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UX professionals' definitions of usability and UX – A comparison between Turkey, Finland, Denmark, France and Malaysia

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Abstract. This paper examines the views of user experience (UX) professionals on the definitions of usability and UX, and compares the findings between countries and within different socio-cultural groups. A mixed-method analysis was employed on data gathered on 422 professionals through a survey in Turkey, Finland, Denmark, France, and Malaysia. Usability appears to be an established concept, respondents across all countries agreeing on the importance of the ISO 9241-11 definition. There is also a tendency that UX professionals attach organizational perspective to usability. UX professionals diverge when defining UX, and there are systematic differences related to socio-cultural conditions. UX professionals in Finland and France incline more towards the definition highlighting the experiential qualities, when compared to Turkey and Malaysia that incline towards the definition reflecting the ease of use, utility, attractiveness, and degree of usage. Further research should address the implications of the diverse meanings and contexts of usability and UX.

Keywords: User experience, usability, UX professional, cross-cultural HCI

1 Introduction

As Human Computer Interaction (HCI) communities emerge all over the world, user experience (UX) professionals may find themselves as leaders in an emerging field, who have the opportunity to spread the word and to establish its meaning and value for many stakeholders. Currently, the UX field is not clearly defined and professionals'

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roles and competences are positioned along a continuum between the pure user-research for understanding and the applied design of objects, systems, or interactions[1].

Despite having established standards that define usability (ISO 9241-11; [1]) and UX (ISO 9241-210; [2]), HCI has so far failed to establish solid consensus about a scientific definition of usability and UX. The discipline of HCI appears to have accepted various loosely defined notions of usability, see e.g., [3]. For UX, the controversy about the scientific use of the concept is even more obvious. Sustained efforts over the years have aimed at defining UX (see e.g., [4,5,6,7]), connecting UX to existing HCI theory (e.g., [8,9,10]), or connecting UX to system development and design literature (e.g., [11,12,13]). However, it is fair to say that UX as a research area still can neither define the concept of UX, agree on how to capture the experiential qualities, or provide unified guidelines for experience design [7].

Our aim is to contribute to the clarification of the use of key concepts in the UX community. To this end, we focus on how UX professionals define usability and UX and on the socio-cultural factors that may influence the UX professionals' perspectives. By socio-cultural factors, we refer to certain demographic and professional background variables that have been shown to influence the way usability and UX professionals understand and apply usability and UX concepts in their work, such as gender, educational background, country of work, job titles, hierarchical positions in the organization. We conducted a questionnaire survey study in five countries, including questions on demographics and professional background of the respondents. This paper shows that UX professionals agree on the ISO definition of usability, but diverge when defining UX, and that there are systematic differences related to socio-cultural conditions.

2 UX communities in Turkey, Malaysia, France, Finland and Denmark

In this paper, we compare views of UX professionals from UX communities in Turkey, Malaysia, France, Finland, and Denmark as these together represent geographic and cultural diversity. We relied on convenience sampling, executing the study in countries of the researchers showing initial interest in this study. However, we also intentionally included diversity into the sample. The selection includes countries with an extensive background in HCI (Finland, Denmark) and in ergonomics (France), as well as countries with a relatively recently established UX community (Turkey, Malaysia). Moreover, we intentionally wished to include cultural diversity into the sample and tried to locate countries representing variety in terms of geographical position such as North-European, Central-European, South-East-European, and Asian.

In Turkey, the dominant UX community is UXPA Turkey Chapter, which was launched in 2014 in İstanbul as a non-profit local chapter of the global UXPA[2] to serve interaction designers, usability/UX professionals, HCI specialists, etc. In the email list

[1] http://interactions.acm.org/blog/view/ux-research-vs.-ux-design

[2] UXPA (The User Experience Professionals Association).

of UXPA Turkey, there are more than 500 recipients, which present a variety in terms of professional practice.

In Malaysia, there is a recently established Human Computer Interaction Special Interest Group (SIGHCI) under the Human Factors and Ergonomics Society of Malaysia. The SIG plans to work with other technical committees and institutions in the development of usable products and services. In addition, UX Malaysia is an active and the largest UX-related social media group in Malaysia, comprising of UX practitioners in Malaysia and around the world. Founded in 2012, the group consists of 1897 members on Facebook. Another Facebook group known as SIGHCI Malaysia comprising of 75 members promotes HCI activities among Malaysian universities.

In France, FLUPA (France-Luxembourg User Experience Professionals' Association) was founded in 2008 as the France-Luxembourg branch of UXPA. In the email list, there are more than 500 recipients. In addition, Ergo IHM is a mailing list available in French community that reaches more than 800 professionals and students in the field of HCI.

In Finland, there is an ACM SIGCHI[3] Chapter, namely SIGCHI Finland, founded in 2001. SIGCHI Finland is a scientific association that aims at gathering together researchers and practitioners in HCI, usability, and user experience in Finland. The email list includes around 450 recipients. In addition to SIGCHI Finland, there are several practitioner-oriented communities operating in Finland: IxDA Helsinki, IxDA Tampere, and KäytettävyysOSY, all having dedicated Facebook and LinkedIn groups that include several hundred members.

In Denmark, the dominant UX community is Sigchi.dk, which in 2015 changed its name to UX Denmark. Sigchi.dk (uxdanmark.dk) is associated with ACM SIGCHI and UXPA, but not a formal chapter of any of those. Sigchi.dk was launched in 1999 as a web site for interaction designers, usability professionals, HCI specialists, and so forth. The website uxdanmark.dk has about 1348 registered members from industry, government, and academia. The UX Denmark social media groups (LinkedIn UX Denmark and Facebook SIGCHI.dk page) have each about 491 members.

