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An Empirical Study of User Experience on Touch Mice

Jyh-Rong Chou
I-Shou University, TAIWAN

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The touch mouse is a new type of computer mouse that provides users with a new way of touch-based environment to interact with computers. For more than a decade, user experience (UX) has grown into a core concept of human-computer interaction (HCI), describing a user's perceptions and responses that result from the use of a product in a particular usage context. This paper presents an empirical study of UX on touch mice via the user experience questionnaire (UEQ) survey, the purpose of which is to uncover how target users perceive the selected touch mice after interacting with them. A total of 20 university students were recruited as target users to participate in the UX test to perform defined tasks with the 6 selected touch mice under the Windows 8 operating environment. The experimental results can help researchers understand how users perceive and value such new type of computer mouse, thus ensuring positive UX and leading to more desirable touch mice.

Keywords: user experience, touch mouse, user experience questionnaire (UEQ), empirical study

INTRODUCTION

A computer mouse is a peripheral device used to control a cursor in two dimensions in a graphical user interface (GUI). It typically features two buttons and a scroll wheel, which can also act as a third button. Over the past few decades, the computer mouse has become one of the most effective input devices when interacting with computers, and there have been a lot of relevant studies concerning the use of computer mouse, particularly in the ergonomic (e.g., Card et al., 1978; Delisle et al., 2004; Lin & Tsai, 2015; Müller et al., 2010; Onyebeke et al., 2014) and educational (e.g., Donker & Reitsma, 2007; Lane & Ziviani, 2010) fields. With the popularity of smartphones, tablets, and many types of information appliances, touchscreens have been being commonly used for users to interact with GUIs on the screen. Microsoft Windows 8 released in 2012 has also provided a new GUI that supports both desktop and touch devices. The touch screen has often been declared as more intuitive and convenient than traditional input devices. As its control interface overlays the monitor, there is no need for such extra devices as the mouse, which needs a space-occupying carrier and operating environment. Moreover, the touch screen is much more robust and durable as compared with other mobile input

Correspondence: Jyh-Rong Chou,
Professor & Chairman of Department of Creative Product Design I-Shou University
No.1, Sec. 1, Syuecheng Rd., Dashu District, Kaohsiung City 84001,TAIWAN, R.O.C.
E-mail: jrchou@isu.edu.tw

devices (Albinsson & Zhai, 2003). Despite the aforementioned advantages, it is not completely superior to the mouse in terms of operational performance (Forlines et al., 2007; Kin et al., 2009; Sears & Shneiderman, 1991; Wu et al., 2011). In keeping with the touchscreen trend, the touch mouse, a new type of computer mouse, offers a blending for input and manipulation that is halfway between a traditional mouse and touch screen. This new type of computer mouse enables users to use touch gestures such as press, pinch, slide, tap, and swipe to enhance their interaction with the computer. Touch-based interaction with computing devices nowadays is becoming more and more common. However, there is relatively little empirical research in the area, particularly on the use of touch mouse. The use of computer mouse refers to interacting with computers through a mouse device, which can be regarded as a human-computer interaction (HCI) system. The recent shift of emphasis in the field of HCI from usability testing to experience eliciting has instigated a series of research activities in understanding and defining user experience (UX) (Lallemand et al., 2015; Law et al., 2008, 2009). UX is a multidimensional concept and various definitions have been proposed in the literature. According to ISO 9241-110:2010, UX is defined as ‘‘a person’s perceptions and responses that result from the use and/or anticipated use of a product, system, or service’’. Hassenzahl and Tractinsky (2006) argued that the concept of UX attempts to go beyond the task-oriented approach of traditional HCI by bringing out aspects such as beauty, fun, pleasure, and personal growth that satisfy general human needs but have little instrumental value. UX is a term used to describe a user’s perceptions and responses that result from the use of a product, system, or service in a particular context of use. The perceptions and responses can be physical, psychological, or both, while the context can be a momentary, episodic, or cumulative. Although a diversity of UX models have been developed during the past decade (Desmet & Hekkert, 2007; Hassenzahl & Tractinsky, 2006; Law & van Schaik, 2010; Park et al., 2013; Zhou & Jiao, 2013), there is still a lack of systematic research on how to measure UX (Väänänen-Vainio-Mattila et al., 2008; Vermeeren et al., 2010). Most existing guidelines on UX measures are based on traditional usability metrics (Tullis & Albert, 2008). However, usability tests tend to focus on objective task performance whereas UX focuses on subjective lived experiences (Kaye, 2007).

