

User experience: A concept without consensus? Exploring practitioners' perspectives through an international survey

Carine Lallemand ^{a,b,*}, Guillaume Gronier ^a, Vincent Koenig ^b

^a Public Research Centre Henri Tudor, 29 Avenue John F. Kennedy, L-1855 Luxembourg, Luxembourg

^b University of Luxembourg, ECCS Research Unit, Route de Diekirch, L-7220 Walferdange, Luxembourg



ARTICLE INFO

Article history:

Keywords:

User experience
Survey
Definition
Concept
Practitioners
Usability

ABSTRACT

For more than a decade, User Experience (UX) has grown into a core concept of Human–Computer Interaction (HCI). Practitioners and researchers from a wide range of disciplines are daily working with this concept. However, despite many attempts to understand, define and scope UX, one may still wonder whether a consensus has been reached on this concept. In a willingness to address the complexity of this research topic and bring the concept of UX to maturity, a replication of an international survey has been conducted. The main goal of the present study is to get a better understanding of practitioners' viewpoints on the notion of UX and to analyze potential evolutions over time in the understanding and practical use of the concept. As both practical and theoretical implications of UX are of the greatest importance for whoever designs interactive systems, the exploration of practitioners' perspectives is a valuable step toward continual improvement of UX activities. The present survey has been conducted amongst 758 practitioners and researchers from 35 nationalities. It allows to better understand how this concept is understood and used throughout the world. Amongst interesting results, important differences were observed according to the geographical location and background of the respondents.

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1. Introduction

Some concepts in the field of HCI are commonly used by practitioners even if a lack of empirical research has prevented their full understanding and impact. User experience (UX) could be one of those fashion and fuzzy terms that is increasingly used even though no clear consensus has been reached yet regarding its definition or scope. While some authors question the added value of UX compared to established concepts such as usability, ergonomics or user acceptance (Barcenilla & Bastien, 2009), some also agree that UX is a "truly extended and distinct perspective on the quality of interactive products" (Hassenzahl, 2008).

Since the 2000s, the concept of UX is widely used but understood in different ways (Law, Roto, Hassenzahl, Vermeeren, & Kort, 2009). Many definitions and models have been proposed (Forlizzi, J., 2000; Hassenzahl, 2003; Karapanos, Zimmerman, Forlizzi, & Martens, 2010) without resulting in a true consensus. According to Law et al. (2009), this lack of conceptual clarity can

be explained by the fact that UX is associated with a wide range of fuzzy and dynamic concepts and is used as a generic term combining several HCI notions. Understanding UX thus appears as an important challenge for HCI as it constitutes a first conditional step toward UX measurement and design (Law, Vermeeren, Hassenzahl, & Blythe, 2007). As stated by Fenton and Pfleeger (1997): "you cannot control what you cannot measure and you cannot measure what you cannot define" (p. 14). One of the three pillars of the UX Manifesto, published in 2007 (Law et al., 2007) therefore consisted in answering the question "What is UX?", in particular by studying the basic concepts and assumptions related to UX. Several studies have tried to meet this challenge since. Indeed, research attempts to understand UX have been made following two main approaches: reviewing UX research on the one hand (Bargas-Avila & Hornbæk, 2011; Law, van Schaik, & Roto, 2014), and interviewing or surveying UX professionals on the other hand (Law et al., 2009, 2014; Tokkonen & Saariluoma, 2013). This paper follows the approach of understanding UX by surveying UX professionals. By replicating a UX survey conducted in 2008 by Law et al. we explore what UX is according to UX practitioners.

In the first and upcoming section, we will briefly describe the origins of UX and the attempts made by the research community to understand, scope and define UX. In the second section of the paper, we will describe the methodology used to conduct our

* Corresponding author at: Public Research Centre Henri Tudor, 29 Avenue John F. Kennedy, L-1855 Luxembourg, Luxembourg. Tel.: +352 42 59 91 2923 (office); fax: +352 42 59 91 777.

E-mail addresses: carine.lallemand@tudor.lu (C. Lallemand), guillaume.gronier@tudor.lu (G. Gronier), vincent.koenig@uni.lu (V. Koenig).

replication study. In the third and fourth sections, we will present the results of the survey and summarize the main findings in a topic-based analysis. The fifth section will focus on the comparison between the results of the present study and the results of the original study conducted in 2008. Finally, we will discuss the challenges, successes and limitations of this replication study.

2. User experience: a “Truly Distinct Perspective” beyond usability?

In the 1990s, Donald Norman was amongst the first authors to use the term “User Experience” in order to describe all aspects of a person’s experience with a system (Norman, Miller, & Henderson, 1995). Norman explains he introduced the term UX because he believed “usability” to be too narrow to represent a holistic vision of human-computer interactions. Nearly at the same period, Alben’s paper entitled “quality of experience” (Alben, 1996) put the focus on users’ sensations, their understanding of how things work, their feelings during usage, the achievement of their goals and also on the overall interaction context.

At the theoretical level, UX relies on several trends (Rogers, 2012): activity theory (Kuutti, 1996), distributed cognition (Hollan, Hutchins, & Kirsh, 2000), but also usability studies (Nielsen, 1993; Shackel, 1991) and emotional design (Jordan, 2002; Norman, 2004). Activity theory and distributed cognition have outlined a comprehensive view of user experience as a complex and socially situated phenomenon where technology acts as a mediator between the user and the activity. The user is therefore not considered as a distinct entity, but rather dependent from the context of the entire system, including the environment, the user characteristics and also the technological objects and tools. Interactive systems provide rich and complex functionalities and the quality of UX will of course also rely on their usability. Numerous usability studies from the 1980s (Nielsen, 1993; Shackel, 1991) are indeed the fundamental bases on which the field of UX is grounded. Usability refers to “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (ISO, 1998). In major UX models (Hassenzahl, 2003; Mahlke, 2008), the usability concerns for effectiveness and efficiency were included as “pragmatic” or “instrumental” qualities of a system, whereas the notion of satisfaction has been extended to the one of “hedonic” system’s quality. Finally, emotional design (Jordan, 2002; Norman, 2004) has helped to formalize the link between UX and emotion generation. Indeed, pleasure and emotions generated by the use of products or technological systems, and even the satisfaction of basic needs through technological interactions (Hassenzahl, 2010), are major research topics within the field of UX.

Across the numerous definitions that have been proposed (Desmet & Hekkert, 2007; Hassenzahl & Tractinsky, 2006; Law et al., 2009), researchers and practitioners agree that UX is the result of the interaction between three elements: the user, the system and the context (Roto, Law, Vermeeren, & Hoonhout, 2011). Following this common vision in the field of HCI, Hassenzahl and Tractinsky (2006) define UX as “*a consequence of a user’s internal state, the characteristics of the designed system and the context within which the interaction occurs*” (p. 95). Despite sharing many common grounds with the concept of usability, UX expands it by including emotional, subjective and temporal aspects involved in the interaction. As stated by McCarthy and Wright (2004): “*Experience of technology refers to something larger than usability or one of its dimensions such as satisfaction or attitude.*” (p. 6) While the concept of usability mainly focuses on an objective approach of the interaction, UX is also exploring subjective factors characterizing the experience between human and technology. Some authors even

described UX as a “counter-movement to usability thinking” (Gegner, Runonen, & Keinonen, 2011). However, usability concerns are generally included as parts of UX, often under the title “pragmatic” (Hassenzahl, 2003) or “instrumental” (Mahlke, 2008) aspects of the interaction. UX might therefore offer a holistic approach to understanding human-computer relationship and its underlying experience.

At a higher level, usability and UX are both considered part of User-Centred Design (also called Human-Centred Design), which is defined as “an approach to interactive systems development that aims to make systems usable and useful” (ISO 9241-210, 2010). This process has been first formalized as an ISO standard in 1999 (ISO 13407, 1999) and was at that time only focused on usability. However this major usability standard has been updated in 2010 for the user experience era (ISO 9241-210, 2010) and now includes the concern for UX as one of the six key principles that will ensure that a design is user-centred. More recently, the ever-growing interest and focus on UX has given birth to a novel design process. While User-Centred Design designates the process of designing usable and useful technologies, the term “Experience-Driven Design” or “Experience Design” (Hassenzahl, 2010) is now used to designate the process of designing for UX. The objective of Experience Design is to “is to bring the resulting experience to the fore – to design the experience before the product.” (Hassenzahl, 2013, Section 3.4). Despite the use of a distinct terminology, Experience Design is not mutually exclusive with traditional User-Centred Design. The user’s perspective still remains the central reference of the development process in both cases. As UX goes beyond usability by bringing experiential aspects into the process, similarly, Experience Design goes beyond User-Centred Design by putting more emphasis on the quality of the experience as felt by the user.