3 Related work

3.1 HCI definitions of usability

Usability is a concept that stems from the research in ergonomics done in 80's on the interactive systems, and gradually evolved into a definition of quality in use [14]. The current standard definition of usability adopted by the HCI community (ISO 9241-Part 11; [1]) reflects quality in use[4] and stresses out the outcome the users gain by interacting with a system [14]. This definition states that usability is "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency

[3] ACM SIGCHI (ACM Special Interest Group on Human-Computer Interaction).

[4] In this paper, quality in use has the same meaning as the broad view of usability expressed in ISO 9241-11 [1], in conformance also with Bevan (1995, 1999) [15] [16], and Hornbæk and Law (2007) [17].

and satisfaction in a specified context of use" [1]. This definition and the definitions of each of its three aspects are supposed to be a common reference for HCI researchers and UX professionals alike. However, the meaning of the usability construct and its implications for how to measure usability appear to be undecided in HCI discipline (see e.g., [18]). Accordingly, studies of correlations among usability aspects have been a standard way to try to define usability, see e.g., [19], though not with much success. A meta-analysis of usability studies indicated diversity in conclusions on if and how different aspects of usability were correlated [17]. Hertzum [3] describes six different perspectives on usability: universal usability, situational usability, perceived usability, hedonic usability, organizational usability, and cultural usability. While these six perspectives on usability have a shared essence, they differ in focus, scope, mindset, and the methods most appropriate for working with usability.

3.2 HCI definitions of UX

The ISO 9241-210 [2] defines UX as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service". UX focuses on the individual experience in relation to the use of a product, rather than on the effectiveness and efficiency of achieving a goal in a context of use of a product [14,20,21]. Bevan et al. [14], however, points out that satisfaction as an aspect of usability includes aspects of UX and this clarification is to be added to a future revision of ISO 9241-11. Early efforts in HCI to formulate a shared UX definition for academic research (see e.g., [4]) ended up formulating a gap between those UX professionals who view UX as related to design issues and those who view UX as something to measure or capture [6,7]. Moreover, while some definitions of UX (e.g., the ISO standard for UX [2], [19]) explicitly mention the use of an interactive system, product, or service, other HCI researchers (and Don Norman[5]) focus on human experience with technology (see e.g., [23]). Moreover, while the original meaning of UX refers to momentary evaluation (see [20,22]), Kujala et al. [22] explicitly aim at the evaluation of long-term experience with an interactive system, product, or service. Accordingly, there can be a difference in conceptualizing UX due to the scope; some definitions focus on (momentary) experiences of interaction with technology (e.g., [23]), while other focus on experience with long-term use and/or interaction with an interactive system, product, or service (see e.g., [22]). When referring to the long-term use of interactive systems, product, and services, Kujala et al. point out the following UX attributes: attractiveness of the system, ease of use, utility, and degree of usage [22]. This definition is referred to as system-oriented perspective of UX [24]. On the other hand, when referring to interaction with technology, McCarthy and Wright define UX by four threads of experience: compositional, sensual, emotional, and spatio-temporal [23]; this view is referred to as human-oriented definition of UX [24].

[5] https://www.nngroup.com/articles/definition-user-experience/

3.3 How usability and UX are construed by UX professionals

Previous studies on how usability and UX are construed by UX professionals have examined system developers, users, and UX professionals' operational understanding of usability and UX [24,25,26]. The focus in these studies was on these stakeholders' understanding in use, which is different from giving definitions and explaining a concept such as usability and UX. In these studies [24,25,26], seventy-two participants across Europe (Denmark), India, and China elicited their personal constructs of quality in use in the context of using their computers in everyday life; e.g., how they thought about the use of their own email system. The studies employed the repertory-grid method (see [27]). The findings [24,25,26] showed differences in how UX professionals think about their own user experiences, compared to how developers and users think about theirs. The differences included that UX professionals in general focused more on describing the human user, and in particular more on the human subjective user experience, than the two other stakeholder groups who focused more on the systems and the context of use. Interestingly, UX professionals were not as concerned with the context of use as the users. Clemmensen et al. [24] also found that all four UX conceptual classifications that were used to do content analysis of the participants' answers (i.e., ISO 9241-210 user experience, objective vs. subjective UX, system-oriented UX, and human-experience of technology) could capture most of what participants said about their system use. In contrast, various views on usability definitions (i.e., ISO 9241-11 definition, utilitarian vs. experiential view, organizational usability, and user experience) turned out to be hard to fit to half of what the participants said about their use of their own systems (see [25]). Thus, it was found that the concept of usability as described in the literature appeared to be much narrower than UX when trying to fit it to the words that system developers, end users, and UX professionals use to construe quality in use in the context of their own use of computers in everyday life.

3.4 Socio-cultural factors shaping UX professionals' understanding and work practices

HCI research has revealed that various kinds of socio-cultural factors affect perception and practice of usability and UX. Previous studies conducted on Danish, Chinese, and Indian UX professionals showed that nationality has an influence on the way UX professionals think about and perceive usability and UX [24,25,26]. A study on usability practices in game development in North-European countries (mostly Sweden, Finland, and UK) showed that more than 80% of Finnish game companies employ usability testing as compared to about 50% in the other surveyed countries [28]. A survey conducted in 2011 showed that while the practice of user experience has gained more attention in Malaysia, UX professionals are new to the terminologies of usability and user experience [29]. Research with users of different nationalities also found that nationality affects the way usability is understood (e.g., effectiveness and efficiency were emphasized by Danish users, while visual aspects wereemphasized by Chinese users [30]), and perceived (e.g., US users perceiving lower levels of user satisfaction, effectiveness and efficiency than Taiwanese users' [31]).

