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Demarcation of Design System in EdTech Structure: A Methodology module of interactive communication design

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Abstract:
Contemporary creative tendencies in design are strategically focused on user-centered design, while the communication aspect is based on the influence of new technologies in the application of design and the theory of global business practice. This attitude improves the knowledge required in the future business practice of students, who have mastered the mentioned subjects and their easier positioning in the labor market. Taking into consideration the methodology and processes of designing interfaces, as well as methods of applying interaction techniques and predictive models, they affect the modern language of design in the business world and the increasingly strong influence of the digital sphere. At the same time, this paper will discuss the relationship between design and communication practices united into visual communication and what to look for in contemporary education of young designers. Management of techniques and management of design strategies of visual communication, development of design knowledge and creative ideas aligned with 1.service design and 2. interactive design through Human-Computer Interaction (HCI) and Croudsorsing. Therefore, the field of design is considered in the form of a support system and the opportunities it provides through transformation of design under the influence of modern trends and market demands.

Keywords: design process methodology, communication practice, interaction design, service design, predictive models, Human-Computer Interaction (HCI), Crowdsorsing.

MINDS model

1. Introduction

This paper discusses the field of innovation important in the realization of interactive design, but also service design. Theoretical and practical knowledge in this field is shaped by methodological experience that provides modern innovative design techniques in the digital sphere of product realization and placement. Contemporary digital design practices and disciplines of visual communication are considered. By applying visual solutions, the role of the designer is to convey information and wishes of clients through visual narration that contributes to efficient and purposeful design solutions. Therefore, the strategic role of the educational apparatus oriented towards these guidelines is essential to analyze, how can service design and interactive design could be a supporting system in a technology driven context of education? Taking into account the importance of Human-Computer Interaction (HCI), but also crowdsourcing, and the impact on applied computer design through the teaching example of evaluation of the creation of a mobile application, its usability, functionality, aesthetic experience observed through the UI/UX evaluation of students. Through the integration of concepts from diverse fields such as UX/UI design, technology, and communication, interactive guidelines and designs can be developed to effectively engage users. By exploring topics like the role of design in digital transformation and advanced Human-Computer Interaction (HCI) practices, individuals are equipped with the skills needed to navigate the contemporary digital sfere.

2. Materials and Methods

Considering of the available time during which a designer should express creative potential, providing an adequate solution, affects the possibility of realization of the final solution, client satisfaction, service, but also factors of practicality and adequate application of design, which improves the design criteria in digital practice. Therefore, the consideration of accelerated delivery of design solutions is conditioned in today's time by many factors that designers encounter. Synthesis and cooperation of structures within the company, as well as interdisciplinarity that shapes the creative process, emphasize the importance of information technologies on interactive design, enhance the importance of technology, through design perspectives.

Materials considerimg the Management and INteraction Design for Service (MINDS) [1] approach on service, but also service design, and the influence of the human factor during the initial phase of the design process. This is significant, because

it also concerns crucial problems in the formation of technicians and engineers and thus includes the adoption and construction of knowledge, analysis of solutions, but also the formation of creativity, risk evaluation and synthesis of the system during the process of technological transfer [2]. Conditioned by the delivery timeframe in the domain of industrial creation, product design can be analyzed by considering the importance of applying ideation and rapid prototyping (RP), significant especially in the domain of engineering design turned into tangible artfacts [3].

Methodology based upon the domain of digital prototyping environments, VR, HMD, AR and MR services stakeholders can co-create design together, and share them in an immersive yet real environment [4]. Therefore, the need for new techniques, devices, that would meet the needs of the global product market affects creativity, especially in the domain of reducing production time. Therefore, the improvement of design methodology is aimed at acquiring knowledge in the process of design activities and increased creativity. Especially, the time spent by a designer during the search and gathering of information is reduced to 60% [5]. Models based upon process-oriented depend on network structures that significantly emphasize interaction design. It is important to point out, that in interactive design, but also service design is a common design thinking approach, which emphasizes the importance of the human factor in the creative process and improvement of design criteria in digital practice today. Therefore, the importance of the MINDS method emphasizes in the process of creating and implementing a product that has a certain role, highlighting the role of technology, management and interaction design. In this regard, the interdisciplinary approach enables a theoretical analysis of the application of the methodology of innovation and the communication aspect of design practice.