State of the literature:

- The computer mouse has become one of the most effective input devices when interacting with computers and there have been a lot of relevant studies concerning the use of computer mouse in the ergonomic and educational fields.
- The touch mouse is a new type of computer mouse that provides users with a new way of touch-based environment to interact with computers.
- The user experience questionnaire (UEQ) has been recognized as a validated instrument which covers comprehensive UX dimensions measuring both classical usability aspects (efficiency, perspicuity, and dependability) and UX aspects (novelty and stimulation).

Contribution of this paper to the literature:

- This paper presents an empirical study of user experience (UX) on touch mice to uncover how target users perceive the selected touch mice after interacting with them on the Windows 8 operating environment.
- This study applies the User Experience Questionnaire (UEQ) to collect users’ respondent data and analyze their actual experience and perception of using the touch mice.
- The results can help researchers understand how target users perceive and value such new touch-based interaction devices, thus ensuring positive UX and leading to more desirable products of touch mouse.

UX is considered a key quality of interactive products on today’s competitive mass markets and is of growing popularity in both academia and industry. It generally involves experiential, affective, meaningful, and valuable aspects of product use, and can be regarded as a sum of momentary constructions that grow from the interaction of users with their environments. These constructions may be affected by several strands that include, but are not limited to, compositional, sensory, emotional, spatiotemporal, and interaction-based factors (Battarbee & Koskinen, 2005).The touch mouse provides users with a new way of touch-based

environment to interact with computers while UX is concerned with the encounters a user has while interacting with products, systems, and services. Within this context, this paper presents an empirical study of user experience on touch mice using a self-report questionnaire instrument. The results can help researchers understand how users perceive and value such new interactive products, thus ensuring positive UX and leading to more desirable products of touch mouse.

METHOD

Subjects

A total of 20 university students were recruited as target users to participate in the empirical study. These subjects consisted of 10 females and 10 males, ranging in age from 20 to 24 years (Mean=20.85, S.D.=0.988). Each subject received remuneration (NT$ 300 per student) as compensation for the time and effort he/she spent participating in the empirical study. All participants are right handed users and were required to have familiarity with the Windows 8 operating system in order to ensure experimental variables being equitable and objective.

Experimental Design and Materials

Six touch mice were selected as product samples for measuring the UX of these alternative products. The UX experiment conducted in a laboratory at I-Shou University aimed at uncovering how target users perceive the selected touch mice after interacting with them. A SONY VAIO laptop with a 15.5" Full HD display and the Windows 8.1 operating system was used as the test platform for the UX experiment. The drivers and gesture software for each · tested mouse were pre-loaded into the system. The product samples and experimental environment for the UX test are shown in Figure 1.

The Windows 8 touch language includes: press and hold to learn, tap for primary action, slide to pan, swipe to select, pinch and stretch to zoom, turn to rotate, swipe from edge for app commands, and swipe from edge for system commands. Referring to the Windows 8 user experience guidelines created by Microsoft, the UX test comprises 8 tasks as given in Table 1.