As academic and business contexts seem to rely on different practices, understanding the field of UX might be done either by reviewing UX Research or by interviewing or surveying UX Practitioners. On the one hand, from an academic perspective—despite the existence of a variety of perspectives and approaches—some commonalities on UX have nevertheless been summarized in a valuable UX White Paper (Roto et al., 2011). At a generic level, the research community agrees that UX as a phenomenon designates the experience of using an interactive system. Based on the literature, we can assume this experience to be unique to an individual and influenced by several factors, encompassing prior experiences and expectations based on those experiences (Hassenzahl, 2008; Roto et al., 2011). The social and cultural context of the interaction also plays an important role by impacting the felt experience: “UX may change when the context changes, even if the system does not change.” (Roto et al., 2011, p. 10). Finally, the temporal dimension of UX was also highlighted in prominent publications in the field of HCI (Karapanos et al., 2010; Roto et al., 2011), which showed that UX starts way before the direct interaction with a product (e.g., through advertising, experience of related technologies or reading of users’ online reviews) and does not stop just after usage. Time spans of UX have therefore been identified to help thinking about the dynamics of UX (Karapanos et al., 2010; Roto et al., 2011). On the other hand, from a business perspective, studies have shown the heterogeneity of views on the nature and scope of UX (Law et al., 2009, 2014; Tokkonen & Saariluoma, 2013). Practitioners nevertheless tend to agree on the fact that UX is a subjective and dynamic concept, influenced by several contextual factors (Law et al., 2009). Respondents’ background variables were rarely able to significantly explain variations in views on UX (Law et al., 2009). In the next section of this paper, we will provide rationale and further details for our survey on UX Practitioners around the world, done by replicating a previous survey conducted in 2008 (Law et al., 2009).

3. A replication of the survey “understanding, scoping and defining user experience”

We decided to replicate a previous survey entitled “understanding, scoping and defining UX: a survey approach” (Law et al., 2009), for gaining a better insight into how the UX concept might have evolved over time and how it shapes practice. The original study has been first spread during the main conference CHI’08 before being further broadcast through additional communication channels. Results have been published the following year in the proceedings of CHI’09, as a 10-pages long paper. 275 answers had been collected at that time from 25 countries.

In order to facilitate multicultural participation and to reach a wider audience within the French-speaking community of UX practitioners and researchers, we translated all questionnaire items from the English master version to both French and German. A back translation process has been applied to ensure the quality and validity of the process. More than 758 valid answers have been collected from all over the world. Preliminary results have been published in 2013 (Lallemand, Koenig, & Gronier, 2013).

3.1. Rationale for a replication

Several reasons explain our choice to replicate this survey. First of all, as UX is still a concept in maturation, it is worth taking stock of the situation four years after the initial study in order to observe a potential evolution in representations, points of view and practices associated to UX. Replication acts here as a way to check whether the results still apply in a different context to the original study, especially in a different temporality.

Moreover, the translation into two other languages allowed us to reach a wider and more diverse audience, especially in the multicultural context in which the present work took place. As this study constituted an exploratory step within a wider Luxemburgish project focused on UX Design, gathering additional knowledge about the French- and German-speaking practitioners’ community (not well represented in the initial study) seemed crucial to us. By trying to draw an accurate picture of the current situation of UX and building on that basis, we ultimately aim at better methodologies, frameworks and metrics to design for UX.

3.2. Form of replication

This study may be considered as a direct replication, since differences between both studies are limited to:

- A minor extension through the translation into French and German languages. The original English version was kept as default language and still represented 58.4% of the completed surveys.
- Additional items on sociodemographics aimed at better categorizing participants and acting as control variables to analyze the data.

Table 1

UX Definitions used, as drawn from original survey.

D1	All aspects of the end-user's interaction with the company. Its services and its products. The first requirement for an exemplary user experience is to meet the exact needs of the customer without fuss or bother. Next comes simplicity and elegance that produce products that are a joy to own, a joy to use. True user experience goes far beyond giving customers what they say they want, or providing checklist features. [Nielsen & Norman Group, nngroup.com]
D2	A consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.) and the context (or the environment) within which the interaction occurs (e.g. organizational/social setting, meaningfulness of the activity, voluntariness of use, etc.) [Haszennahl & Tractinsky, 2006]
D3	The entire set of affects that is elicited by the interaction between a user and a product including the degree to which all our senses are gratified (aesthetic experience) the meanings we attach to the product (experience of meaning) and the feelings and emotions that are elicited (emotional experience). [Desmet & Hekkert, 2007]
D4	The value derived from the interaction(s) [or anticipated interaction(s)] with a product or service and the supporting cast in the context of use (e.g. time, location, and user disposition). [Sward D. & G., 2007]
D5	The quality of experience a person has when interacting with a specific design. This can range from a specific artifact such as a cup toy or website up to larger integrated experiences such as a museum or an airport. [UXnet.org]

3.3. Structure of the survey

The UX questionnaire encompasses 3 sections:

- (1) Background: in this first section, respondents were asked to answer 13 questions about their job and educational background, their level of familiarity with UX or the importance of UX in their current job. Finally, sociodemographic information (age, gender, country of residence) was also collected. As mentioned before, one of the main differences between the initial study and its replication consists of additional sociodemographic questions allowing better categorizing respondents. The following questions have therefore been added to the initial survey: current job position, level of familiarity with the concept of UX and collaboration with people working in the field of UX (in case UX was not central at all to their own job).
- (2) UX Statements: respondents were asked to assess their agreement level with 23 UX Statements on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Possibility was also given to select the answer “I don't understand” when they felt that a statement was not clear enough for them to take a stand. Statements were formulated similarly to the following example: “*User experience should be assessed while interacting with an artifact*”. See complete list of statements in Section 4.2.
- (3) UX Definitions: Five UX definitions were presented (Table 1). For each of them, respondents were asked to answer the following open-ended question “What do you think of this definition?” Finally, respondents were asked to choose which definition suits them best (“If you had to pick one of these UX definitions, which one would it be?”) and to freely comment on the reasoning for their choice. These open-ended questions aimed at providing participants with a free space to express their view on the topic and to discuss the definitions. It was expected to provide us with valuable information on how participants define and scope UX. It allows for both identifying a range of issues not previously conceptualized through the UX Statements and knowing what the requirements are for a useful UX definition.

3.4. Sampling and diffusion of the survey

The survey was broadcast online from February to April 2012, on multiple advertisement channels. As for the original study, practitioners’ forums, social networks and mailing lists were the main vector of dissemination.

With regard to sampling requirements, this exploratory survey did not involve a strictly random and representative sample. As the whole population of practitioners working in a field related to UX is not clearly defined, we decided to simply broadcast the survey

on the web. This allowed reaching a wide audience in line with the primary exploratory goal of the study. It also provided us with information on which kind of practitioners declare working in the field of UX. However, we are aware of several biases potentially impacting our results, especially the fact that only self-motivated and careful respondents would answer the questionnaire. Moreover, this method does not allow controlling either the absolute coverage of our advertisement or the relative coverage with regard to the target population.

3.5. Participants

A total of 898 questionnaires have been collected and 758 valid questionnaires have been used for computing the data. Invalid questionnaires mainly resulted from bugs in the online survey system (automatic log off after a period of inactivity) or incomplete answers. A questionnaire had to be filled out at least to the 4th question (demographics on current job position) to be considered valid, 569 participants (75% of valid questionnaires) provided their agreement level with at least one of the UX statements. 428 participants (56.5% of valid questionnaires) have picked a definition. Due to these differences in survey completion amongst our respondents, we draw the reader's attention on the fact that sample sizes in the results analyses will vary according to the number of participants having completed each survey section. We used SPSS software 22 to perform statistical analyses.

The mean age of the sample was 35.8 years ($Min = 21$, $Max = 70$, $SD = 9.4$), encompassing 44.3% of females ($n = 320$) and 55.7% of males ($n = 403$). 58.4% of the respondents have answered the English version of the questionnaire, against 39.2% for the French version and only 2.4% for the German one. Thirty-five distinct nationalities are represented, with a majority of Europeans (61.9%), especially coming from France (34.7%). North Americans represent 25.4% of the respondents, Asians 5.7% and less than 3% of participants come from other geographical areas.

4. Results

We will first provide the reader with a linear description of the main results of the survey, organized following the three questionnaire sections: Background, UX Statements and UX Definitions. In this section the reader learns more about the respondents' profile, their level of familiarity with the concept of UX or the reasons why they are interested in understanding the nature of UX. We will also describe the levels of agreement of our respondents with the 23 UX Statements. Finally, we will report on which of the five UX definitions the participants preferred and analyze their open answers to understand what they expect from a useful UX definition.

In a second section, we will explore the study's main outcomes through a topic-based analysis in order to better understand how UX professionals perceive several facets of UX. This topic-based analysis will use the survey results to answer the following questions:

- Is UX a new approach?
- What are the links between UX and previous/related fields like usability or user-centered design?
- Is there a need for a standardized definition of UX?
- How to approach UX: quantitatively or qualitatively?
- Is UX individual or social?
- What shapes UX? user-related factors? contextual factors? a temporal dynamic?

Finally, in a third section, we will compare our results to those obtained in 2008 by Law et al. (2009) and investigate a potential

evolution in the understanding of the UX concept. Our respondents' agreement levels on UX statements and choice of a UX definition will be compared to the results collected in 2008.