For service design, it represents a human-oriented design, created by collaboration, but also by a multidisciplinary approach, that directs innovation towards the practical and service side. Although, service has a predominantly logical characteristic, it is important to consider it through an interdisciplinary approach and the possibility of a methodological approach to the organization. Sametime, it is essentially difficult to balance innovation with the service and defined character that the design should provide. Especially in the domain of value creation, but also the role of design thinking, distinction of service design and service design as a systematic based approach to service innovation [6].

2.1 Service design and methodology of innovative and interactive design comunicology

By analyzing the many stages that a design goes through and that shape it, it is important to consider the possibility of generating, testing and evaluating solutions, as well as ways that can lead to finding the most effective solution. Therefore, what is really necessary in the design process, to find the value of creation, but also the balance of creation and organization. Therefore, prototyping and easier presentation of the solution is as important as the development of simulation, in order to improve the communication aspect of the design. In order to expand, and develop valuable insights that guide innovation development, approaches based on exploration, experimentation, prototyping [7] and iterative processes may be analyzed. In recent research Vanja Stankovic [8] conducted on methodology of Sustainable desing: Design for sustainability, sustainability guide from SVID, defines the design processes as: understanding and defining needs, generation of ideas, visualization and screening, development, testing, implementation. Regarding valuable insights, those approaches could provide and lead to advanced design practice, by applying design thinking onto creation of effective design. As Unger and Chandler pointed out, UX designer needs to understand how to logical and vilable structure for the experience and needs to understand the elements that are important to creating a emotional conection with the product's user [9].

Moreover, consideration of the role of service design fields, digitalization, user experience, are conected by integrating the service ecosystem concept, the proposition of 'design for experience' as an approach to public service design [10], by appreciating the importance of public service logic (PSL), seen as a macro design application system that refers to service user. It may indicate that who creates and who design plays an important role, especially with the increasing influence of digitalization. In research conducted in the field of digitalization influence on New Product Development (NPD), the importance of collaborative information technology (CIT) is pointed, and observations into, how these tools are transforming the very nature of how things are designed [11]. In line with design thinking, content strategy and AI, specific industry practices may advocate for users, based upon user centered methodology by continuation of advancment of design processes for developing content across different platforms, interwined by technical and professional communication(TPC) and UX design as a user centered [12]. Aldo, digital servis user espect to individual actors and contextual factors, consider value co creation(VCC) in technology enabled servces [13].

2.2 Interaction design modules

Interaction design modules serves as a platform for implementing these strategies, ensuring the seamless integration of design principles into digital products and experiences. Contemporary emerging technologies orient the development of interaction design modules within EdTech. Among these modules are UX/UI, information architecture, prototyping, interaction patterns, multimedia integration, accessible and responsive design, and iterative design based on positive feedback. However, according to a review of Human-Computer Interaction (HCI) in information system development, current HCI methods have limitations, particularly in addressing the needs of mobile users and emerging technologies [14]. To enhance interface design effectiveness, Human-Centered Design is integrated with flexible methodologies.

It is important for designers to learn to align their creations with the wishes of the client, the company and the needs of the market, therefore alignment with the innovation fueled by data, research, and prototyping occurs when data, research, and prototyping are integrated. Creative Design Tools (CDTs) are accentuated for their ability to stimulate creativity and promote sustainable social impact. Individual skills and educational analysis are enhanced when applied within the context of System Research, Design, and Creativity, and the Disruptive Design methodology to education system design [15].

Meanwhile, training students to articulate that knowledge and possibility to be trained, to use data gained by crowdsourcing is another contemporary necessity. And by that, leveraging students-requesters, to become crowds and to understand how to motivate, examine and research respondents, in order to better apply the design and thus the final product. At the same time, by applying software and platforms to instruct software engineers to improve work and future challenges. Therefore, Figure 1. *An Integral Part of the Crowdsoursing system Implemented in Education* shows the important components of the circular matrix supporting interactive module design in the obscure system according to this typing.