Cross-cultural usability studies also indicate that cultural issues shape UX professionals work practices. Cultural factors influence usability evaluations (e.g. [32,33,34])

and participatory design sessions [35,36], as shown in studies carried out in different countries. Also organizational culture differences have been argued to shape UX professionals work practices: usability is understood and practiced in different ways in organizations with cultural differences [37,38]. Studies also show that very surprising and negative views may be attached to usability in organizations [39,40].

Factors defined by the professional profile such as educational background and experience level have also been shown to influence the work practice. For example, the experience level of UX professionals may shape the outcomes of their work, such as in usability evaluation [41]. There is also a lot of diversity in the education of UX professionals – a multitude of disciplines contribute to and are relevant in UX work and this goes for the field of HCI overall (see e.g. [42,43,44]). Clemmensen [45] found that the UX community in Denmark mainly consisted of young people with less than five years of experience with usability work, and had an education in the social sciences or the humanities rather than a technical field. Most respondents in the survey had a keen interest in communication or participatory design.

Furthermore, the UX profession includes a variety of job titles emphasizing one or another aspect of their work, and a variety of roles in the system development cycle. The label UX professional may refer to usability/UX designers, researchers, managers, or engineers, among others (see e.g., [43,46,47]). Such a variety in job titles indicates that these professionals may be engaged with very different concerns in their work. A review [48] of ISO standards that address usability evaluation pointed out that ISO 9241-11 [1] targeting especially usability and UX professionals, provides guidelines on usability evaluation in various stages of system development such as the requirements, design, development, and use, but not in the post-implementation (maintenance) stage. On the other hand, ISO 13407 [49] (revised under ISO 9241-210 [2]) targeting designers of interactive systems, does not guide evaluation during the implementation stage. Standards targeting IT professionals, including software engineers, then again, refer also to evaluation at post-implementation stages such as support and maintenance [48].

Sivaji et al. [50] found that also gender has an effect on the effectiveness of a method used in usability evaluation, in particular when gender interacts with the social status of the users performing the evaluation.

3.5 This study

Given the diversity of perspectives on usability and UX pointed out in our review, it is expected that different UX professionals may prefer different definitions of these concepts. Moreover, the diversity of socio-cultural conditions, which characterize and influence UX professionals' mindset and work practices, is expected to be also reflected in the diversity of ways UX professionals conceptualize usability and UX. In this study, we refer to socio-cultural conditions as being defined by the country of work, gender, educational background, experience level, hierarchical position in organization, job title, role in system development, and similar other variables that form the demographic and professional background of UX professionals. These variables represent social and cultural factors that influence people's mindset, attitude, and practices related to their profession.

Based on the related work, we maintain that if there are common understandings of usability and UX among professionals, it is not clear which are the shared understandings or how UX professionals define these concepts. There seems to be many aspects that may be shaping these understandings: there may be a difference in understanding related to the history of UX within a country, and to the profile (gender, educational background, job title, and design process participation, etc.) UX professionals have. In this study, we inquire these understandings and definitions and their relations to the socio-cultural factors. We are especially interested in examining whether there are differences that can be accounted by the local communities' different history in HCI and different cultural background as defined by the country of work. The overall aim is to clarify the use of key concepts in the UX community. Our research questions are:

- RQ1: How usability is defined by UX professionals?
- RQ2: How UX is defined by UX professionals?
- RQ3: Does country of work have an impact on the way UX professionals define usability and UX?
- RQ4: Do other socio-cultural factors than country of work, i.e. demographic and professional background, impact the way UX professionals define usability and UX?

4 Method

4.1 Research design

An online survey was administered over a period of eight weeks from January to March, 2016. Data were collected from the UX professionals working in Turkey, Denmark, France, Finland, and Malaysia. The survey was distributed in local languages through the local UX communities' mailing lists and social media of each country.

4.2 Variables

Dependent variables. To measure and capture UX professionals' definitions and understanding of usability and UX, we asked the respondents to choose their position on a scale between two polar versions of usability and UX, respectively (see Table 1 and Table 2). For usability we chose the ISO 9241-11 definition [1] versus the Elliott and Kling's organizational perspective on usability [51] (see also [3, 52]). The idea was that though the ISO definition is widely known, UX professionals working in companies and large organizations may prefer the organizational usability definition. Moreover, Bevan et al. [14] pointed out that organizational perspective should be included in the next revision of ISO 9241-11.

For UX, we chose two definitions that have a different focus; the first is based on Kujala et al. [22], which is in line with ISO 9241-210 [2] and reflects a system-oriented definition of UX [21]. The second represents the McCarthy and Wright's view on UX and focuses on the experience of interaction with technology [23], and represents a human-oriented view of UX [24]. As McCarthy and Wright's view [23] is more on the human experience of using technology, we expected that as practitioners, UX professionals would clearly prefer the system oriented definition of UX.

Regarding the capture of usability and UX understandings, respondents were also invited to provide their own definitions, which resulted in a relatively large amount of qualitative data to be coded and analyzed.

