need fulfillment on the perception of technology in both leisure and professional contexts, utilizing Hassenzahl model's as a foundation (Hassenzahl et al., 2010). They found that the hedonic quality (pleasure derived from technology use) of both work and leisure experiences is influenced by need fulfillment. However, pragmatic quality (usability) was notably influenced by need fulfillment, primarily in leisure experiences. This observation deviates from Hassenzahl's claim that pragmatic quality simply acts as a barrier remover for need fulfillment, suggesting that usability can indeed contribute to need fulfillment, especially in leisure contexts (Hassenzahl et al., 2010).

Regarding context, leisure experiences frequently took place with a partner or friend and

at home, while work experiences were more common with acquaintances or colleagues and at work. The narrative content corroborated these observations. The study reinforces Tinsley and Tinsley's (Tinsley and Tinsley, 1986) suggestion that leisure experiences lead to aesthetic rewards and stimulation, with higher hedonic quality and beauty being associated with leisure experiences.

In our review of existing literature, we noted some degree of discrepancy between the assertions made by Hassenzahl et al. (Hassenzahl et al., 2010) and Tuch (Tuch et al., 2016). It is important to note, however, that in their respective studies, there was no evaluation of test objects that spanned both leisure and professional contexts. Our investigation seeks to provide an initial insight into the influence of both pragmatic and hedonic qualities on software systems in the context of leisure and professional use.

3 RESEARCH METHODOLOGY

In this study, our focus was the evaluation of collaboration tools, investigated through the lens of hedonic and pragmatic factors. We wanted to understand the relative importance of these factors, as rated by the participants, using the list of factors from the User Experience Questionnaire Plus (UEQ+) (Schrepp and Thomaschewski, 2019). Additionally, we explored the possibility of further hedonic and pragmatic aspects not captured in the questionnaire. Our guiding hypothesis was that perceptions of the importance of hedonic and pragmatic factors would differ between professional and leisure contexts.

In this study, products with a high level of awareness were evaluated to ensure the subjects could assess the products. Our selection criterion for these products allowed for freedom of choice, but they had to be classified as collaboration tools.

The study was conducted with master's degree students at the University of Applied Sciences Emden/Leer (Germany) as part of the university course "User Experience". We had a total of 44 respondents participating in the study. Our approach is divided into three main steps:

- Step 1: Identification of the most important UX factors for different collaboration tools.

- Step 2: Evaluation of the importance of each UX factor in specific use cases.

- Step 3: Quantitative determination of the differences in the evaluation of products utilized in professional and leisure contexts.

The different steps are explained in greater detail in the next three subsections.

3.1 Step 1: Identification of the most important UX factors

In the first phase, participants were asked to select the UX factors from the UEQ+ they considered intrinsically important when evaluating the UX factors of collaboration tools. They also had the option to suggest other UX factors not included in the UEQ+ list. These chosen factors were then compiled and ranked based on importance through a web conference discussion among the participants. This way, a validated list of UX factors could be included but new, possibly overlooked UX factors could be introduced as well.

3.2 Step 2: Evaluation of the importance of each UX factor

Informed by the list of UX factors deduced from Step 1, the participants were then asked to rate the importance of selected products on a seven-point Likert scale, ranging from -3 (extremely unimportant) to +3 (extremely important). They were instructed to select a product of their choice from the following categories: Collaboration Platform, Document Management System, Instant Messaging Service, Task Management System, and Web Conferencing.

3.3 Step 3: Determination of the distinction

In the final phase of our study, we used a two-tailed t-test to determine differences in the importance of UX factors between product groups and contexts of use. The objective of this analysis was to identify UX factors that demonstrated significant differences in the ratings when used in either a professional or leisure setting.

4 RESULTS

In this section, we will present the results from the three steps as described in Section 3.

4.1 Results from Step 1

A web conference was organized with the participants, during which the most pertinent UX factors were discussed. As a result of this interactive process, the list of UX factors was reduced to 18 factors. Each of these UX factors is detailed below, complete with succinct descriptions for clarity. Notably, those factors that were initially part of the User Experience Questionnaire Plus (UEQ+) have been appropriately marked.