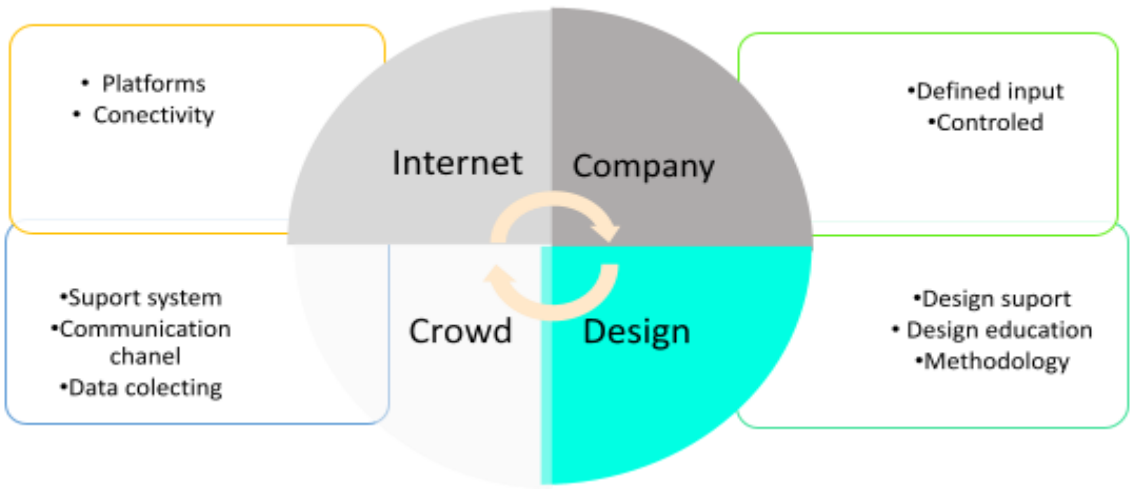


Figure 1. An Integral Part of the Crowdsoursing system Implemented in Education

Moreover, it is important to understand motivations behind software task engagement and develops a decision support system for optimizing crowdsourcing operations, aligning incentives with crowd needs [16]. Feedback is an important component of design education, especcially Crowdsourcing ofers an even more scalable approach, or anonimity [17]. With a significant negative class recall rate of 84%, supervised machine learning models trained on crowdsourced labels show promising potential for timely identification of students, teams, or course materials at risk. Student crowdsourcing offers course instructors an analysis in education, enhancing the learning experience, particularly in computer science or data science courses [18]. Thererfore, knowledge learning with crowdsourcing has launched an enormous picture for the researchers in AI-related disciplines and progress in the field from a systematic perspective [19], especially in the field of human-machine colaboration.

2.3 Interaction Design Chalenges

Considering the chalenges in incorporation of the croudsorsing in design project, by implementation of crowdsourcing in evaluation of interface design, relies on the effective communication channels, design methodology, and data collection methods and the requesters should be reminded that the quality of the gathered data varies in different task designs. This point adds to the argument that the influence of crowdsourcing in interface design is also affected by the task design. As a consequence, investigation of quality assurance algorithms should consider the variability in crowdsourcing data [20]. Despite of the increasing importance and benefits of crowdsourcing services, reflects on usability issues, technology interaction, and many quality issues are remained persistant chalenge [21,22]. Especially, the existing curricula, teaching practices, staff knowledge and institutional culture, also influence, how the subject may be developed within schools and universities considering context of learners cross-phase experience, and progression towards employment [23].

The importance of deeper research of HCI principles, but also methods and models, interaction design examples and knowledge in this field, complemented by crowdsourcing methodologies and demonstration examples of pre-design models through simulation and modeling of functionality and usability is vital. It is necessary to get better understanding with the methodology and processes for designing interfaces, methods of applying interaction techniques and predictive models. Moreover, the introductionof the idea development as well as design process are taking into account, by guideing students in research methodologies, to conduct future-oriented research in the early stages.

Development of the UX process by introducing novel digital tools such as artificial intelligence (AI) has the potential to improve efficiency and accuracy, while creating more innovative and creative solutions. These include understanding the

context of use, uncovering user requirements, aiding solution design, and evaluating design [24]. Nowdays, digital interactive technology and interactive experience design mode, which are innovative to improve efficiency on learning, by improving metacognitive experience and promoting the development of learners' metacognitive experience in smart education in the context of digital era, by useing digital interactive technology to promote the development of learners' metacognitive experience [25].

2.4. Transformative Potential of HCI, Interactive Design and Sructure Design Methodology in education

It includes a User-center design approach, which in addition to needs, requirements, behavior can be improved communication aspects of design and innovative product structures. Professional flow, market demand management, communication systems among others. At standpoint of inclusion of specific knowledge and skills [26], transdisciplinarity, again reflecting trends in wider design research and especially education research responding to challenges that are slowly being recognised as fully global in nature, scale and complexity [27]. At global scale, pluriversality is futures-oriented in the lenses through which students view the richness of design as practiced in different epistemologies, ontologies, cultures, subcultures, global, and local places [28].