Table 1. Definitions of usability rated in the survey

Definitions of usability	Based on
1: Usability describes how a product can support its users to be effective, efficient and satisfied in its use.	ISO 9241-11, 1998 [1]
2: Usability describes the match between the product and the organization adopting it.	Elliot & Kling, 1996 [51]

Table 2. Definitions of UX rated in the survey

Definitions of UX	Based on
1: UX is the perceived attractiveness, ease of use, utility, and degree of usage of the product.	Kujala et al., 2011 [22]
2: UX is the combined experience of the composition of the elements, sensory qualities, related emotions, and the context.	McCarthy & Wright, 2004 [23]

Independent variables. To answer the research questions, the socio-cultural factors acting as independent variables were captured in terms of demographics (e.g., age, gender, education, occupation status, graduation field), and professional profile (HCI education, work experience, UX knowledge, and job characteristics such as job title, job position, stage in system development when involved).

4.3 Sample

The target participants were practitioners who would self-identify as usability/UX professionals; they had to be knowledgeable about usability and UX in order to be able to answer the questions about their background. We aimed to include both in-house UX professionals and external consultants, and we had a question where participants had to identify as one of these groups. At the same time, our participants should have a local association, a country of work, so people from e.g., Norman Nielsen and other similar groups should participate in the survey only if they had a presence in the countries we aimed to include. To ensure the best sampling, we used local UX groups' email lists, social media groups, and – to a wide extent – our own and our colleagues' personal networks, so we utilized theory-based convenience sampling.

4.4 Questionnaire

The questionnaire contained 62 questions that aimed to gather information related to the following seven categories: organization and work environment, usability/UX understanding, usability/UX activities and tools utilized in work, integration of usability/UX work, usability/UX communities, usability/UX in the country of work, and background including demographics and professional information. In this paper, in order to answer the research questions, we report data from 19 questions that focused on usability/UX understanding and on the background information.

4.5 Data analysis

For the data analysis, we employed a mixed-method approach. The quantitative data were coded to allow statistical data analysis in SPSS. Variables were not normally distributed, thus we used the Mann-Whitney test to compare the importance ratings given by the respondents in different countries. Wilcoxon signed-rank test was employed to test whether the two definitions elicit significantly different importance scores within the same socio-cultural group (e.g., same hierarchical position).

The qualitative data – obtained from open-ended questions – were coded in Excel and Nvivo using the content analysis method. In both categories of definitions, usability and UX, we labeled different aspects (attributes, descriptions, and perspectives) that were pointed out in previous studies, e.g., [3,14,24,25,26]. Moreover, other aspects that emerged in a data driven manner during the qualitative analysis of the definitions were also extracted such as subjectivity and objectivity of the constructs, and the customer perspective of usability and UX.

5 Results

5.1 Demographic and professional profile of UX professionals

A total of 422 valid participants were retained for analysis after cleaning the data. The professionals are relatively mature regarding age (*median* = 34; *M* = 35.2; *SD* = 8.3), and have in average 5 years of experience in UX field (*median* = 5; *M* = 6.7; *SD* = 5.6). The average experience in the current job title position is 3 years (*median* = 3; *M* = 4.3; *SD* = 4.6). The age ranges from 19 to 66 years, and the total work experience from 0 to 43 years (*median* = 10; *M* = 11.2; *SD* = 7.9), thus the sample represents a wide and heterogeneous population of UX professionals in terms of age and work experience.

The sample distribution by country was as follows: 21.3% of participants were from Turkey, 11.6% from Denmark, 15.4% from France, 20.4% from Finland, and 29.1% from Malaysia (see Table 3). Ten (2.4%) were classified as "Other" because the respondents belonged to different countries than where the survey was conducted (e.g., Germany, Mexico). Among participants, 4.7% were of foreign nationality relative to the survey country and 90.3% were locals; the rest did not disclose their nationality.

Table 3. Demographic profile of UX professionals (*N* = 422)

		Entire sample (*N* = 422)		Provided Usability definition (*N* =120)		Provided UX definition (*N* = 104)	
		n	*%*	*n*	*%*	*n*	*%*
Country of work	Denmark	49	11.6	9	7.5	8	7.7
	Finland	86	20.4	20	16.7	22	21.2
	France	64	15.2	39	32.5	32	30.8
	Malaysia	123	29.1	30	25.0	23	22.1
	Turkey	90	21.3	18	15.0	16	15.4
	Other	10	2.4	4	3.3	3	2.9
Gender	Female	188	44.5	59	49.2	50	48.1
	Male	213	50.5	61	50.8	54	51.9

	Missing	21	5.0	0	0	0	0
Occupation status	Employed	352	83.4	97	80.8	83	79.8
	Freelance	16	3.8	7	5.8	5	4.8
	Entrepreneur	30	7.1	6	5.0	7	6.7
	Other	24	5.7	10	8.3	9	8.7
Education level	Basic or diploma	21	5.0	1	.8	2	1.9
	Bachelor degree	118	28.0	32	26.7	29	27.9
	Master degree	213	50.5	72	60.0	63	60.6
	PhD degree	49	11.6	15	12.5	10	9.6
	Missing	21	5.0	0	0	0	0
Graduation field	Computer/information[a]	136	32.2	34	28.3	28	26.9
	Media/communication[b]	56	13.3	19	15.8	20	19.2
	Psychology	29	6.9	15	12.5	8	7.7
	Arts	23	5.5	6	5.0	4	3.8
	Business/management[c]	22	5.2	3	2.5	2	1.9
	Electronic/automation[d]	18	4.3	2	1.7	2	1.9
	Other	115	27.3	40	33.3	40	38.5
	Missing	23	5.5	1	.8	0	0

Notes: [a] Computer and information sciences; [b] Media and Communication; [c] Business and management; [d] Electronic, automation and communication engineering, Electronics.