4.1. Background, domain and role

Regarding their educational background ($n \text{ valid} = 755$), two-thirds of the respondents were primarily educated in Psychology/Social Sciences (24.1%), Technology/Software (22.3%) or HCI (16%). The remaining third encompasses Design (14.3%), and other training backgrounds (Arts, Marketing, Business, Info/Comm., and Miscellaneous). The general profile of the respondents is presented in Table 2 using the same format as the original study in order to facilitate the comparison between both studies (presented in Section 6).

The distribution of respondents according to their business domain or role is presented in Table 3. A majority of them are working in industry (66.4%). The distribution of the sample according to roles is quite balanced, although managers and students are less represented. Without having accurate data on the distribution of people working in the field of UX across the population, the ratios related to all of these roles might reflect the reality on the field. In any case, the relatively large sample size allows us to draw conclusions related to each category of respondents.

4.1.1. Level of familiarity with the concept of user experience

On average, respondents have 6.53 years of experience in the field of UX ($SD = 6.45$) and 6.44 years ($SD = 6.24$) in the overall field of User-Centered Design (both measures being obviously highly correlated with $r = .83$, $p < .01$).

The level of familiarity with the concept of UX ($n \text{ valid} = 743$), self-assessed by the respondents on a 10-points scale, scored

Table 2
General profile of the respondents.

Variable	Frequency	Valid percent (%)
<i>I work in (n valid = 758):</i>		
Industry	503	66.4
Academia	100	13.2
Both or between	155	20.4
<i>My primary role is (n valid = 758):</i>		
Researcher	128	16.9
Consultant	199	26.3
Manager	80	10.6
Practitioner	278	36.7
Student	73	9.6
<i>I was originally educated in the field of (n valid = 758):</i>		
Arts	37	4.9
Design	105	13.9
Marketing	12	1.6
Business	30	4
Quality/Processes	5	0.7
Psychology/Social Sciences	164	21.6
Technology/Software	149	19.7
Human-computer interaction	116	15.3
Other	140	18.5
<i>Which applies the best to your primary interest in UX? (n valid = 755, 3 missing)</i>		
I'm interested in understanding the nature of UX:		
Per se	98	13
To design better products	392	51.9
To better sell products	28	3.7
To make people happier	161	21.3
Other	76	10.1
<i>How central is UX to your professional work? (n valid = 752, 6 missing)</i>		
Very central		
Very central	438	58.2
Central	193	25.7
Less central	89	11.8
Not central at all	32	4.3

Table 3

Distribution of respondents according to their business domain and role.

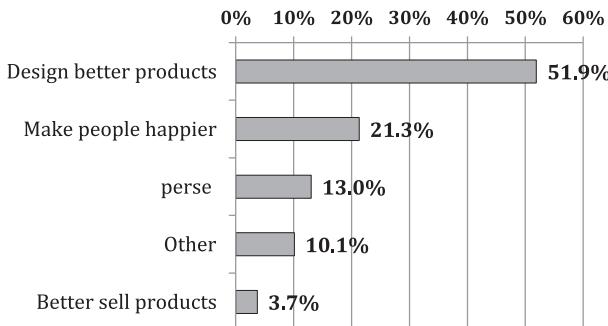
Role	Domain			Total
	Industry	Academia	Both or between	
Researcher	27	60	41	128 16.9%
Consultant	159	0	40	199 26.3%
Manager	64	4	12	80 10.6%
Practitioner	243	5	30	278 36.7%
Student	10	31	32	73 9.6%
Total	503	100	155	N = 758
	66.4%	13.2%	20.4%	

7.91 on average ($SD = 2.29$). 1.3% of the respondents declared having never heard about this concept and were therefore thanked for their participation and immediately filtered out of the survey, before reaching the UX Statements section. Note that this high average level of familiarity might be explained by the open advertisement of the survey, where only the most motivated participants decided to answer the survey. It is thus safe to assume we captured personal opinions about what is important in UX for people who really are and feel involved in this topic.

We conducted one-way between subjects ANOVAs to compare the effects of domain and role on the level of familiarity with UX. The extent of familiarity was assessed as higher in Industry ($M = 8.13, SD = 2.19$) than in Academia ($M = 6.80, SD = 2.47$) or Both or Between ($M = 7.90, SD = 2.29$), $F(2, 740) = 14.09, p < .001, \eta^2 = .04$ (inter-group differences tested by post hoc analyses significant at $p < .001$ level). This might be explained either by the fact that scientists are more cautious when dealing with "familiarity" regarding a concept still in evolution; or maybe also because practitioners tend to use it more often in their daily practice, resulting in actually higher familiarity. The same tendency holds for the roles: consultants are most familiar with the concept ($M = 8.38, SD = 2.08$), followed by practitioners ($M = 8.08, SD = 2.11$), managers ($M = 7.69, SD = 2.52$) and researchers ($M = 7.58, SD = 2.47$). Not surprisingly, least familiar with UX are the students ($M = 6.75, SD = 2.46$), $F(4, 738) = 7.94, p < .001, \eta^2 = .04$ (inter-group differences tested by post hoc analyses significant at $p < .001$ level). This observation might confirm some authors' belief (Law et al., 2014) that there is a need for enhanced education and training in UX. Regarding the language, an independent-samples t -test was conducted to compare the effects of language on the level of familiarity with UX. The concept of UX is more familiar to English-speakers ($M = 8.36, SD = 1.96$) than French-speakers ($M = 7.25, SD = 2.53$), $t(743) = 6.69, p < .001, \eta^2 = .06$. It is worth noting that French-speaking respondents assessed, on average, their familiarity level under the global mean of the sample. Familiarity level also correlates with years of work experience ($r = .35, p < .001$), and only weakly with age ($r = .12, p = .001$).

4.1.2. Primary interest for UX and importance of UX

UX is considered "central" or "very central" to their professional work by 83.9% of respondents. Only 4.3% of them declare that UX is not central at all to their professional work, however 40.6% collaborate with someone working in the field of UX. We conducted one-way between subjects ANOVAs to compare the effects of role and domain on the importance of UX. Once again, UX appears less central for researchers ($M = 2.16, SD = 0.86$) and students ($M = 2.08, SD = 1$) than for managers ($M = 2.54, SD = 0.76$), consultants ($M = 2.48, SD = 0.81$) or practitioners ($M = 2.44, SD = 0.83$), $F(4, 747) = 6.18, p < .001$. Unsurprisingly, UX is considered much more central in Industry ($M = 2.48, SD = 0.81$) or Both or between Industry and Academia ($M = 2.35, SD = 0.81$) than in Academia

**Fig. 1.** Interest in understanding the nature of UX.

($M = 1.93, SD = 0.89$), $F(2, 749) = 17.96, p < .001, \eta^2 = .046$. All inter-group differences were tested by post hoc analyses and significant at $p < .001$ level.

Looking at the reasons why our respondents are interested in UX (Fig. 1), a majority of them are interested in UX to design better products (51.9%), and, unsurprisingly, this holds particularly true for practitioners in Industry. On the other hand, in Academia, respondents are more interested in UX per se, as an object of study ($\chi^2 = 22.56, p < .01$).

4.2. UX statements

To analyze participants' answers to UX Statements (ST), we first computed descriptive statistics (minimum, maximum, mean and standard deviation) and ranked the 23 statements according to their mean level of agreement (a score of 1 being the minimum level of agreement and a score 5 the highest). Table 4 presents the UX statements sorted by mean agreement. This is what we will refer to as "agreed statements" in the following sections.

Out of twenty-three Statements about UX, seven collected a mean higher than 4 out of 5 (which corresponds to a level of agreement ranging from "agree" to "strongly agree"). Considering the statements this applies to, it seems that the respondents agree on the importance of a user's internal state, his past experiences, goals and needs, and also on the importance of the context in which the artifact is experienced. We noticed also that usability and User-Centered Design remain closely related to UX and are described as its basis. Conversely, while the majority of statements lead to an average score corresponding to a level of agreement ranging from "neutral" to "agree", the respondents disagreed on average with two of the statements. Thus, no confusion is made between UX and emotional attachment ($M = 2.71, SD = 1.14$). Similarly, UX is not considered as a marketing concept ($M = 2.38, SD = 1.13$).

The average rate of non-understandability (i.e., percentage of respondents choosing to tick "I don't understand" for a statement) was 2.84%. The level of comprehensibility can therefore be considered sufficient. As for the initial study, Statement n° 02 (ST02) collected the highest level of non-understandability with an average rate of 8.3%. No differences were found for the non-understandability rate between the three versions of the survey (one-way between subjects ANOVA), which reflects a sufficient quality of the French and German translations.