Introduction to students a psychological techniques and mechanisms of retaining users' attention, strategic transfer of information through design and narrative structure, as well as multidisciplinary approach and communication practices through digital environment, technology design, interdisciplinarity by developing concepts, creative strategies, UX/UI design, and digital products is vital. Therefore, the creation of interactive guidelines and design is essentially important. Implemented through educational paradigm it may be concerned with approaches toward new labour market tendencies aligned with topics such as role of design in the transformation of human digitality and advanced HCI practice.

3. Results

3.1 Framework and Architecture of Exemplified Interactive Design

By applying an exemplary model and method of testing the work of the mobile application, students evaluates the created linear movement flow through a mobile app. The research was conducted with 20 second-year students majoring computer multimedia at ITS(Information Technology School in Belgrade). The theme of the mobile application provides the possibility of controlling a quadrifter, a real-time drone, called "Here I am". The screens are detailed designed as a patways of using the device, with pre-installed navigation, and with the ability to control, check the state of rest, time waves, control the power supply and internal batteries. Also, the application is enabled by connection with the operator, as well as by checking the signal.

- 1. screen - is a login screen, through which the user can perform log-in, but also pause the operation of the device and system.
- 2. screen- by which the aircraft's prepareness regime and condition are checked, the range of the aircraft expressed in km outside temperature and battery state at a given moment, with a map of the starting point and checking the current location.
- 3. screen - allows the aircraft to be controlled, with manual control, automatic application and immediate landing. It provides the possibility of day and night cuts, as well as the possibility of recording. At the same time, the current route of movement expressed in percentages is shown, as well as the speed of movement expressed in km/h.
- 4th screen - shows weather conditions, the possibility of checking and hourly rate of movement of weather disasters and possible weather warnings.
- 5th screen - allows checking the system, connection to the operator, as well as rest during signal loss with the switchboard with an overview of activities.

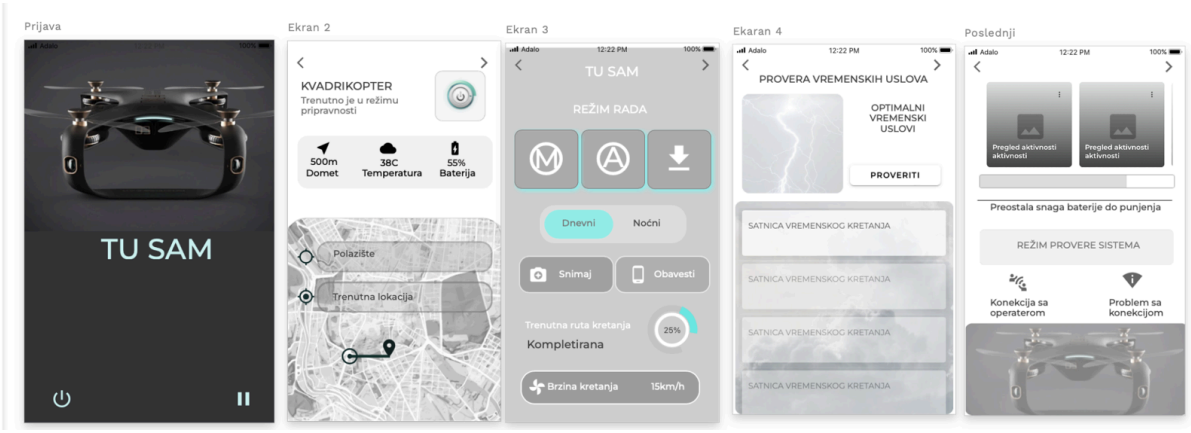


Figure 2 . The Appearance of an exemplary mobile application based on which a visual assessment of the possibility of application and UI/UX was tested

This paper presents partial research data listed in the following segments of the paper.

3.1.1 Functionality evluation

Based on the set parameters (functional, user, visual and segmented), students were expected to analyze the functionality of the mobile application and enter percentage values. The analysis (are conducted or) included work with students who, based on the presentation, participated in the restructuring of functionality, degree of applicability and visual identity of the mobile application based on the conducted conclusions. Understanding functionality refers to a time frame that is limited to 08(eight) minutes within which students check the functionality of the mobile application and attached elements. The x axis displays a time span of 8 minutes, while the y-axis displays all 5 screens.