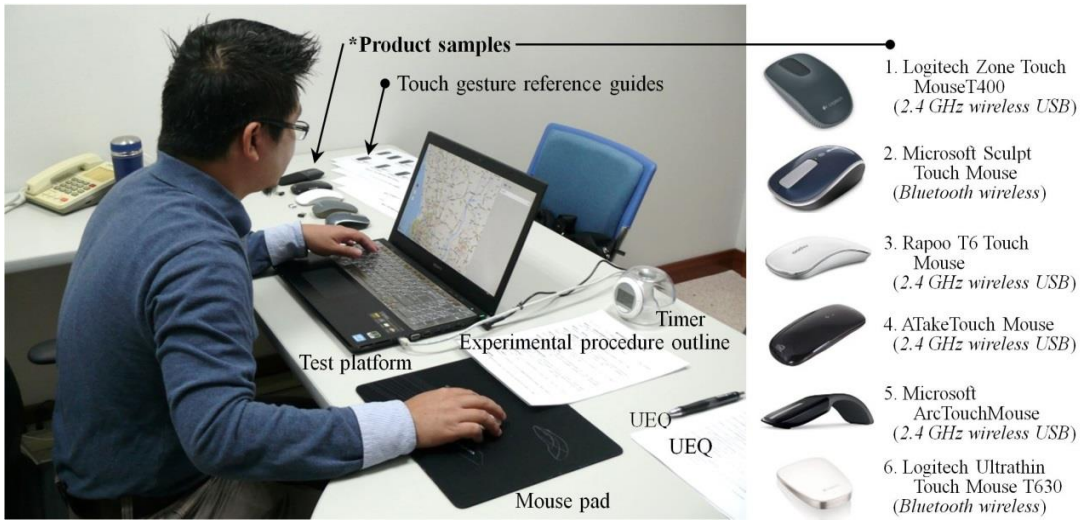


Figure 1.Product samples and experimental environment for the UX test

Questionnaire Survey

Generic subjective UX measure methods include interviews, questionnaires, surveys, storytelling, etc. In this study, the User Experience Questionnaire (UEQ)

was employed as UX instruments for the UX measure. The UEQ was developed by Laugwitz et al. (2008) through a data analytical approach. It is a validated tool and has been widely used for measuring the UX of interactive products (Cota et al., 2014; Rauschenberger et al., 2013; Schrepp et al., 2014). The UEQ is based on a hierarchical structure of UX constructs. It consists of 6 dimensions, each dimension of which comprises 4 or 6 sets of bipolar items as shown in Table 2.

The UEQ is based on the semantic differential format designed to cover a comprehensive impression of user experience, measuring both classical usability aspects (efficiency, perspicuity, and dependability) as well as UX aspects (novelty and stimulation). As shown in Appendix A, the UEQ consists of 26 items and the order of positive and negative worded terms for each given item was randomized in the questionnaire. It employs a 7-point scale to gather respondents' ratings for each perceptual item and support immediate responses to express feelings, impressions and attitudes toward the use of a product

Table 1. Designated tasks for the UX test

	Task	Description
1	Scrutinizing the mouse (about 2 minutes)	Read the experimental procedure outline and the evaluated mouse's touch gesture reference guide and then scrutinize the mouse before use, including its appearance, size, weight, materials, etc.
2	Installing the mouse (about 1 minute)	Install the mouse and connect it to the laptop through the USB receiver or wireless Bluetooth.
3	Browsing maps (about 4 minutes)	Open the built-in Maps App from the Start screen and search for the location of the 8 designated cities (Kaohsiung/I-Shou University, Bangkok, Paris, London, New York, Tokyo, Beijing, and Taipei/Taipei 101 in order) by using the mouse (employing the zooming and panning functions).
4	Creating a folder (about 1 minute)	Create a new folder on the Windows desktop and move it to the upper-right corner of the screen (employing the right-click and drag-and-drop functions).
5	Copy and paste operations (about 2 minutes)	Copy a paragraph of text from the designated Adobe PDF file and paste it into a Word document (employing the left/right button clicking, holding, and dragging functions).
6	Image inserting and file saving operations (about 2 minutes)	Insert a designated image (the evaluated product sample) into the Word document and save the document (using the serial number of the tester plus the sample number as the file name) to the created folder (employing the left/right button clicking and touch gesture scrolling functions).
7	Sending emails (about 2 minutes)	Send the document file (using the tester's own webmail account) to the assigned email address.
8	Finishing the tasks (about 1 minute)	Delete the folder and then disconnect the wireless mouse from the laptop.

Procedure

The UX test required subjects to perform defined tasks and each product was tested for about 20 minutes (including 5 minutes for the questionnaire responses) for a total testing time of approximately 2 hours per subject. Before the UX test began, the experimenter provided a summary of the procedure. Each subject was asked to perform the 8 designated tasks with each of the selected touch mice. After finishing the testing tasks, the UEQ was immediately given to the participants. The participants were instructed to respond to the questions according to their actual experience and perception of using the product samples.

Data Analysis

The UEQ employs a 7-point scale ranging in score from -3 to 3 to gather respondents' ratings for each perceptual item. The negative worded terms (Items 3, 4, 5, 9, 10, 12, 17, 18, 19, 21, 23, 24, and 25) were transformed so that the higher the numerical value the more positive a subject's impression was in the perceived situation. After collecting the rating data of the questionnaire responses, the

reliability analysis was employed to assess the internal consistency of the UEQ scales. The statistics including the means, standard deviations, and confidence intervals were then used to interpret the UX test results.