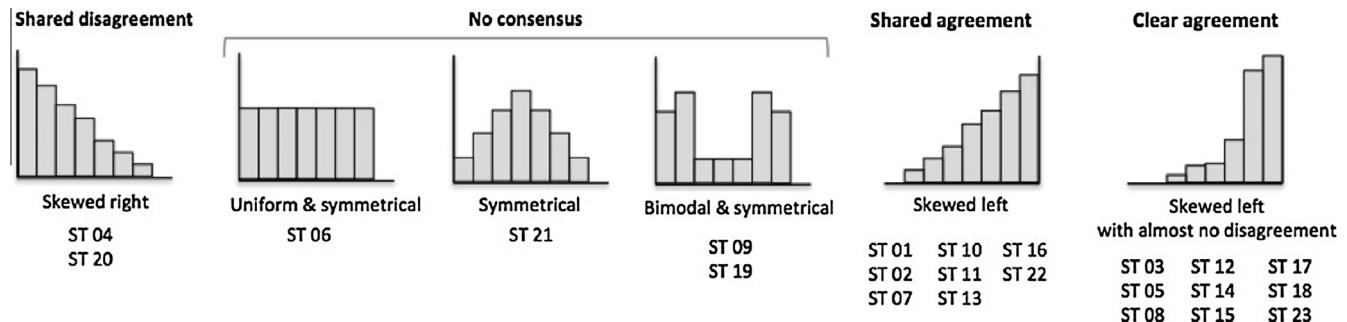
When looking at the frequency distribution of answers among the five agreement levels, it is possible to distinguish several groups of statements according to the shape of their distribution graph. This allows a better and more accurate understanding of participants' opinions on the statements.

Fig. 2 summarizes the statements' distribution graphs according to four tendencies: (a) almost uniform and symmetrical graphs

Table 4

Statements about UX sorted by mean agreement.

	N	Min	Max	Mean	Std. Dev.
[ST03] Fleeting and more stable aspects of a person's internal state (e.g., needs, motivations) affect a person's experience of something	565	1	5	4.54	.63
[ST05] UX occurs in, and is dependent on the context in which the artefact is experienced	561	1	5	4.34	.91
[ST18] Designing (for) UX must be grounded in User-Centred Design	549	1	5	4.29	.83
[ST8] Prior exposure to an artefact shapes subsequent UX	552	1	5	4.21	.78
[ST12] Usability is a necessary precondition for good UX	560	1	5	4.15	.99
[ST14] Measuring UX implies determination of merits, values, and significance of an artefact in relation to a person's goals and needs	539	1	5	4.12	.76
[ST17] UX should be assessed while interacting with an artifact	556	1	5	4.02	.86
[ST13] We cannot design UX, but we can design for UX	531	1	5	3.96	1.08
[ST23] UX can change even after a person has stopped interacting with the artefact	545	1	5	3.96	.87
[ST1] UX is highly dynamic – it changes constantly while interacting with a product	576	1	5	3.93	1.01
[ST15] UX refers to affective states, i.e., any combination of valence (good–bad, pleasant–unpleasant) and physiological arousal (calm–excited)	534	1	5	3.89	.89
[ST02] Imagined use of a product can result in real experiences	524	1	5	3.80	1.06
[ST07] There is a definite need for a standardized definition of the term UX	568	1	5	3.71	1.07
[ST22] UX must be approached qualitatively	561	1	5	3.66	.99
[ST16] UX can be quantified and thus compared across similar (or competitive) artefacts	553	1	5	3.62	.96
[ST11] UX is based on how a person perceives the characteristics of an artefact but not on the characteristics per se	539	1	5	3.56	1.12
[ST06] UX is not about people's performance (ability to understand and use) in their relation with an artefact, but about the person's perception of that performance	564	1	5	3.47	1.22
[ST10] UX should be assessed after interacting with an artifact	550	1	5	3.44	1.19
[ST21] UX is not new, it is already covered by existing engineering approaches	552	1	5	3.14	1.11
[ST19] Only an individual person can have an experience. An experience is something personal. Something 'within' a person	560	1	5	3.14	1.23
[ST09] People will never have comparable UX – each and every interaction with a product results in a unique experience	566	1	5	3.02	1.16
[ST20] UX is equal to emotional attachment	547	1	5	2.71	1.14
[ST04] UX is best viewed in terms of marketing	561	1	5	2.38	1.13

**Fig. 2.** UX statements (ST) sorted by frequency distribution of answers. The statements are classified according to four global types of frequency distribution: shared disagreement, no consensus, shared agreement or clear agreement.

showing no clear consensus (b) skewed right graphs showing shared disagreement (c) skewed left graphs showing shared agreement (d) skewed left graphs with almost no disagreement at all showing clear agreement. In some cases, background variables seem to impact the evaluation of these UX Statements. Independent-samples *t*-test were conducted to compare the effects of language, gender and domain on the level of agreement with one or several UX statements.

Regarding language, 9 significant differences (out of 23 potential differences) were found (ST 04, 07, 09, 15, 17, 18, 19, 22, 23). French-speaking respondents ($M = 3.95$) felt a higher need for a standardized definition of UX than their English-speaking counterparts ($M = 3.54$), $t(545) = -4.51$, $p < .01$, $\eta^2 = .036$. Similarly, UX is more likely to be considered a marketing concept in French-speaking countries ($M = 2.69$) than in English-speaking ones ($M = 2.17$), $t(546) = -5.41$, $p < .01$, $\eta^2 = .051$. Such differences could be explained by the greater familiarity with the concept of UX that was first developed in Anglo-Saxon countries.

Significant gender differences could be observed in only 3 statements out of 23 (ST03, ST06, ST07), which confirms previous work

(Law et al., 2009) by showing that opinions do not contrast sharply according to gender. Educational background significantly impacted UX Statements in 5 cases out of 23 (ST06, ST08, ST19, ST20, ST22).

Regarding the domain, some differences contrast academic and corporate environments (Industry) (5 significant differences out of 23). These relate in particular to the view of UX as a marketing concept, more pronounced in Academia (ST04; $M = 2.8$ vs. $M = 2.26$ in Industry), $t(439) = -4.03$, $p < .01$, $\eta^2 = .028$. On the other hand, Industry ($M = 2.96$) less agrees on the uniqueness of lived experience than Academia ($M = 3.21$), ST09; $t(443) = -1.78$, $p < .05$, $\eta^2 = .006$. Surprisingly, it is rather in Industry that one considers UX should be addressed in a qualitative manner (ST22; $M = 3.70$ vs. $M = 3.51$ in Academia), $t(439) = 1.90$, $p < .05$, $\eta^2 = .005$.

Finally, bivariate correlations analyses were performed in order to study the degree of relationship between agreement with UX statements and demographic variables such as age and work experience. The number of years of work experience in the field of UX is negatively correlated with many statements (ST 04, 06, 07, 08, 11, 14, 15, 20, 22). It is worth noting that the more experienced we are,

the less we consider UX from a qualitative standpoint (ST22; $r = -.18$, $p < .01$) and dependent of users' perceptions (ST11; $r = -.16$, $p < .01$). The more experienced respondents also feel less need for a standardized definition of UX (ST07; $r = -.16$, $p < .01$), probably because they are using the concept for a long time and have gone through an appropriation process. Unsurprisingly (because Age and Work Experience are highly correlated), similar findings hold true regarding the differences between respondents according to their age (7 significant correlations out of 23). We can notice negative correlations between Age and ST 04, 11, 15, 22, 23. On the other hand, Age is positively correlated with ST 08 and 19.

Further results related to UX Statements will be examined following a topic-based analysis in Section 5.

4.3. UX definitions

4.3.1. Choice of a UX definition

The authors of the initial study had selected five UX definitions to be presented to the participants (Table 1), different in terms of perspectives on UX and highlighting distinct aspects of UX (see Law et al., 2009 for more details).

In the present study, 428 respondents indicated which of the five definitions they preferred (Table 5). Definition 2 (D2), focused on what shapes UX, was selected in about a third of cases (31.1%), while D5 and D1 still collected a lot of votes, with respectively 25.2% and 20.1% of the opinions. The less preferred definition is undoubtedly D4 with only 7% of the votes. This latter definition puts the focus on value as an interaction outcome.

Among our respondents, the choice of a definition was correlated to socio-demographic factors. Thus, there are differences in the choice of a UX definition depending on the domain (Fig. 3) ($\chi^2 = 21.67$, $p = .006$), explaining 5% of the total variance in the data ($\Phi^2 = 0.05$). Respondents from industry ($n = 270$) mostly choose D1 and D5, while their academic counterparts ($n = 65$) mostly supported D2 and D3. Respondents qualifying themselves as working for both or between industry and academia tend to favor D2 and D4.

Table 5

Distributions of the preferred definitions in our study.

	D1	D2	D3	D4	D5
Total	86	133	71	30	108
% out of 428	20.1%	31.1%	16.6%	7%	25.2%

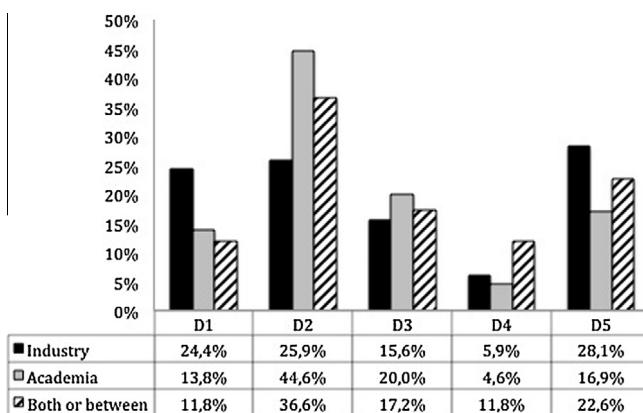


Fig. 3. Choice of a UX definition according to the domain.

Table 6

Choice of a UX Definition according to the Role. Numbers represent frequencies.