- Accessibility: Does the product allow the largest possible number of users to be used without restrictions?
- Adaptability (UEQ+): Can the product be adapted to personal preferences or personal working styles?
- Aesthetics (UEQ+): Does the product look beautiful and appealing?
- Attachment: Is it possible to establish a connection with other individuals through the use of the product?
- Attractiveness (UEQ+): Overall impression of the product. Do users like or dislike it?
- Clarity (UEQ+): Impression towards order, structure and visual complexity of a graphical user interface.
- Dependability (UEQ+): Does the user feel in control of the interaction? Is it secure and predictable?
- Efficiency (UEQ+): Can users solve their tasks without unnecessary effort? Does it react fast?
- Functionality: Does the product provide an adequate array of functionalities to facilitate the successful completion of the tasks in question?
- Interaction: Does the product support interaction between users?
- Intuitive Use (UEQ+): Can the product be used immediately without any training or help?
- Novelty (UEQ+): Is the design of the product creative? Does it catch the interest of users?
- Perspicuity (UEQ+): Is it easy to get familiar with the product and to learn how to use it?
- Self-Presentation: Is it easy to present yourself with the product?
- Stimulation (UEQ+): Is it exciting and motivating to use the product? Is it fun to use?

- Trust (UEQ+): Are the users' data in safe hands and not misused to harm him or her?
- Usefulness (UEQ+): Does using the product bring advantages?
- Value (UEQ+): Does the product design look professional and of high quality?

Utilizing the identified list of UX factors, we proceeded to implement Step 2 of the study.

4.2 Results from Step 2

In the subsequent step of the study, participants were directed to select one software product from each category (see 3.2). They were then required to assign an importance value to each UX factor for the chosen product, employing a numerical scale ranging from -3 (extremely unimportant) to +3 (extremely important). The derived values are visually represented in a bar chart, as illustrated in Figure 1.

We've used these values for our next set of calculations. The results are presented in the next section.

4.3 Results from Step 3

In the final step, we examined how closely related the professional and leisure contexts are for each UX factor in regard to their perceived importance and group by doing a t-test (Williams, 1959). The results are shown in Table 1.