Table 2.Structure of the UEQ

Construct	Dimension	Description of question	Bipolar item
General impression toward the product	Attractiveness	Do users like or dislike the product?	enjoyable-annoying
			good-bad
			pleasing-unlikable
			pleasant-unpleasant
			attractive-unattractive
			friendly-unfriendly
Pragmatic quality	Perspicuity	Is it easy to understand how to use the product? Is it easy to get familiar with the product?	comprehensible-incomprehensible
			easy to learn-difficult to learn
			simple-complicated
			clear-confusing
	Efficiency	Is it possible to use the product quickly and efficiently? Does the user interface look organized?	fast-slow
			efficient-inefficient
			practical-impractical
			organized-cluttered
	Dependability	Does the user feel in control of the interaction? Is the interaction with the product secure and predicable?	predictable-unpredictable
			supportive-obstructive
			secure-insecure
			meets expectations-does not meet expectations
Hedonic quality	Stimulation	Is it interesting and exciting to use the product? Does the user feel motivated to use the product again?	valuable-inferior
			exiting-boring
			interesting-not interesting
			motivating-non-motivating
	Novelty	Is the design of the product innovative and creative? Does the product grab the user's attention?	creative-dull
			inventive-conventional
			leading edge-common
			innovative-conservative

RESULTS

Reliability was evaluated by assessing the internal consistency of the UEQ scales. The Cronbach's alpha coefficients of the instrument were classified as shown in Table 3. Most single scales showed high consistency values except the Dependability dimension for Sample 3. As a whole, the reliability of the questionnaires was acceptable.

Table 3. Cronbach's alpha reliability analysis results

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Attractiveness	0.79	0.90	0.93	0.88	0.82	0.92
Perspicuity	0.82	0.83	0.87	0.68	0.95	0.92
Efficiency	0.72	0.90	0.80	0.83	0.72	0.88
Dependability	0.83	0.79	0.41	0.85	0.92	0.83
Stimulation	0.89	0.92	0.84	0.94	0.74	0.98
Novelty	0.89	0.82	0.88	0.89	0.81	0.94

According to the UX testing results, the statistics (means, standard deviations, and confidence intervals) of the respondents' judgments with respect to each of the

product samples were categorized, as shown in Appendix B. The bar charts with confidence intervals are shown in Figure 2, where the error bars represent the 5% confidence intervals for the scale means (i.e. the probability that the true value of the scale mean lies outside this interval is less than 5%). The benchmark comparison for the 6 product samples was further charted as shown in Figure 3.