	D1	D2	D3	D4	D5	Total
Researcher	12	27	22	4	12	77
Consultant	16	30	12	11	32	101
Manager	15	10	5	3	14	47
Practitioner	38	47	27	8	39	159
Student	5	19	5	4	11	44
Total	86	133	71	30	108	428

Those results seem in line with the origins of the UX definitions presented to the participants. D2 and D3 are academic definitions (Desmet & Hekkert, 2007; Hassenzahl & Tractinsky, 2006), whereas D1 and D5 originate in Industry.

Differences of opinion also exist depending on the role ($\chi^2 = 30.27$, $p = .017$), explaining 7% of the variance ($\Phi^2 = 0.07$). Results from Chi-square tests confirm that researchers and students tend to choose D2 and D3. Practitioners preferred D1, whereas consultants preferred D4 and D5. Finally, managers preferred D1 and D5 (Table 6).

Similarly, educational background also explains 7% of the variance in the choice of a UX definition ($\chi^2 = 26.32$, $p = .05$, $\Phi^2 = 0.07$) (Table 7).

Significant differences in the choice of a UX definition seem also to depend on the language in which the survey was answered ($\chi^2 = 8.14$, $p = .43$), which explains 1.9% of the total variance ($\Phi^2 = 0.01$). English-Speaking participants preferred D1 and D3, whereas French-Speaking participants tend to choose D2, D4 or D5 (Fig. 4). No statistics were calculated regarding respondents who answered the survey in German, as their sub-sample ($n = 9$) was too small to allow for statistical comparison.

Gender, interest in UX or the fact that UX is central to the activity of the respondents do not appear significant in the choice of a UX definition, as opposed to age, $F(4,422) = 7.38$, $p < .001$, $\eta^2 = .065$, and years of experience in the domain of UX, $F(4,405) = 3.87$, $p = .004$, $\eta^2 = .037$. Respondents preferring D2 are

Table 7

Choice of a UX definition according to the educational background. Numbers represent frequencies.

	D1	D2	D3	D4	D5	Total
Design/arts	19	18	11	8	20	76
Business/marketing	13	6	6	0	8	33
Psychology/soc.	15	41	14	7	27	104
Technology/SW	16	30	23	5	24	98
HCI	11	24	6	4	18	63
Total	74	119	60	24	97	374

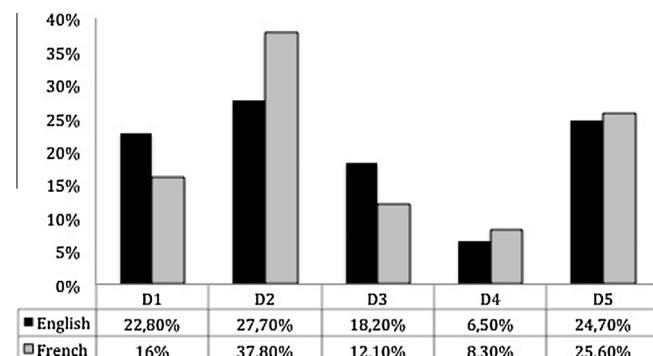


Fig. 4. Choice of a UX definition according to the language in which the survey was answered.

on average younger ($M = 32.7$, $SD = 8.1$) than respondents preferring D4 ($M = 39.2$, $SD = 12.5$) or D1 ($M = 38.4$, $SD = 9.65$). Similarly, respondents preferring D2 have on average less experience in the domain of UX ($M = 5.32$, $SD = 5.70$) than respondents preferring D4 ($M = 8.80$, $SD = 7.35$) or D1 ($M = 8.65$, $SD = 7.63$).

The qualitative analysis of answers to the open-ended questions, “*What do you think of this definition?*” specifically shed light on the elements an acceptable definition of UX should include and how it should be formalized. A synthesis of most frequent comments, as expressed by the participants, has been made and is presented in the following.

4.3.2. What should a good definition of UX highlight?

4.3.2.1. Focus on the user. According to the respondents, a good UX definition should definitely be focused on the user. D4 particularly drew criticism for not mentioning the user: “*not a very good definition; it lacks a clear focus on the user.*” Conversely, respondents liked D3 for being “*much more user-centric, which is the way to go when talking about UX*”. User’s goals and user’s affective and emotional states are highlighted as crucial aspects to be included in a UX definition.

Conversely, many respondents stated that a UX definition should not relate to companies or marketing and therefore should not use the word ‘customer’ to designate the user (“*UX is not necessarily about marketing a product. It’s much larger.*”). D1 drew criticism for being too focused on business while participants also disliked the use of the word ‘product’ in D3. Similarly, the notion of ‘value’ used in D4 was more associated with Service Design than with UX.

4.3.2.2. Interplay of factors. Respondents mostly see UX as a multi-dimensional concept. Thus, UX professionals are looking for a definition able to encompass several aspects of the interaction, accounting for the complexity of UX. Respondents especially liked the interplay of factors involved in D2, while they found D3 “*way too focused on emotions*”. System-related aspects, contextual aspects, social-aspects as well as temporality were often cited as important to mention in any good UX definition.

4.3.2.3. Components and results of UX. Participants further commented that a good UX definition should both mention the components of UX and the results (outcomes) of an experience. D2 was typically understood as a description of the main elements composing UX, while D3 was seen as a “*post-UX definition, only focusing on the results*”. Some participants suggested combining D2 and D3 in order to have a broader and more comprehensive definition of UX.

Regarding the outcomes of UX, respondents often deplore that the five definitions included in the survey tend to describe only what a positive UX would be. Participants underlined the fact that UX might be positive or negative, and that the latter should not be avoided.

4.3.3. How should a good definition of UX be formulated?

4.3.3.1. Definition’s length. UX professionals agree on the fact that a good UX definition should be short enough to be easily understandable and memorisable, while at the same time being detailed enough to encompass every important UX-related aspect. D1 for example was often described as “*too long*” or “*way too wordy*” while D4 was described as “*too short*”, “*only encompassing the bare minimum*” or even “*too brief to be comprehensive*”. Similarly, D2 was criticized for entailing too many brackets, making it hard to read and understand. One of the participants even stated, “*if you have that many (e.g.) in a single sentence, your sentence is probably not clear enough.*”

4.3.3.2. Definition’s wording. Many participants would enjoy having a user-friendly UX definition. The words used within the definition should be accurate and clear. A UX definition should not entail terms or concepts that are vague and make things even less understandable. As an illustration, the notions of ‘value’ or ‘supporting cast’ evoked in D4 are criticized for being “*vague*” or “*obscure*”. Defining a complex concept by using even more complex concepts definitely leads to an unusable definition. Similarly, respondents deplore the fact that D5 defines UX by the too generic wording ‘*quality of experience*’, which is actually a statement of the obvious.

4.3.3.3. Definition’s scope. Respondents underlined that the scope of a UX definition should neither be too restrictive (because UX is commonly defined as holistic) nor should it be too large in order to be distinct from other related concepts (such as usability for example). D4 is for example described as “*far too narrow*”, “*too simplistic*” and “*incomplete*”, therefore “*leaving out some important points*”. On the contrary, D2 drew criticism for lacking precision. While a majority of respondents agree that D2 mentions the three main elements of an interaction (i.e., user, system, and context), many respondents pinpointed the fact that D2 could as well be a definition of usability or user-centred design in general. Regarding D3, respondents are unhappy with the fact that “*it reduces UX only to the affective part of the interaction*”.

Moreover, respondents feel also concerned by the universality of a UX definition, which should not be focused on a specific type of product or service. D2 was appreciated because it “*works for many different applications*” and “*feels more universal*”. Similarly, D5 was described as “*applicable across a broad range of experiences*”. D3 was disliked for only using the word ‘product’ and omitting the ‘service’ aspect of UX.

4.3.3.4. Definition’s aim. Many respondents feel the need for a definition that would allow translating the concept into practice. D2 is thus described as “*too academic*” and “*too far away to support a business case or development of a product/service*”. It is seen as “*descriptive, but providing little direction as to what exactly should be done*”. Similarly, D3 was described as “*too conceptual and intellectual*”. Several respondents believed D3 to describe “*an experience, but it does not indicate how the designer fits into the experience. It is not designed, just experienced*”. Participants also often mentioned the issue of measurability of UX as being a main concern for UX professionals.

Finally, regarding the question why we should consider having pragmatic definitions, one of the respondents states, “*a good definition – if we have to have one at all, needs to be easy to ‘sell’ to the community that will use it!*”.