In the group of Collaboration Platform products, significant differences were observed in the UX factors of Aesthetics, Dependability, Efficiency, Novelty, Stimulation, and Usefulness. Within the Document Management group, Functionality emerged as the distinguished UX factor exhibiting a significant difference. For products within the Instant Messaging Service category, the UX factors of Aesthetics, Attractiveness, Dependability, Efficiency, Novelty, Stimulation, and Usefulness were recognized as significantly different. With regard to the Task Management System group, Efficiency, Functionality, Usefulness, and Value were identified as factors of considerable variance. Lastly, in the category of Web Conferencing Systems, Aesthetics, Attachment, Attractiveness, Dependability, Efficiency, Functionality, Novelty, Stimulation, Trust, Usefulness, and Value were the UX factors showcasing significant differences.
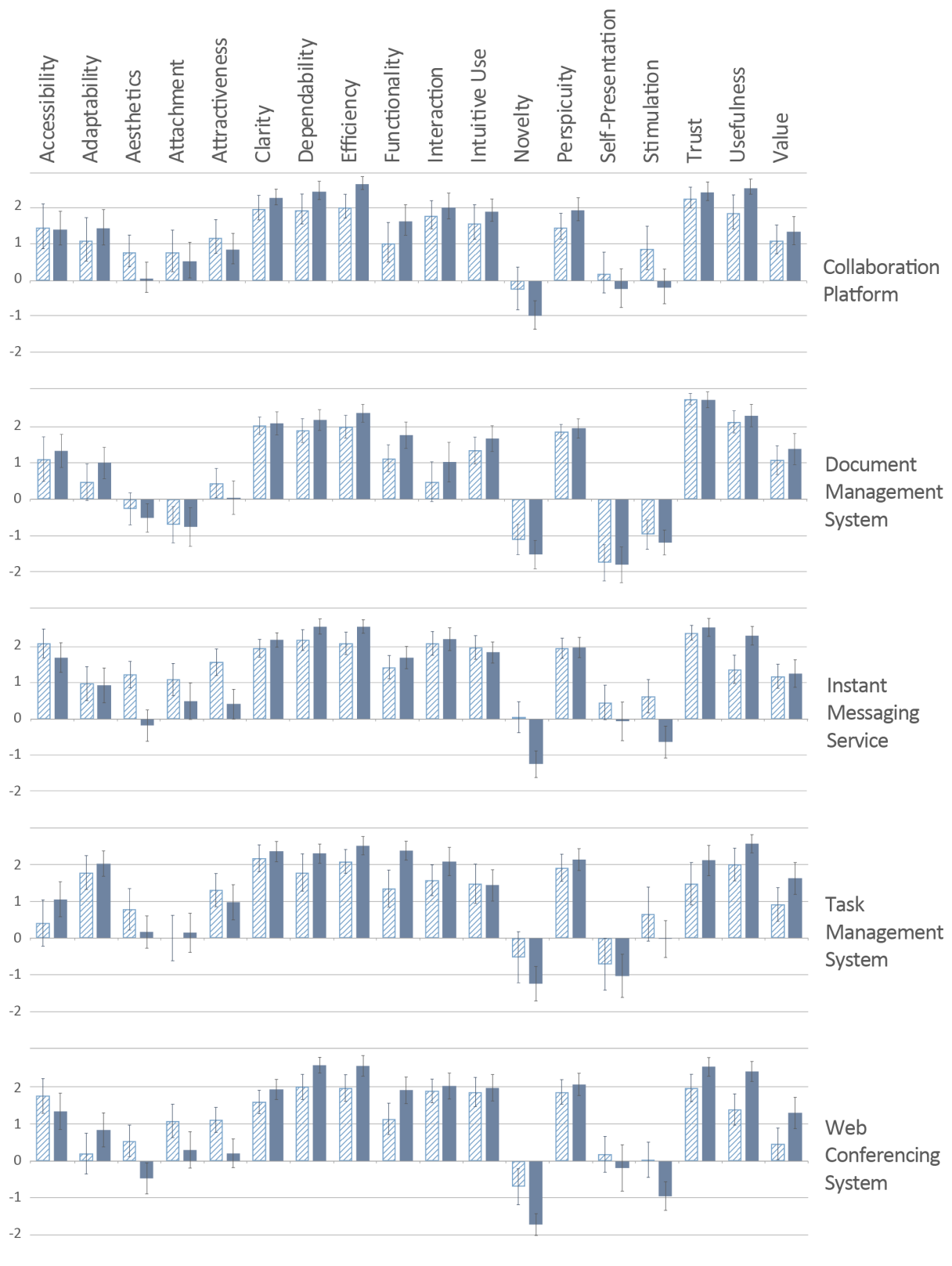
Figure 1: Importance ratings per group and UX factor. Left: Leisure context; Right: Professional. Error Bars: 5% Confidence Interval.

Table 1: T-test between professional and leisure context for each UX factor and Group. Significance is coded as follows: p < .05*, p < .01**, p < .001***

UX Factor	Collaboration Plattform	Document Management	Instant Messaging Service	Task Management System	Web Conferencing System
Accessibility	0,903	0,559	0,180	0,110	0,239
Adaptability	0,412	0,121	0,886	0,402	0,081
Aesthetics	*0,030	0,411	***0,000	0,094	**0,001
Attachment	0,529	0,863	0,083	0,738	*0,026
Attractiveness	0,322	0,209	***0,000	0,359	**0,001
Clarity	0,137	0,749	0,156	0,445	0,117
Dependability	*0,030	0,192	*0,041	0,086	**0,005
Efficiency	***0,000	0,067	*0,014	*0,043	*0,011
Functionality	0,086	*0,019	0,246	***0,000	**0,007
Interaction	0,390	0,177	0,613	0,099	0,597
Intuitive Use	0,240	0,210	0,534	0,896	0,680
Novelty	*0,039	0,157	***0,000	0,086	***0,001
Perspicuity	0,068	0,619	0,912	0,362	0,377
Self-Presentation	0,306	0,877	0,156	0,510	0,377
Stimulation	**0,009	0,421	***0,000	0,127	**0,002
Trust	0,403	0,890	0,365	0,081	*0,012
Usefulness	*0,012	0,437	***0,000	*0,035	***0,000
Value	0,426	0,321	0,775	*0,039	**0,009

5 DISCUSSION

Our research reveals the complexity and nuances in evaluating the importance of UX factors for collaboration tools. It has been shown that the context in which these tools are used, whether professional or leisure, significantly impacts the perceived importance of individual UX factors.

The following conclusions can be drawn from the t-test:

1. A higher level of significance suggests an equivalence in importance ascribed to both professional and leisure contexts, indicating no apparent differences.