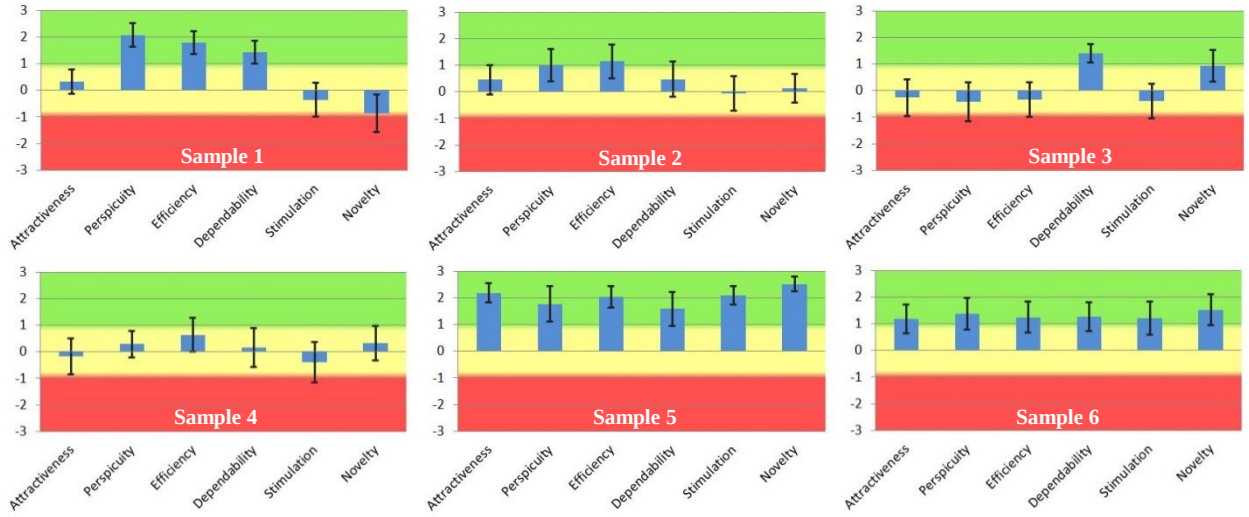
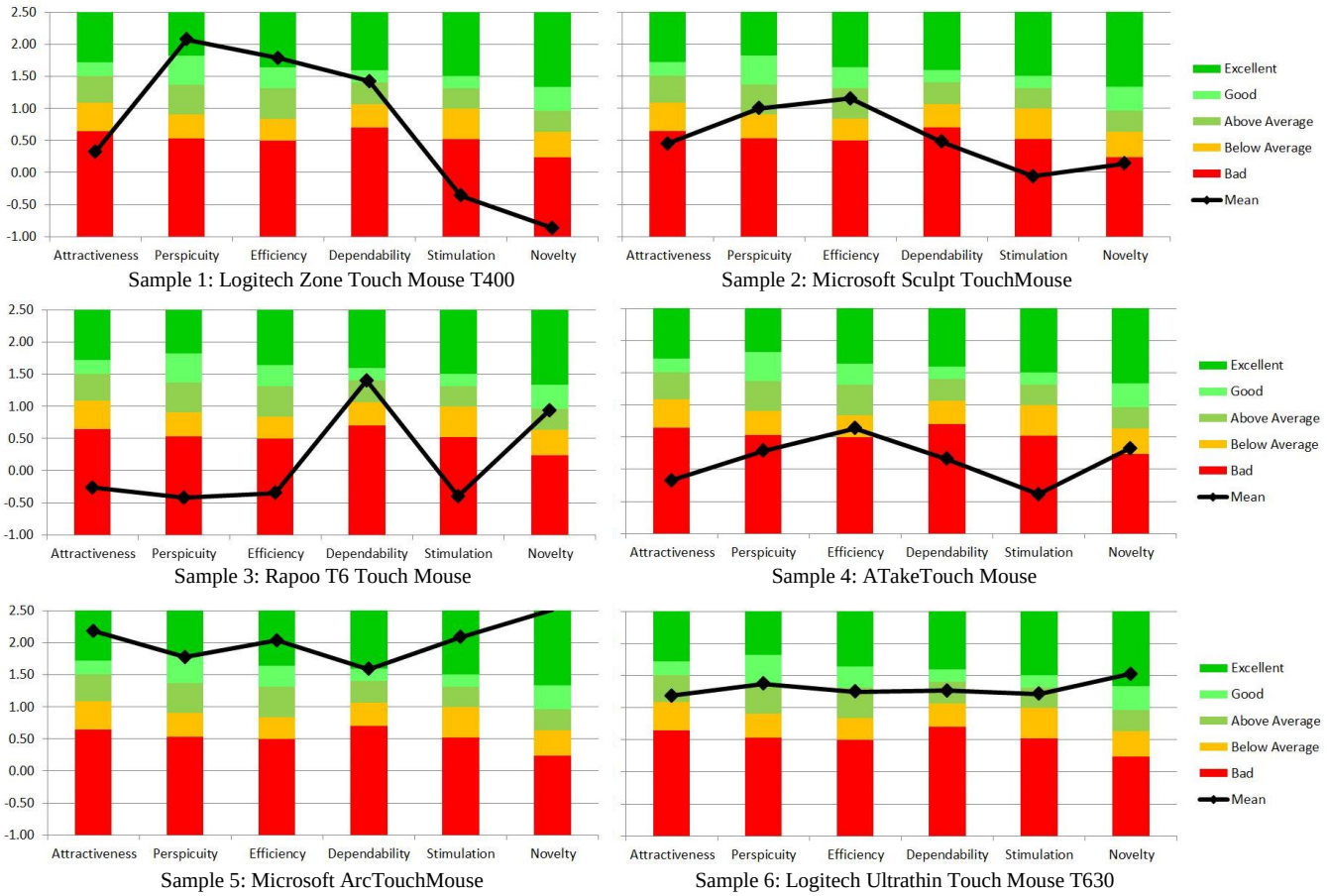


Figure 2. Bar charts with confidence intervals for the scale means



Sample 1: Logitech Zone Touch Mouse T400

Sample 2: Microsoft Sculpt TouchMouse

Sample 3: Rapoo T6 Touch Mouse

Sample 4: ATakeTouch Mouse

Sample 5: Microsoft ArcTouchMouse

Sample 6: Logitech Ultrathin Touch Mouse T630

Figure 3. Benchmark comparison for the 6 product samples

DISCUSSION

UX constructs involve the general impression toward a product and extend the usability approach to cover issues beyond pragmatic quality for fulfilling "do-goals" with hedonic quality for satisfying "be-goals". Touch mice provide users with a new way of interacting with computers. Uncovering how users perceive such new way of touch-based interaction is an important issue for both academic research and industrial application. This study applied the User Experience Questionnaire (UEQ) to collect users' respondent data and analyze their actual experience and perception of using the touch mice under the Windows 8 operating environment.