5. Topic-based analysis

5.1. Is UX a new approach? (ST 21)

Conversely to Hassenzahl’s (2008) famous assumption “UX is not just old wine in new bottles”, our respondents do not, on average, consider UX as a new approach. Their rating of the statement “UX is not new, it is already covered by existing engineering approaches” is globally neutral ($M = 3.14$, $SD = 1.11$). Country of residence is one of the only background-related variables a one-way between subjects ANOVA shows a slight significant difference on that statement, $F(542, 6) = 3.80$, $p < .001$, $\eta^2 = .04$. Continents that less agree with the statement are Europe ($M = 3.03$, $SD = 1.12$) and North America ($M = 3.12$, $SD = 1.08$). They are opposed to Oceania ($M = 3.61$, $SD = 1.09$), Africa ($M = 3.67$, $SD = 0.58$), Asia ($M = 3.71$, $SD = 1.08$), South America ($M = 3.72$,

$SD = 0.83$) and Middle East ($M = 4, SD = 0.82$). The occidental origin of the UX concept and its progressive geographical spread may explain those differences. Regarding possible links with other statements, results show several positive (however quite low) correlations with statements focused on related fields or concepts, as ST04 "UX is best viewed in terms of marketing" ($r = .14, p < .001$), ST12 "Usability is a necessary precondition for good UX" ($r = .11, p = .013$) or ST20 "UX is equal to emotional attachment" ($r = .24, p < .001$). This is not surprising considering the fact that, if one thinks UX is not a new approach, then one might more likely think of it as related to other concepts.

5.2. What are the links between UX and previous/related fields? (ST 04, 12, 18, 20, 21)

According to our respondents, UX is undoubtedly rooted in User-Centered Design and Usability. The first assumption (i.e., UX is rooted in UCD) is in the top three statements regarding the level of agreement: "Designing (for) UX must be grounded in UCD" ($M = 4.29, SD = 0.83$). Moreover, usability is seen as "a necessary precondition for good UX" by 81.4% of participants ("agree" or "strongly agree") ($M = 4.15, SD = 0.99$). Definition D2, which is the most agreed upon definition, also emphasizes this link with usability and UCD by stating that UX would be "*the consequence of a user's internal state, the characteristics of the designed system and the context within which the interaction occurs*". The three classical pillars of usability and UCD (user, system and context of use) are thus used here, highlighting a close link between usability and UX.

On the one hand, considering UX as rooted in UCD seems compliant with the academic literature. As mentioned in the first section of this paper, UCD and UX Design are not mutually exclusive and share both the primary concern to incorporate the user's perspective into the development process and several methods to achieve this goal (Maguire, 2001). On the other hand, considering usability as a precondition for good UX would basically mean that a positive experience might not occur unless the system is easy to use. It is noteworthy that studies have shown that perceived usability might be influenced by more subjective factors, as aesthetics (Tractinsky, Katz, & Ikar, 2000) or hedonic qualities of the system (Thüring & Mahlke, 2007). Conversely to what respondents stated, usability would therefore not be a precondition for good UX (at least in the conditions explored by those cited studies) and UX-related factors like aesthetics or hedonic qualities might even significantly influence perceived usability.

5.3. Is there a need for a standardized definition of UX? (ST 07)

The starting point of this study was the apparent lack of consensus on what UX is. Considering the diversity of UX definitions, from both business and academic worlds, it is interesting to wonder whether a single and standardized definition of UX should really be a reason for concern.

It seems that the need for a standardized definition of UX is felt differently amongst different cultures and levels of expertise. Thus, if Statement 07 collects a rather neutral agreement score ($M = 3.71, SD = 1.7$), it is interesting to notice that French-speaking participants ($M = 3.95$) feel a higher need for a standardized definition compared to their English-speaking counterparts ($M = 3.54, t(545) = -4.51, p < .01, \eta^2 = .036$). The delayed emergence of the UX concept in French-speaking countries might explain a difference in the appropriation of UX, and therefore, a higher need for a definition that could act as a guidance.

Similarly, the most experienced practitioners feel less need for a standardized definition of UX (ST07; $r = -.16, p < .01$). It seems that with progressing experience and increasing integration of UX into

business processes, experts have developed their own understanding of this concept and do not need a shared view on this topic any more. As outlined in the Manifesto for UX (2007), a standardized UX definition would in fact mostly contribute to communicate on UX, to teach this concept and to progress in this field of research. An agenda for UX research and practice has been published in 2010 (Law & Van Schaik, 2010) and focuses primarily on the need to model UX. It seems however that this concern is more relevant to academia as practitioners are more likely to think that UX should be approached in a qualitative way ($M = 3.70$ vs. $M = 3.51$ for researchers), $t(439) = 1.90, p < .05, \eta^2 = .005$.

5.4. How to approach UX: quantitatively or qualitatively? (ST 16, 22)

On the question whether UX should be approached quantitatively or qualitatively, no clear answer emerged out of the survey. Respondents agree on both the statements that "UX must be approached qualitatively" (ST22; $M = 3.66, SD = 0.99$) and that "UX can be quantified and thus compared across similar (or competitive) artifacts" (ST16; $M = 3.62, SD = 0.96$). As mentioned above, Industry ($M = 2.96$) less agrees on the uniqueness of lived experienced than Academia ($M = 3.21, t(443) = -.78, p < .05, \eta^2 = .006$). This means that respondents in Industry tend to believe more in the comparability of peoples' experiences than respondents in Academia. Surprisingly, it is rather in Industry that one considers that UX should be addressed in a qualitative manner (ST22; $M = 3.70$ vs. $M = 3.51$ in Academia), $t(439) = 1.90, p < .05, \eta^2 = .005$. As underlined by Law et al. (2014), UX practitioners might lack training to master quantitative measurement methods. Moreover, we could also assume that they might favor qualitative approaches because of end-user recruitment issues or the common use of "guerilla" usability methods, which involve similar techniques to traditional usability methods with however a more quick-and dirty, informal approach.

Following these results, it is worth comparing these self-reported views on the qualitative versus quantitative aspects with other research on actual UX practice. Interesting research papers give us some clues to understand the reality of UX research and practice. In their review on empirical research on UX, Bargas-Avila and Hornbaek (2011) showed that among 66 empirical studies, half were qualitative, while researchers used quantitative methods in 33% of the cases and combined approaches in 17% of the cases. By comparing their results to Barkhuus and Rode's review (2007), they also show an apparent shift in Academia from quantitative methods to qualitative methods. More recently, Law et al. (2014) conducted both interviews and a survey to collect attitudes toward UX measurement. The outcomes of their study allowed them to build a synthesis of arguments for and against UX measurement. Here again, no clear consensus emerged and respondents mentioned distinct pros and cons for both qualitative and quantitative UX assessment methods. Some participants described quantitative measures as useful to convince decision makers to modify a problematic design, whereas others highlighted the easiness to derive alternative design ideas from qualitative UX feedbacks.

5.5. Is UX individual or social? (ST 09, 19)

On average, respondents agree on the fact that "only an individual person can have an experience" (ST19; $M = 3.14, SD = 1.23$). However, professionals' opinions are more balanced regarding the assumption that "people will never have comparable UX" (ST09; $M = 3.02, SD = 1.16$). The frequency distributions of answers among the five agreement levels on these two statements are almost bimodal and symmetrical, which means that participants have an opinion about this question (neutral answers are not fre-

quent), but there is no consensus. For example, 43.1% disagree or strongly disagree with ST09, while 37% agree or strongly agree with the same statement (20% of the respondents being neutral).

In the literature, UX might be sometimes studied as a social experience, when for example a group of people is experiencing together. By introducing the notion of "co-experience", [Battarbee \(2003\)](#) and [Battarbee and Koskinen \(2005\)](#) underlined how the meanings of individual experiences emerge and change, as they become part of social interaction. However, we believe this is not contradicting the statement that "only an individual person can have an experience" as it is the meaning attached to the experience, and not the fact of having lived the experience, that changes in a social context. The presence of people sharing the experience at the same time is therefore one of the contextual factors shaping UX.

5.6. What shapes UX?

5.6.1. Does UX depend on user-related factors? (ST 03, 14, 15, 11)

Several statements included in the survey aimed at collecting UX professionals' opinions on which factors they believe are impacting UX. Among the suggested factors, those related to the users seem to reach consensus. Thus, ST03 is the statement showing the highest level of agreement (ST03; $M = 4.54$, $SD = 0.63$): 94.7% of respondents either agree or strongly agree on the fact that "Fleeting and more stable aspects of a person's internal state affect a person's experience of something". Similarly, we observe a shared agreement on ST14 ($M = 4.12$, $SD = 0.76$), ST15 ($M = 3.89$, $SD = 0.89$) and ST11 ($M = 3.56$, $SD = 1.12$).

In the original paper, [Law et al. \(2009\)](#) explained this tendency by referring to [Preece, Rogers, and Sharp \(2002\)](#) who stated that "user experience goals differ from the more objective usability goals in that they are concerned with how users experience an interactive product from their perspective rather than assessing how useful or productive a system is from its own perspective." ([Preece et al., 2002, p. 19](#)).

This might therefore explain why our respondents believe that "We cannot design UX, but we can design for UX" (ST13; $M = 3.96$, $SD = 1.08$). UX professionals are actually designing systems or products meant to trigger a specific type of experience but they are not designing the experience in itself.

5.6.2. Does UX depend on contextual factors? (ST 05)

In addition to user-related factors, UX experts also agree that contextual factors strongly contribute to shape UX. The second most agreed upon statement "UX occurs in, and is dependent on the context in which the artifact is experienced" exemplifies this point of view (ST05; $M = 4.34$, $SD = 0.91$). These outcomes, along

with the choice of D2 as the preferred UX definition, seem to confirm that the classical usability triad user-system-context (ISO 9241–210, 2010) still remains relevant in the context of UX.