Table 3 presents the demographics of the UX professionals participating in our survey; the first data column presents the figures for the entire sample, the second and third summarize the characteristics of the UX professionals who provided free-form definitions of usability and UX in the open-ended questions. The respondents who provided free-form definitions have similar profiles as the whole sample; however, regarding the country distribution, France is slightly more represented in the free-form definitions.

Table 4 presents the professional profile of the UX professionals responding to the survey; there are no major differences between the entire sample and the respondents providing own definitions to the open-ended questions. Across the sample, most of the UX professionals are involved in early stages or all stages of product/system development. Early stages included kick-off or initialization, requirements, and design. Late stages included development, testing, and implementation phases. Post-implementation was coded as not really involved in the development. According to their self-evaluation, the participants have medium or higher level of knowledge on UX, and most of them keep up with the evolution of the field by using different information media such as conferences, courses, books, blogs, magazines, and scientific articles. Most of the UX professionals have one or two types of formal HCI education such as HCI courses, theses, and/or project experience. A large proportion of UX professionals (41.2%) did not disclose the hierarchical position of their job; the most common position is lower or middle management, followed by top management. Regarding the job titles, there is a balance between titles specifying usability and UX (such as usability or UX specialist) and those that do not (such as product manager or service designer). Similar distributions are found in the groups providing own usability and UX definitions; however, a larger proportion of usability/UX jobs are found among the providers of UX definitions.

Table 4. Professional profile of UX professionals (N = 422)

		Entire sample (N = 422)		Provided Usability definition (N =120)		Provided UX definition (N = 104)	
		n	*%*	*n*	*%*	*n*	*%*
HCI formal education	No formal HCI	16	3.8	5	4.2	4	3.8
	1 type	179	42.4	47	39.2	40	38.5
	2 types	57	13.5	22	18.3	18	17.3
	3 or more types	57	13.5	17	14.2	19	18.3
	Missing	113	26.8	29	24.2	23	22.1
UX vocational education	No vocational UX training	318	75.4	90	75.0	78	75.0
	Vocational UX training	82	19.4	30	25.0	26	25.0
	Missing	22	5.2	0	0	0	0
Job title	UX or usability in job title	192	45.5	58	48.3	60	57.7
	No UX or usability in title	199	47.2	61	50.8	43	41.3
	Missing	31	7.3	1	0.8	1	1.0
Job hierarchy	Entry level	34	8.1	8	6.7	6	5.8
	Specialist	16	3.8	7	5.8	6	5.8
	Lower/middle management	106	25.1	33	27.5	26	25.0
	Top management	66	15.6	16	13.3	14	13.5
	Outside hierarchy or other	26	6.2	13	10.8	8	7.7
	Missing	174	41.2	43	35.8	44	42.3
Keeping up with UX field	Keep up	355	84.1	112	93.3	98	94.2
	Do not keep up	46	10.9	8	6.7	6	5.8
	Missing	21	5.0	0	0	0	0
UX expertise level	Novice	36	8.5	8	6.7	7	6.7
	Little expertise	35	8.3	11	9.2	6	5.8
	Medium expertise	119	28.2	45	37.5	30	28.8
	Considerable expertise	149	35.3	38	31.7	38	36.5
	Expert	62	14.7	18	15.0	23	22.1
	Missing	21	5.0	0	0	0	0
Stage in system development (SD)	Not involved in SD	20	4.7	5	4.2	3	2.9
	Late stage	19	4.5	1	0.8	1	1.0
	Early stage	174	41.2	52	43.3	44	42.3
	All stages	206	48.8	61	50.8	55	52.9
	Missing	3	0.7	1	0.8	1	1.0

5.2 Usability understanding

Answering RQ1, "How usability is understood/defined by UX professionals?", we found that most professionals (77.8% of 414 respondents who rated the definitions) preferred the ISO 9241-11 definition [1] rather than the organizational usability definition by Elliott and Kling [51] (see Table 5). However, a relatively large number of respondents (76; 18.4%) found both definitions important.

A substantial number of participants (120; 28%) have commented the existing definitions or entered their own definitions on usability. Content analysis of the free-form usability definitions showed that 108 (90%) of the answers described usability by different **attributes** of usability or of usable systems/products/services (e.g., "efficiency", "easy to use"), or **requirements** of usability or of usable systems/ products/ services

(such as "you can use it without instructions"). These descriptions were expressed as standalone definitions, explanations, or additions to the definitions 1 and 2 provided in the questionnaire. The rest of free-form answers (10%) were comments on the survey definitions, reference to standards, or some other personal insights about usability or usable products that were not interesting from the research point of view.

Among the words used to describe usability, the most predominant were efficiency, effectiveness (also utility, usefulness, and helpfulness), functionality, ease of use (also learnability, accessibility, cognitive load), accomplishing (user, business) goal, meeting needs, requirements and expectations of the user or business/organization. There were also references to attributes related to emotions and feelings such as: satisfaction, pleasantness, stress-free, emotional load, enjoyable. In the free-form answers, 13 respondents referred to the **concept of experience** (use experience, user experience, and service experience) when discussing the concept of usability. Respondents also stressed that usability is a **subjective and/or objective** quality. Moreover, respondents pointed out that usability should also take into account the **business/organization needs and goals** and that usability is not only about users, but also about **customers** highlighting that users' and customers' requirements "are not always the same thing".