2. Conversely, a lower level of significance implies a disparity in the importance attributed to professional and leisure contexts, highlighting discernible differences.

Interestingly, our study shows that not all collaboration tools are evaluated similarly. In particular, for tools such as document management and task management systems, no significant differences were found in evaluating the importance of UX factors between professional and recreational contexts. This suggests that these tools are used similarly in both contexts. On the other hand, collaboration tools, instant messaging and web conferencing systems show significant differences in importance ratings, suggesting that their use and perception are highly context-dependent.

Despite these differences, there is a group of UX factors whose importance remains the same in all contexts and for all tool types. These include:

- Accessibility
- Adaptability
- Clarity
- Interaction
- Intuitive Use
- Perspicuity
- Self-Presentation

These factors seem to be universal and independent of the specific application of the tool.

It is also worth noting that our study does not confirm the assumption that pragmatic qualities such as Dependability and Efficiency are uni-

versally applicable "hygiene factors" (Hassenzahl et al., 2010). Instead, we found significant differences in the evaluation of these aspects. Moreover, our results support the idea that more hedonic factors, such as novelty and stimulation, serve as motivators.

In contrast to Tuch's (Tuch et al., 2016) findings, our study did not demonstrate that pragmatic qualities are particularly important in the leisure context. This raises questions about the role and importance of UX factors in different contexts that require further investigation.

Our study emphasizes the need for a differentiated approach when evaluating the importance of UX factors, depending on context and specific type of collaboration tool. A general statement or evaluation does not seem possible due to the heterogeneous results. This underlines the complexity of UX factors and the need to consider specific contexts of use and requirements in the evaluation and design of collaboration tools.

5.1 Limitations

Despite the findings garnered from this research, it's essential to acknowledge certain limitations that may influence the interpretability and generalizability of our results. Firstly, the scope of our research was confined to collaboration tools exclusively, therefore limiting the broad applicability of our findings across all software systems or technological domains.

Secondly, our study population comprised only students, potentially introducing a bias in our results. Given the distinct demographics, usage patterns, and expectations of this specific group, caution must be exercised when extending the results to a broader, more heterogeneous user base.

Thirdly, a bias towards the importance of factors may be given, as steps one and two of the study were performed by the same group of individuals: UX factors identified as being of relevance in step one may be more likely rated as relevant in step two of the study. This may be prevented by conducting the named steps in a single-blind manner, where participants of step two did not preselect potentially relevant factors.

Lastly, the set of User Experience (UX) factors we considered may not be exhaustive. Though we endeavored to encompass a comprehensive array of factors, there may still be critical, yet overlooked aspects that could influence users' perceptions and experiences with collaboration tools.

6 CONCLUSIONS AND FUTURE WORK

In our study of collaboration tools from a User Experience (UX) perspective, we sought to discern the relative significance of UX factors in various usage contexts. The study used a three-step approach to identify, evaluate, and ascertain distinctive UX factors and their perceived importance across collaboration tools.

Significant variations were observed in the perceived importance of several UX factors across different collaboration tool types, underscoring the intricate role of professional and leisure context in such evaluations. For instance, certain UX factors like Dependability and Efficiency, contrary to being universally applicable "hygiene factors," exhibited significant variations, illuminating the nuanced nature of these evaluations. Similarly, more hedonic elements like novelty and stimulation emerged as motivators, thereby refuting the established notion that pragmatic qualities primarily dominate the leisure context.

However, our study also identifies certain UX factors that remain universally important, regardless of the tool type or context, such as accessibility, adaptability, clarity, interaction, intuitive use, perspicuity, and self-presentation. This discovery suggests an enduring baseline of factors pertinent to any successful UX design across contexts.

The findings highlight the need for a differentiated, context-specific approach in assessing the importance of UX factors. A homogeneous evaluation or universal statement about the importance of UX factors appears untenable given the diverse outcomes. Consequently, our study emphasizes the intricate complexity of UX evaluations and the important necessity of considering specific contexts and requirements when designing and evaluating collaboration tools.

These findings do not only underscore the impact of context on the significance of UX factors but also generate new research avenues exploring the role and importance of such factors in different settings. Future work could strive to expand these initial findings and continue to unravel the complexities of UX in a world increasingly dependent on digital collaboration.

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