5.6.3. Are there temporal dynamics of UX? (ST 08, 17, 23, 01, 02, 10)

As stated in the User Experience White Paper ([Roto et al., 2011](#)), there seem to be several time spans of user experience, depending on the moment of usage. The respondents globally agree on the fact that "UX is highly dynamic and changes constantly when interacting with a product" ($M = 3.93$, $SD = 1.01$). The temporal dynamics of UX therefore seem to reach consensus amongst the respondents ([Fig. 5](#)).

A majority of them acknowledge the existence of an anticipated UX where "imagined use of a product can result in real experiences" (ST02; $M = 3.80$, $SD = 1.06$) and "prior exposure to an artifact shapes subsequent UX" (ST08; $M = 4.21$, $SD = 0.78$). Momentary UX (the one that is experienced during usage) seems to be favored against Episodic UX (evaluated after usage). Respondents therefore agree on the fact that UX should be assessed "while interacting with an artifact" (ST17; $M = 4.02$, $SD = 0.86$) more than "after interacting with an artifact" (ST10; $M = 3.44$, $SD = 1.19$). Finally, the notion of Cumulative UX computed by the recollection of multiple periods of use also succeeds to reach a consensus among the respondents. Hence, they are likely to agree on the fact that "UX can change even after a person has stopped interacting with the artifact" (ST23; $M = 3.96$, $SD = 0.87$).

6. What are the trends and changes of the UX concept? Comparison between original and replicated survey

6.1. Sampling comparison

As sampling differences might have an impact on the comparability of the results between this study and the original survey broadcast in 2008, it is important to study the structure of both samples.

First of all, the sample size in the current study is almost three times bigger than the one used in 2008. At that time, 275 answers from 25 countries had been collected whereas we collected 758 answers from 35 countries. Vectors of dissemination for both surveys were quite similar (mailing list, conference attendees, professional networks).

In 2008, the geographical distribution was mainly focused on Finland (17.4%), USA (15.6%), UK (13%) and the Netherlands (11.6%). In our study, the main nationalities represented are France (33%), USA (20.8%) and UK (7%). The Netherlands only represents 2% of our respondents. It is important to note that the better coverage of French-speaking respondents was among the main goals of this replication study.

[Table 8](#) presents a comparison between the distributions of respondents according to other background variables. The first main difference between the two samples regards the domain and role. Thus, while Industry represents more than half of the sample in both cases, Academia was much more represented in 2008 (26.2%) than in 2012 (13.2%). Consequently, this is also reflected by the percentage of researchers, which was higher in 2008 (37.8%) than in 2012.

Regarding the respondents' educational background, we can observe two main differences. There are more respondents trained in the field of Arts/Design in 2012 (18.8%) than in 2008 (12.2%) and fewer respondents educated in the field of HCI in 2012 (15.3%) than in 2008 (24.8%).

In both surveys, more than half of the respondents declared their interest in understanding the nature of UX to design better products. This therefore remains the main concern of UX

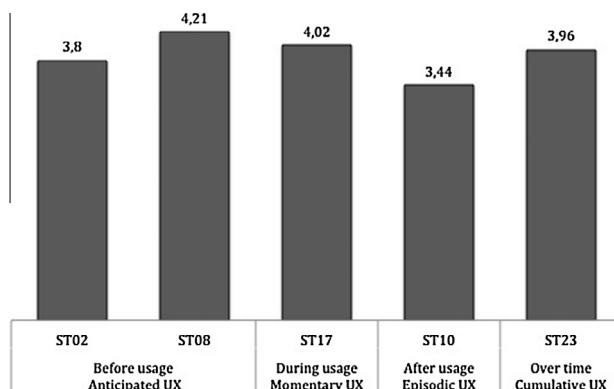


Fig. 5. Time spans of user experience: mean agreement of time-related statements.

Table 8

General profile of the respondents: comparison between the initial and the present surveys.

Variable	Initial study (%)	Current study (%)
<i>Domain</i>		
Industry	51.1	66.4
Academia	26.2	13.2
Both or between	22.6	20.4
<i>Role</i>		
Researcher	37.8	16.9
Consultant/manager	26.1	36.9
Practitioner	19.4	36.7
Student/other	16.7	9.6
<i>Educational background</i>		
Arts, design	12.2	18.8
Psychology/social sciences	22	21.6
Technology/software	18	19.7
Human-computer interaction	24.8	15.3
Other	23	24.8
<i>Interest in understanding UX:</i>		
Per se	18.5	13
To design better products	55.4	51.9
To make people happier	14	21.3
To better sell products/other	12.2	13.8
<i>How central is UX to your work?</i>		
Very central	56.8	58.2
Central	36	25.7
Less central/not central	7.2	16.2

professionals. In the initial survey, a bigger ratio of respondents were interested in understanding the nature of UX per se than in the present study (18.5% vs. 13% respectively). As this concern is typically related to UX research, it might be explained by the higher ratio of respondents from Academia in the initial study. Finally, the willingness to make people happier through the understanding of UX has increased from 14% of the respondents in 2008 to 21.3% of the respondents in 2012.

Regarding how central UX is to the respondents' work, we observe in both studies a very high ratio of respondents declaring that UX is very central (56.8% and 58.2%). However, we can notice that a considerable percentage of respondents in 2012 declare UX to be less central or not central at all to their work (16.2%). This ratio was much lower in 2008 (7.2%). We suggest two main explanations: first, the dissemination of the survey in 2012 might have reached a broader population than the initial survey, thus explaining the presence of respondents for whom UX is less central to their work. Another sound explanation might also be that UX has become more popular so that even people who will not define themselves as UX professionals have become familiar with this concept and have been willing to provide their point of view on this topic.

To summarize, in comparison to the sample used in 2008, our sample is bigger in size and involves more French respondents. The proportion of practitioners (vs. academics) is higher than in the initial study.

6.2. Comparison regarding UX statements

The comparison between the rankings of the UX statements sorted by mean agreement shows a very similar ranking pattern between the present study and the initial one. Statements ST03, ST05, ST18 and ST08 rank highest on mean agreement, whereas ST04 and ST20 ranked lowest on mean agreement in both surveys.

Despite the overall closeness of statements' mean scores, we can still observe some changes regarding the ranking of some statements. First of all, the need for a standardized definition of UX (ST07) seems more prominent in the present study (ranked

13 out of 23; $M = 3.71$, $SD = 1.07$) than in the original one (ranked 17 out of 23; $M = 3.49$, $SD = 0.7$). This might be explained by a difference in sampling (see previous section for sampling comparison) or by the fact that some professionals feel that they need such a definition to better communicate on UX. Similarly, the respondents in the present study agree more on the assumption that "usability is a necessary precondition for good UX" (ST12; ranked 5 out of 23 in 2012 vs. 11 out of 23 in 2008). This observation is quite unexpected considering the fact that UX research ([Thüring & Mahlke, 2007](#); [Tractinsky et al., 2000](#)) has shown that the links between usability and UX seem not to comply with this assumption. We could have expected a better dissemination of UX research into Industry over time. It seems however this goal remains difficult to achieve.

On the other hand, we observe a decrease in ST11 "UX is based on how a person perceives the characteristics of an artefact, but not on the characteristics per se". This statement was the 6th most agreed upon statement in 2008 and is only ranking 13th in 2012. We could assume that the concept of UX was first mostly associated to user-related aspects (e.g., values, affects, emotions). The evolution of UX design methods and the better understanding of UX in general might lead the professionals to think that "the characteristics of the system per se" are able to support UX in a consistent way.

6.3. Comparison regarding UX definitions

The comparison between the initial and the current study regarding the choice of a preferred UX definition is presented in Fig. 6.

First, it is worth noting that D2 remains the first chosen definition with approximately a third of overall participants' votes. The main evolution regarding UX definitions regards D5, with a percentage of votes increasing from 17% in 2008 to 25.2% in 2012 (+8.2%). This increase in D5 comes mostly at the expense of D3, which drops from 21% in 2008 to 16.6% in 2012 (-4.4%). Finally, D4 and D1 also collected less votes in 2012 than in 2008 with a decrease of approximately 2% for each.

We suggest two hypotheses to explain this evolution. First, our sampling has a higher ratio of practitioners from Industry and we saw in the previous section that they tend to favor D5. Second, the evolution might also be explained by the fact that UX has become more popular and is therefore applied in a wide variety of contexts. D5 is an easy-to-understand definition that confers an extremely broad scope to UX and might therefore unite numerous respondents.

Now that we have presented and discussed all results, it is worthwhile reflecting on the challenges, successes and limitations of this replication study.

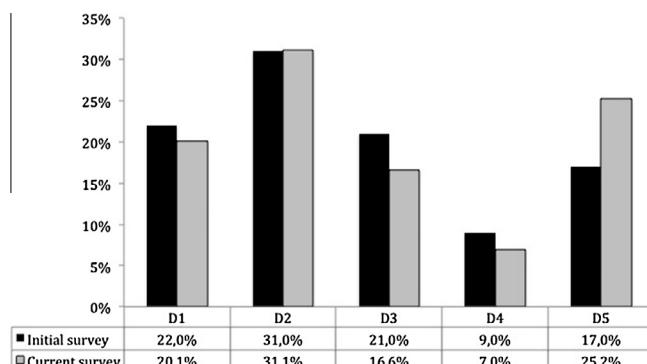


Fig. 6. Evolutions in the choice of a preferred UX definition.