Table 5. Which definition is the most important? (N = 414)

	Ratings for Usability		Ratings for UX	
	n	*(%)*	*n*	*(%)*
Definition 1 is the most important	231	(55.8)	70	(16.9)
Definition 1 is somewhat more important	91	(22.0)	44	(10.6)
Both definitions are equally important	76	(18.4)	131	(31.6)
Definition 2 is somewhat more important	12	(2.9)	92	(22.2)
Definition 2 is the most important	4	(1.0)	77	(18.6)

5.3 UX understanding

Referring to RQ2, "How UX is understood/defined by UX professionals?", we found that when contrasting the Kujala et al. [22] and McCarthy & Wright's [23] definitions, participants were not in a consensus on the importance of these two definitions (Table 5). Many of them found both definitions important (31.6%). A higher proportion of respondents (40.8%) inclined towards the second definition highlighting the sensorial and emotion-related qualities. Overall, according to Sign test, the second definition was rated as statistically significantly more important across all data (Z = -3.14; p = 0.002); however, according to Wilcoxon signed-rank test which takes into account also the magnitude of the differences between two paired scores, the preference towards the second definition failed to reach statistical significance at 0.05 (Z = -1.69; p = 0.09).

Participants provided 104 definitions and/or clarifications as free-form answers, representing about a quarter of the total respondents (see Tables 3 and 4). Content analysis of the free-form UX definitions showed that 83 (80%) of the answers were **descriptions of UX** that referred to or reflected **attributes or requirements** of UX and/or of systems/products/services. We grouped the attributes and/or requirements in the following categories 1) formal and aesthetic; 2) performance/operation-related; 3) information

related, 4) emotion, feelings and cognitive; 5) experience related; and 6) other. The most predominant characterizations were those invoking emotions, feelings, experiences, performance and usability attributes. It was observed that, when describing UX with own words, UX professionals still addressed the performance and operation qualities of the product such as ease of use and effectiveness. In this category, we identified also that professionals pointed out that usability is a quality of UX and is part of UX. Moreover, it was pointed out that the product has to match the goals, needs, and expectations of the users. As anticipated, emotion- and experience-related qualities were frequently mentioned among the descriptions of UX. Interestingly, but not entirely unexpectedly, UX professionals pointed out descriptors such as fashion and branding, that we grouped in the category of formal and aesthetic qualities, and descriptors such as memory trace, sense making and meaning creation that we grouped within the emotional and cognitive attributes. Not the least, the references to business value, customers, and company's marketing strategy indicate the broad view on UX that transcends the boundaries of users' satisfaction and reaches out to the company's returns.

When **describing what UX is,** respondents utilized various terms and conceptualizations such as: UX is (about) emotions/ feelings/ perception/ understanding of the user, UX is (about) (use/user) (overall/entire) experience, UX is a (user centered design) method/methodology. Other participants referred to UX as being attribute(s) (related to the systems) such as satisfaction, ease of use, suitability, etc. (see above), a process, all aspects/dimensions of use/interaction, and results/effects/reactions. Further, other characterizations were found in terms of business branch, memory trace, aesthetic elements, and adaptation of tool to user.

Regarding the **organizational and business perspective**, five respondents pointed out concepts such as business needs, company marketing's strategy, business outcomes, and three respondents brought up the c**ustomer's perspective** by stating that the UX is defined by the customer, UX has to be designed in accordance with the customer requirements, and UX impacts customer's system use.

5.4 Country specific usability and UX

Referring to RQ3, "Does country of work have an impact on the way UX professionals understand/define usability and UX?", we tested whether there were any significant differences in rating the importance of usability and UX definitions between countries. Table 6 shows the ratings of the usability definitions by country. There was a clear agreement among countries that the ISO definition of usability (Definition 1) is more important than the organizational definition; however, there were variations in the degree of importance and at those agreeing with both definitions. According to the Mann-Whitney test, there was a significant difference in the ratings between Finnish and French UX professionals, the former had stronger preferences towards the ISO definition compared to French respondents ($U = 2184$; $p = 0.017$).

Table 7 shows the ratings of UX definitions by country and the medians of each definition's ratings. There were statistically significant differences between France and Finland, on one hand, and Malaysia and Turkey, on the other hand (see Table 8). Turkey and Malaysia significantly preferred Definition 1 highlighting system-oriented UX, as

compared to Finland and France who preferred the experiential definition. Slight differences, but not reaching statistical significance at 0.05 were observed between Denmark and France, and between Finland and France (Table 8).

Table 6. Rating of Usability definition (% by country)

	Denmark	Finland	France	Malaysia	Turkey
Definition 1 is the most important	63.4%	59.3%	46.9%	57.7%	54.4%
Definition 1 is somewhat more important	12.2%	31.4%	21.9%	13.0%	27.8%
Both definitions are equally important	22.0%	9.3%	26.6%	24.4%	11.1%
Definition 2 is somewhat more important	2.4%	0%	3.1%	4.9%	3.3%
Definition 2 is the most important	0%	0%	1.6%	0%	3.3%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%
Medians of rating scores					
Usability definition 1	1	1	2	1	1
Usability definition 2	5	5	4	5	5

Note: The medians are calculated for the scales 1: The most important … 5: The least important.