Based on the obtained results of understanding and functional application of the mobile app, the conclusion indicates that the 1st screen, followed by the 2nd screen, did not disturb the predicted time flow of the application, ranging from up to 3.5 minutes, while functional application and operation in the 3rd screen also showed that it is in the predicted range for 5 minutes from the beginning of the evaluation. The work in the 4th screen was also extremely simplified, thanks to the connection to the external system, while the work on the last 5th screen, required the longest analysis time.

3.1.2. Usability evaluation

The second analysis that was conducted indicates the understanding and degree of the difficulty of the usability of the mobile application. This involves applying a 20-minute time frame that was required to check the usability of each component and the ease of application expressed through the functional elements of the mobile application shown in the Figure 3. in the Section Uderstanding of Usability.

It shows the increase in student engagement over the time it took them to analyze each individual component. The display on the screens indicates that the difficulty of applying the 2nd screen increased to 16 minutes, during which students analyzed the possibilities of application of each component, mostly in the analysis of the location and movement of the drone from the initial to the current location.

The increase in time required to analyze the operation of the components of the 3rd screen indicates the time required for students to analyze the grounding, as well as checking the changes of the night on the daily regime of work. The results of the increase in the required time to master the system inspection regime are responsible for the additional time spent analyzing the operation and ease of use of the last screen.



Figure 3 . Derived measurement results based on students assessment

3.1.3. Results of functional components and visual identity of the mobile application

They point to three key segments that were insisted on during the analysis, the application of adequate elements, the application of adequate (recognizable icons), as well as the application of appropriate colors (color structures of the application).

- The application of adequate elements indicates that 38% of students believe that it would be more noticeable to apply more appropriate elements in the design of the mobile application interface, while 62% of them did not have a problem with the applied elements.
- The application of the corresponding icons indicates the applied icons of the appropriate display and appropriate to the theme of the mobile application, in fact 95% of them are of that view, while 5% had suggestions regarding the display of the complete driving route and the way of logging into the mobile application.
- The application of adequate color seeds indicates according to the results that the applied colors are adequate themes of the mobile application, elements and screens on which they are placed, compared to 92% of students, while 2% of students believed that the mobile application required more intense contrasts of the background and content placed on the screens.
- The last segment of the analysis was related to the application rating of the mobile application based on the functionalities shown, the degree of demanding use, adequate application of appropriate elements, icons and color structure. Based on which the mobile application was rated with an average score of 3.5 out of the 5 offered.
- This paper does not present the process of recording and evaluation of the analyzed data, as well as the sematization of the given process.

3.1.4 Future perspectives of working on creating an adequate design solution

Based on the demonstrated example of successful engagement of students in the creative process and evaluation of the final product, it is important to note the importance of this type of work, because not only their creative potency is developed, but also analytical structure and thinking that involves not only divergent thinking, mapping solutions and narrowing of choices that will lead to the most effective creative outcome and innovation of interactive design. At the same time, a collaborative aspect of cooperation and consideration of more opinions is being developed during the creative process, but also cooperation within the team and the importance of collaboration. Therefore, investigation, research, analysis, idea generation, prototyping, implementation and evaluation are basic processes that take place in all design disciplines and are conditioned by the requirements of the project. The importance of this methodology is reflected in the defined structure that directs and influences the process of designing the final solution according to the needs of users [15]. Therefore, the introduction into educational teaching of such an evaluation system is an obvious example of supporting the design system.

4. Conclusions

This paper refers to design support system as a comprehensive framework that a multidisciplinary approach, improving insights from various fields such as digital environment, technology design, and communication practices. By integrating concepts, creative strategies, and UX/UI design principles, in developing digital products that effectively affects and engages user interactions. Implemented within an educational paradigm, it aligns with emerging labor market tendencies and

addresses topics like the role of design in human digital transformation and advanced Human-Computer Interaction (HCI) practices.

Furthermore, it incorporates methodologies such as crowdsourcing, service design, and innovative interactive design communicology to enhance the design process. Interaction design modules serve as practical tools for implementing these strategies, ensuring the seamless integration of design principles into digital experiences.

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