7. Challenges and limitations of the replication

7.1. Volatility of concepts in the field of HCI

Repeating a conceptual survey presents inherent challenges due to the relative volatility of some concepts and notions developed in HCI, but also due to the volatility of both humans and technology. Driven toward novelty and innovation, some terms used in this research field tend to emerge as popular trends and fade away quickly without having been really analyzed through the lens of empirical research. Some authors in HCI suspect that it could have been the case for UX, which is often used as an umbrella term to designate a wide range of fuzzy and dynamic concepts such as affects, hedonism or aesthetics (Roto et al., 2011). Moreover, after 4 years of intensive use by both practitioners and researchers, it was challenging to repeat a survey aimed at the basics and the definition of UX. We encountered for example the case of a group leader on LinkedIn who refused to broadcast the study claiming that it was now useless because every good practitioner knows what UX is, even though he was unable to provide an accurate definition of UX, himself. Fortunately, beyond this single case, the replicated survey has been received warmly by the community, which demonstrates the need and openness to reflect and examine the concept of UX once again, in a new temporal context. Understanding and validating previous findings seemed nevertheless highly valuable and our approach succeeded in analyzing the maturational process of the UX concept.

7.2. Language and translation of material

When working in a non-English speaking country, replication (or even partial use of existing tools only) generally involves the translation of those tools into the native language of the users composing the target population and sample. The administration of a questionnaire in the native language of respondents allows to provide them with a better understanding of the items and to decrease the rate of people being excluded or who abort due to language difficulties. However, translating a survey may become very complex when dealing with conceptual topics (as it is the case here), which already involve several ambiguous items (whether intended or not by their authors) in their original version. The present study was translated into German and French. Even if a back translation process has been used to verify the reliability of the translation, it is not yet sure whether concepts were understood precisely the same way across different languages (and maybe even across different respondents for the same language). To overcome this difficulty when computing the data, we also compared the level of non-understandability of the items (respondents had the option to check "I don't understand"). Being almost similar for each language and similar to the level found in the original study, the translation was considered fairly reliable.

7.3. Comparability of the results: Sampling and advertisement of the survey

Replicating a research work dealing with the definition of a concept implies reaching a comparable sample both in terms of sample size and demographics. This however, is a difficult task to achieve, given this exploratory study does not involve a random and representative sample. As the whole population of practitioners working in a field related to UX is not clearly defined, it was decided to simply broadcast the survey on the web. We were aware that several biases might have impacted previous results (and may also impact ours), especially the fact that only self-motivated and careful respondents would answer the questionnaire.

Moreover, it was impossible to accurately know neither the number of people touched by the advertisement of our survey (probably several thousands), nor the coverage of the target population. However, every research design choice has strengths and weaknesses. The diffusion method chosen for the original study has clear advantages in terms of reaching a wide audience, which fulfilled the primary exploratory goal of the study and provided us with information on what kind of practitioners declare working directly or indirectly on topics related to UX. We succeeded in reaching an international sample larger than the original one ($N = 758$ in 2012 vs. $N = 275$ in 2008) but still almost equivalent in characteristics. The larger sample size had two main advantages: first it allowed detecting more subtle differences in the understanding and perceptions of the notion of UX according to background variables; second it allowed detecting societal evolution related to the field of HCI (e.g., an increase in the number of UX practitioners from Asia, Middle-East or Africa).

7.4. Limitations highlighted in the original survey design

Replicating research implies repeating a study exactly the way it has been conducted the first time. It is however close to impossible to design studies without any limitation and thus most studies present some limitations, highlighted by the authors or not, that need to be copied for the sake of replication. We emphasize this aspect for it is a peculiar activity in research to design a study with full awareness of limitations one could address if the study was not a replication study. This indeed seems counter-intuitive to the constant strive for progress, but ultimately, due to the need for solid replication in science, leads to more solid progress. In the case of the UX Survey, we noticed some possibilities for improvement regarding the survey design (e.g., reduction of the number of items, rephrasing of ambiguous UX statements, rotation/counterbalancing of items or the modification of open-ended questions). These improvements could have been done quite easily with a new pre-testing phase involving a limited set of participants. For the sake of replication however, no major change has been implemented with regard to the original study and the only revision regarded a slight extension of the study (cf. Section 3.2).

8. Conclusion

By replicating and extending a previous UX survey, we intended to gain further insight into the maturational process of the UX concept. We also aimed at validating previous findings almost taken for granted by the HCI community (e.g., uniqueness of an experience, influence of the context, or temporal dynamics of UX). Despite some challenges and difficulties to overcome, replication of such a survey appeared valuable and highly interesting for the community.

Regarding the levels of agreement with the 23 UX Statements included in the survey, our results largely confirm previous findings. Respondents agree on the importance of both user-related factors and contextual factors as important variables shaping UX. The temporal dynamic of UX also reached consensus amongst the respondents. It is also worth noting that the assessment of Momentary UX (while interacting with an artifact) was favored against Episodic UX (evaluated after usage). Conversely to what respondents declared in 2008 (Law et al., 2009), our respondents believe that UX is not a new concept and that "it is already covered by existing engineering approaches", undoubtedly rooted in User-Centred Design and usability. On the question whether UX should be approached quantitatively or qualitatively, no clear answer emerged out of the survey. Similarly, respondents do not share a clear view on UX being individual or social. In some cases, back-

ground variables seem to impact the evaluation of these UX Statements. Amongst them, domain, role, language and years of experience had the greatest impact while gender differences were rarely significant, which confirms previous work by showing that opinions do not contrast sharply according to gender (Law et al., 2009).

The choice of a UX definition was influenced by several factors, including the language in which the survey was answered, respondents' age, educational background, domain, role and years of experience in the UX domain. It also seems that the need for a standardized UX definition (ST07) is felt differently amongst different cultures and levels of expertise. French-speaking participants feel a higher need for a standardized definition compared to their English-speaking counterparts. Similarly, the most experienced practitioners feel less need for a standardized definition of UX. We can therefore wonder why and whether we need a standardized definition? On the one hand, previous authors have highlighted the need for such a definition in order to help teaching and disseminating the UX concept (Law et al., 2014). On the other hand, practitioners have pinpointed their desire to keep a diversity and freedom in their practices. According to our respondents, a good UX definition should definitely be focused on the user. It should not relate to companies or marketing and therefore should not use the word *customer*. UX practitioners are also looking for a definition able to encompass several aspects of the interaction, accounting for the complexity and multidimensionality of UX. A good UX Definition should both mention the components of UX and the outcomes of an experience. Participants also underlined the fact that UX might be positive or negative and definitions should therefore not be focused on positive UX only. Regarding the formulation of a good UX definition, it should be short enough to be easily understandable and memorisable while at the same time detailed enough to encompass every UX-related aspect. The words used within the definition should be accurate and clear. The scope should neither be too restrictive nor too large. Finally, respondents feel the need for a definition that would allow translating the UX concept into practice. As one can see, practitioners expressed high expectations regarding a UX definition and one can wonder whether it is possible to specify a unique definition fulfilling all these requirements. It might indeed not be possible to provide a standardized definition for both practitioners and researchers from all fields and providing them with different definitions, able to fulfill their specific needs, might be a promising solution?

Another main difference between Academia and Industry was pointed out by our results and regards the level of familiarity with UX, which appears to be significantly higher in Industry than in Academia. Similarly, UX is considered to be much more central in Industry than in Academia. This could suggest that UX originated as a business concept before finding its way into research and theoretical bodies. While UX practitioners are interested in understanding the nature of UX to better design products, researchers are more interested in UX per se, as an object of study. As mentioned earlier, the choice of a UX definition was also influenced by the domain and role of the respondents.

Finally, the concept of UX definitely opens numerous valuable perspectives for the HCI domain. Nevertheless, many questions also remain unanswered, both at a theoretical or a methodological level. Several initiatives have been launched to structure and support the development of UX at the academic level (Law & Van Schaik, 2010; Law et al., 2007). The results of the present study contribute to this objective. By trying to draw an accurate picture of the current situation of UX and building on that basis, we ultimately aim at better methodologies, frameworks and metrics to design for UX. The better understanding gained of practitioners' perspectives is a necessary step toward continual improvement of UX activities. The numerous differences observed between Industry and Academia clearly indicate that there is however still

a gap between both perspectives. A better integration of theories and practice should thus be a primary goal, undoubtedly leading to a win-win situation for both Academia and Industry. On the one hand, UX research should be better taught to students around the world as they represent the next generation of UX practitioners. On the other hand, UX research should thrive on practice to better answer the needs and expectations of the UX industry and also provide practitioners with solid and valid tools needed when assessing or designing for UX.

9. Conflict of Interest

No conflict of interest.

Acknowledgments

The present project is supported by the Fonds National de la Recherche, Luxembourg (n° 1205972). The authors would like to thank all the authors of the initial survey, especially Effie C. Law, Virpi Roto and Marc Hassenzahl, for their availability and support.

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