In the reliability test results, the Alpha value for the Dependability scale of Sample 3 was relatively low. Further analysis of the result revealed that the item-pairs 8-11, 8-17, 8-19, 11-17, 11-19, and 17-19have lower correlation (0.19, 0.13, 0.14, 0.17, 0.22, 0.05, and 0.15, respectively) that yields the low Alpha coefficient. This is because the subjects have inconsistencies to interpret the 4 worded terms (unpredictable/predictable, obstructive/supportive, secure/not secure, and meets expectations/does not meet expectations) of the scale in terms of the UX responses to Sample 3.

From the analysis of the bar charts we found that subjects had highly positive UX perceptions on Sample 5 (Microsoft Arc Touch Mouse) and Sample 6 (Logitech Ultrathin Touch Mouse T630), and negative general impression (Attractiveness dimension) toward Sample 3 (Rapoo T6 Touch Mouse) and Sample 4 (A Take Touch Mouse). Sample 1 (Logitech Zone Touch Mouse T400) and Sample 2 (Microsoft Sculpt Touch Mouse) had high performance for the pragmatic quality (perspicuity, efficiency and dependability) but relatively low performance for the hedonic quality (stimulation and novelty).

Further analysis of the benchmark comparison results indicates that in terms of the subjects' UX perceptions of the touch mice, the best example was Sample 5 and the worst was Sample 4 as a whole. This result is rational and credible as Sample 5 is a unique touch mouse developed by Microsoft for supporting Windows 8 desktop touch applications.

CONCLUSION

This paper presents an empirical study of user experience on touch mice. In this paper, the UEQ is employed as a psychometric instrument to collect users' rating data. The experimental results can help us to uncover how users perceive the selected touch mice after interacting with them on the Windows 8 operating environment. Although the UEQ has been recognized as a validated instrument which covers comprehensive UX dimensions measuring both classical usability aspects (efficiency, perspicuity, and dependability) and UX aspects (novelty and stimulation), it still has limitations on assessing UX for all kinds of interactive products because different products aim at different dimensions of perceived experiences. Further research could focus on developing a weighting method to identify an appropriate set of dimension weights for a specific product and proposing an effective UX metric to assess the UX quality of the product.

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Appendix A. User experience questionnaire (UEQ) format

	1	2	3	4	5	6	7		
annoying	○	○	○	○	○	○	○	enjoyable	1
not understandable	○	○	○	○	○	○	○	understandable	2
creative	○	○	○	○	○	○	○	dull	3
easy to learn	○	○	○	○	○	○	○	difficult to learn	4
valuable	○	○	○	○	○	○	○	inferior	5
boring	○	○	○	○	○	○	○	exciting	6
not interesting	○	○	○	○	○	○	○	interesting	7
unpredictable	○	○	○	○	○	○	○	predictable	8
fast	○	○	○	○	○	○	○	slow	9
inventive	○	○	○	○	○	○	○	conventional	10
obstructive	○	○	○	○	○	○	○	supportive	11
good	○	○	○	○	○	○	○	bad	12
complicated	○	○	○	○	○	○	○	easy	13
unlikable	○	○	○	○	○	○	○	pleasing	14
usual	○	○	○	○	○	○	○	leading-edge	15
unpleasant	○	○	○	○	○	○	○	pleasant	16
secure	○	○	○	○	○	○	○	not secure	17
motivating	○	○	○	○	○	○	○	demotivating	18
meets expectations	○	○	○	○	○	○	○	does not meet expectations	19
inefficient	○	○	○	○	○	○	○	efficient	20
clear	○	○	○	○	○	○	○	confusing	21
impractical	○	○	○	○	○	○	○	practical	22
organized	○	○	○	○	○	○	○	cluttered	23
attractive	○	○	○	○	○	○	○	unattractive	24
friendly	○	○	○	○	○	○	○	unfriendly	25
conservative	○	○	○	○	○	○	○	innovative	26