Table 7. Rating of UX definition (% by country)

	Denmark	Finland	France	Malaysia	Turkey
Definition 1 is the most important	17.1%	8.1%	6.3%	22.8%	25.6%
Definition 1 is somewhat more important	9.8%	17.4%	4.7%	6.5%	13.3%
Both definitions are equally important	29.3%	24.4%	31.3%	39.0%	31.1%
Definition 2 is somewhat more important	22.0%	26.7%	25.0%	22.0%	15.6%
Definition 2 is the most important	22.0%	23.3%	32.8%	9.8%	14.4%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%
Medians of rating scores					
UX definition 1	3	3.5	4	3	3
UX definition 2	3	2.5	2	3	3

Note: The medians are calculated for the scales 1: The most important … 5: The least important.

Table 8. Significant and near significant differences among countries

	Rating of UX Definitions			
	Mann-Whitney U	*p*	*Definition 1 more preferred by*	*Definition 2 more preferred by*
Turkey vs. France	1773.500	**0.000**	Turkey	France
Turkey vs. Finland	2915.500	**0.004**	Turkey	Finland
France vs. Malaysia	2503.000	**0.000**	Malaysia	France
Finland vs. Malaysia	4157.500	**0.007**	Malaysia	Finland
Denmark vs. France	1036.500	0.061	Denmark	France
France vs. Finland	2328.500	0.097	Finland	France

5.5 Impact of demographic and professional profile on usability and UX understanding

In answering RQ4, the Wilcoxon signed-rank test showed that, with regard to usability, there was a clear and significant consensus towards Definition 1 across all socio-cultural groups. However, with respect to UX, there was no clear consensus towards one definition across the social-cultural groups, thus different social-cultural profiles had different preferences towards the UX definitions as shown in Table 9. The upper part of Table 9 shows the profiles that rated Definition 2 as being more important. The lower part of table shows profiles that inclined towards Definition 1. UX professionals involved early in system development (SD) or not really involved in SD showed a preference towards Definition 2, while people involved in late stages had a preference towards Definition 1. Professionals in France and Finland had a significantly stronger preference for Definition 2 when compared to Definition 1. People self-evaluating themselves as having expert knowledge on UX had a stronger preference towards Definition 2, however the difference only approaching significance. Top management UX professionals tended to prefer Definition 2, while entry-level professionals inclined towards Definition 1. Similar pattern was observed between people keeping up with the evolution of the UX field and people not keeping up, and between professionals with Master degree and professionals with only Bachelor degree. There were stronger preferences for Definition 2 among those graduated in psychology, business and management, and fields classified as "others". Males, professionals with usability or UX in the job title, and with work experience in the UX positions between 7 and 12 years strongly preferred Definition 2 to Definition 1.

Table 9. Profiles that have a significant or near significant impact on UX definitions preference

Type of profile		Definition 2 preferred to Definition 1		Definition 1 preferred to Definition 2	
	n	*Z*	*p*	*Z*	*p*
Early SD stages involvement	166	-1.96	**0.050**		
Not involved in SD	20	-2.43	**0.015**		
Finland	86	-2.81	**0.005**		
France	64	-4.06	**0.000**		
Expert level of UX knowledge	62	-1.80	0.072		
Does keep up with UX field	355	-2.50	**0.013**		
Usability/UX in job title	192	-2.99	**0.003**		
Top management position	66	-1.81	0.070		
Psychology as graduation field	29	-2.22	**0.026**		
Business and management as graduation field	22	-1.72	0.085		
Other grad fields	101	-2.19	**0.029**		
Master degree	213	-3.19	**0.001**		
Male	213	-2.23	**0.026**		
UX work experience between 7 and 12 years	62	-2.86	**0.004**		
Bachelor degree	118			-1.88	0.061
Entry level position	34			-1.66	0.097
Does not keep up with UX field	46			-1.80	0.071
Late SD stages involvement	19			-2.02	**0.043**

6 Discussion

6.1 Consensus about usability definition across countries and social-cultural groups

There was a clear consensus towards the importance of ISO 9241-11 definition [1] of usability among the UX professionals across all countries and socio-cultural profiles analyzed in this paper. This indicates that the ISO definition of usability, reflecting individual empowerment of end users, is widely accepted and adopted in the UX community as pointed out also in [14].

6.2 Organizational usability and other perspectives on usability

The definition addressing organizational usability [51] was rated clearly less important, however a relatively large number of UX professionals acknowledged the equal importance of both definitions. Moreover, the analysis of open answers showed that the UX professionals wished to extend the ISO usability definition with experience, business, and organization related aspects. This shows that, though the ISO 9241-11 usability [1] is an established concept among professionals, the concept is still evolving. The announced forthcoming changes to ISO 9241-11 by Bevan and colleagues [14] to include organizational perspective are in line with our findings. The references to business, organizational, and customer perspective in the open answers as well as the acknowledged importance of both definitions among some UX professionals show that defining usability by addressing the business benefits starts to become important. Thus, usability starts to be recognized as a success and strategic factor for companies, in line with research on usability cost-benefit analysis models [53,54,55]. Some practitioners have also already adopted the customer perspective, which is in line with the recent emphasis on service design as opposed to physical product design [56].

Moreover, our results indicate that besides organizational usability, situational usability, perceived usability, and hedonic usability [3] featured in the open answers. The variety of attributes in the free-form definitions shows that the diversity in HCI research [17] exists also among HCI practitioners. This has implications on how UX professionals actually operationalize the ISO 9241-11 definition [1] and measure the usability attributes in practice.