Appendix B. List of the statistics derived from the respondents' assessment results

Item	Sample 1			Sample 2			Sample 3			Sample 4			Sample 5			Sample 6		
	Mean	S.D.	Conf.	C.I.	Mean	S.D.	Conf.	C.I.	Mean	S.D.	Conf.	C.I.	Mean	S.D.	Conf.	C.I.	Mean	S.D.	Conf.	C.I.
1	0.900	1.119	0.491	0.409 1.391	0.600	1.729	0.758	-0.158 1.358	-0.950	2.038	0.893	-1.843 -0.057	-0.700	2.130	0.933	-1.633 0.233	1.900	1.518	0.665	1.235 2.565	1.150	1.565	0.686	0.464 1.836
2	1.950	1.234	0.541	1.409 2.491	0.600	1.930	0.846	-0.246 1.446	-0.650	2.033	0.891	-1.541 0.241	0.400	2.186	0.958	-0.558 1.358	1.700	1.780	0.780	0.920 2.480	1.450	1.432	0.627	0.823 2.077
3	-0.700	1.559	0.683	-1.383 -0.017	0.750	1.164	0.510	0.240 1.260	0.600	1.875	0.822	-0.222 1.422	-0.200	1.795	0.787	-0.987 0.587	2.450	0.887	0.389	2.061 2.839	1.500	1.504	0.659	0.841 2.159
4	1.850	1.631	0.715	1.135 2.565	1.000	1.686	0.739	0.261 1.739	-0.550	1.959	0.859	-1.409 0.309	0.300	1.380	0.605	-0.305 0.905	2.000	1.556	0.682	1.318 2.682	1.400	1.314	0.576	0.824 1.976
5	0.000	1.338	0.586	-0.586 0.586	0.350	1.755	0.769	-0.419 1.119	-0.600	1.789	0.784	-1.384 0.184	-0.550	2.114	0.927	-1.477 0.377	2.150	0.933	0.409	1.741 2.559	1.450	1.317	0.577	0.873 2.027
6	-0.450	1.761	0.772	-1.222 0.322	-0.200	1.436	0.630	-0.830 0.430	-0.250	1.650	0.723	-0.973 0.473	-0.250	1.552	0.680	-0.930 0.430	2.150	0.875	0.384	1.766 2.534	1.200	1.473	0.645	0.555 1.845
7	-0.650	1.755	0.769	-1.419 0.119	-0.150	1.663	0.729	-0.879 0.579	-0.150	1.814	0.795	-0.945 0.645	-0.500	2.065	0.905	-1.405 0.405	2.150	1.182	0.518	1.632 2.668	1.100	1.619	0.710	0.390 1.810
8	1.750	1.164	0.510	1.240 2.260	0.850	1.899	0.832	0.018 1.682	1.550	1.356	0.594	0.956 2.144	0.400	2.010	0.881	-0.481 1.281	1.100	1.651	0.724	0.376 1.824	1.200	1.642	0.719	0.481 1.919
9	2.300	1.031	0.452	1.848 2.752	1.150	1.872	0.820	0.330 1.970	-0.500	1.821	0.798	-1.298 0.298	1.300	1.455	0.637	0.663 1.937	2.100	1.373	0.602	1.498 2.702	1.400	1.429	0.626	0.774 2.026
10	-1.000	1.864	0.817	-1.817 -0.183	0.500	1.277	0.560	-0.060 1.060	1.350	1.599	0.701	0.649 2.051	1.100	1.744	0.764	0.336 1.864	2.650	0.587	0.257	2.393 2.907	1.850	1.226	0.537	1.313 2.387
11	0.300	1.342	0.588	-0.288 0.888	-0.350	1.755	0.769	-1.119 0.419	1.600	1.314	0.576	1.024 2.176	-0.300	2.055	0.900	-1.200 0.600	1.650	1.631	0.715	0.935 2.365	0.900	1.619	0.710	0.190 1.610
12	-0.450	1.669	0.732	-1.182 0.282	0.550	1.395	0.611	-0.061 1.161	1.500	1.433	0.628	0.872 2.128	0.600	1.569	0.688	-0.088 1.288	2.750	0.550	0.241	2.509 2.991	1.500	1.192	0.522	0.978 2.022
13	2.400	1.046	0.459	1.941 2.859	1.250	1.650	0.723	0.527 1.973	-0.500	1.670	0.732	-1.232 0.232	0.400	1.353	0.593	-0.193 0.993	1.550	1.761	0.772	0.778 2.322	1.100	1.714	0.751	0.349 1.851