6.3 Diversity in UX definitions

There was no clear consensus as regards the UX definition among the UX professionals; however, the preference towards the definition highlighting the experiential qualities during the use of a product [23] was approaching statistical significance when compared to the definition emphasizing system qualities in use [22]. Therefore, UX professionals generally preferred a human-oriented, experiential definition of UX, reflecting more consumer psychology than the work context. This result aligns with the original meaning of UX pointed out in [14,20,21] and with the new emphasis on service design (see e.g., [56]).

We anticipated a stronger preference for the definition reflecting system qualities in use given the fact that these are easier to capture and measure in practice; the results showed that, indeed, certain socio-cultural groups of UX professionals preferred this definition. The comparison between countries showed that Turkey and Malaysia, which represent relatively young UX communities have a stronger preference towards the system-oriented UX definition versus the human-oriented one when compared to Finland and France. However, the preference for the former definition was not statistically significant within the countries, showing quite heterogeneous ratings. On the other hand, both Finnish and French communities showed stronger preferences towards the latter definition.

Further analysis within each socio-cultural group showed that the system-oriented UX definition was preferred by profiles who reported late involvement in system development, and who might not yet have a firmly established foundation of UX knowledge and practice (they were graduates of Bachelor degree, worked in entry-level positions, and did not keep up with the UX field). On the other hand, the definition stressing the experiential qualities was strongly preferred by socio-cultural profiles that reported involvement in early stages of system development or were not really involved, and that had a stronger background in usability and UX studies and work.

These findings may also relate to the organizational culture and background in usability work. Research has reported that organizations tend to start usability and UX work with usability testing in the end (e.g., [57]), while organizations should move towards starting usability and UX work early and continuing it thorough the phases of systems development (e.g., [38, 47]). Thus, the maturity of organizations in terms of UX work, combined with the professional profile of the UX practitioners, would be interesting to examine in relation to the UX understandings of the practitioners.

The free-form definitions of UX revealed an extensive list of attributes. Unlike it was recommended by Bevan et al. [14], UX is viewed by some UX professionals as sharing characteristics with usability by addressing effectiveness, efficiency, and goals. The diversity of attributes assigned to UX by professionals parallels with the divergent discourses on defining UX in HCI (e.g., [4,6,7]). This shows that research efforts of this kind are indeed necessary in order to clarify the true meaning of UX and ways to operationalize it and to measure it.

6.4 Implications for practice and research

This study has implications for interactive systems design and evaluation, as it points out that practitioners should be aware that usability and UX concepts are diverse, while pivotal in achieving the objective of excellence in user interface, quality in use, and service design (see e.g., [15,16,56]). Diversity in the understandings of the UX professionals indicates that there likely is diversity in how UX professionals operationalize usability and UX in practice and in how they strive for high quality usability and UX in their design and evaluation practices. Concepts are still evolving as new dimensions and perspectives emerge; thus, practitioners should keep up with the evolution of the field, and with the practices and conceptualizations adopted by competition.

Our findings showed that our approach of including diversity in the sample in terms of UX community maturity and geographic location was beneficial for understanding

the perspectives and perceptions of both definitions of usability and UX. It is important for practitioners to observe and respond to the global trends across UX communities and countries. We reported also the near-significant results as they may indicate tendencies in the respective community, but also transitions from one perspective to another. Longitudinal studies observing the evolution of views on UX within different socio-cultural groups would confirm or disconfirm the trends. Thus, our research points out that one could trace the development and adoption of usability and UX definitions based on the UX community maturity and geographical location. Further research including other countries would then complete the picture of perspectives and perceptions of usability and UX. Thus, more countries with varying levels of usability and UX history should be included in further analyses to confirm the patterns observed in this study and to provide a mapping of how the field evolves.

Further research should also investigate the implications that adopting one definition or another has on the usability and UX work practices. We plan to extend the analysis to the activities, methods, and tools employed by UX professionals who provided different views on usability and UX. Further research should also examine whether there are differences in usability and UX understanding due to organizational characteristics such as size, type, and culture. This research has not addressed the comparison of views regarding usability and UX, and we plan further analyses to assess the extent to which these views overlap. We plan also to address the time dimension of usability and UX, and the views of UX professionals on this aspect.

7 Conclusion

This paper examined the views of UX professionals on the definitions of usability and UX, and compared the findings between five countries and within different socio-cultural groups. The paper contributes by showing that usability is now an established concept among UX professionals; the respondents across the five surveyed countries recognized the importance of the ISO 9241-11 definition. Moreover, the paper showed that UX professionals increasingly recognize usability as a construct important for the organization, business, and customers, not just for users. The views on UX diverge among different socio-cultural groups when contrasting the experiential qualities with the system qualities in use. Especially UX professionals with a stronger socio-cultural background in usability and UX work preferred the experiential definition.

The paper contributes also by pointing out that UX professionals refer to a variety of characteristics and attributes associated with usability and UX that parallels the struggles in HCI research on finding the best ways to capture the essence of these concepts, as they evolve in time. These findings show that research is still needed on capturing and clarifying the meanings of usability and UX, as well as the implications of this diversity on the UX professionals' design and evaluation practices. Practitioners should be aware of the diversity of usability and UX definitions and adapt their practices to the global trends. We suggest also that further revisions of ISO 9241-11 should make the distinction between usability and UX clearer and firmer, and provide guidelines on using the two concepts in design and evaluation within organisations.

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