14	0.150	1.694	0.743	-0.593 0.893	0.100	1.252	0.549	-0.449 0.649	-0.300	1.838	0.806	-1.106 0.506	-0.500	2.090	0.916	-1.416 0.416	1.900	1.165	0.511	1.389 2.411	0.950	1.395	0.611	0.339 1.561
15	-0.650	2.033	0.891	-1.541 0.241	-0.550	1.905	0.835	-1.385 0.285	0.500	1.606	0.704	-0.204 1.204	0.000	1.717	0.752	-0.752 0.752	2.350	1.040	0.456	1.894 2.806	1.150	1.565	0.686	0.464 1.836
16	0.350	1.348	0.591	-0.241 0.941	0.000	1.589	0.697	-0.697 0.697	-0.800	1.881	0.824	-1.624 0.024	-0.700	1.867	0.818	-1.518 0.118	1.850	1.348	0.591	1.259 2.441	1.100	1.447	0.634	0.466 1.734
17	2.150	1.040	0.456	1.694 2.606	0.850	2.007	0.880	-0.030 1.730	0.800	1.281	0.562	0.238 1.362	0.800	1.908	0.836	-0.036 1.636	1.750	1.446	0.634	1.116 2.384	1.500	1.357	0.595	0.905 2.095
18	-0.350	1.755	0.769	-1.119 0.419	-0.250	1.713	0.751	-1.001 0.501	-0.600	1.847	0.809	-1.409 0.209	-0.250	1.743	0.764	-1.014 0.514	1.900	1.373	0.602	1.298 2.502	1.100	1.518	0.665	0.435 1.765
19	1.500	1.277	0.560	0.940 2.060	0.550	2.038	0.893	-0.343 1.443	1.650	1.309	0.574	1.076 2.224	-0.250	1.997	0.875	-1.125 0.625	1.850	1.631	0.715	1.135 2.565	1.450	1.468	0.643	0.807 2.093
20	1.800	1.508	0.661	1.139 2.461	1.150	1.785	0.782	0.368 1.932	-0.600	1.875	0.822	-1.422 0.222	-0.100	2.100	0.920	-1.020 0.820	1.750	1.372	0.601	1.149 2.351	1.300	1.689	0.740	0.560 2.040
21	2.100	1.165	0.511	1.589 2.611	1.150	1.663	0.729	0.421 1.879	0.000	2.077	0.910	-0.910 0.910	0.050	1.468	0.643	-0.593 0.693	1.850	1.461	0.640	1.210 2.490	1.550	1.468	0.643	0.907 2.193
22	1.450	1.538	0.674	0.776 2.124	0.950	1.605	0.703	0.247 1.653	-0.400	1.903	0.834	-1.234 0.434	0.400	2.088	0.915	-0.515 1.315	2.200	0.951	0.417	1.783 2.617	1.050	1.572	0.689	0.361 1.739
23	1.600	1.188	0.521	1.079 2.121	1.350	1.387	0.608	0.742 1.958	0.100	1.917	0.840	-0.740 0.940	0.950	1.504	0.659	0.291 1.609	2.100	1.071	0.469	1.631 2.569	1.250	1.517	0.665	0.585 1.915
24	-0.750	1.743	0.764	-1.514 0.014	0.200	1.673	0.733	-0.533 0.933	-0.400	1.789	0.784	-1.184 0.384	-0.200	1.824	0.799	-0.999 0.599	2.300	0.865	0.379	1.921 2.679	1.050	1.731	0.759	0.291 1.809
25	1.700	1.129	0.495	1.205 2.195	1.250	1.713	0.751	0.499 2.001	-0.650	1.843	0.808	-1.458 0.158	0.450	1.905	0.835	-0.385 1.285	2.400	0.995	0.436	1.964 2.836	1.350		0.701	0.649 2.051
26	-1.100	1.917	0.840	-1.940 -0.260	-0.150	1.694	0.743	-0.893 0.593	1.300	1.218	0.534	0.766 1.834	0.400	1.729	0.758	-0.358 1.158	2.600	0.681	0.298	2.302 2.898	1.600	1.465	0.642	0.958 2.242

Note:

N=20

S.D.: Standard Deviations; Conf.: Confidence; C.I.: Confidence Interval(p=0.05) per item