

# Developing Practical Tools for User Experience Evaluation – A Case from Mobile News Journalism

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## ABSTRACT

We present a questionnaire called Attrak-Work to support the evaluation of user experience of mobile systems in the context of mobile news journalism. We discuss theoretical background of the questionnaire and describe the development process including the field study within which the questionnaire was developed. The presented questionnaire assesses user's perception of the pragmatic (usability and task and goal achievement) and hedonic (stimulation and identification) qualities and an overall judgment of appeal. We used the questionnaire as part of a field study to corroborate and expand the findings of observations and interviews. We found the Attrak-Work questionnaire a useful tool to be used in this manner especially for the evaluation of the hedonic qualities.

## Keywords

User experience, evaluation, work, mobile phone, journalism.

## ACM Classification Keywords

H.5.2 [User Interfaces]: Theory and methods, Evaluation/methodology. H.5.1 [Multimedia Information Systems]: Evaluation/methodology.

## General Terms

Measurement, Theory, Human Factors, Design.

## 1. INTRODUCTION

There are many well-established ways to evaluate the usability of interactive systems including questionnaires (e.g. [17]), but evaluating experiential aspects such as fun, meaning, or beauty is a much less covered topic. Focusing on user experience and evaluating the experiential aspects helps for example maturing industry sectors to differentiate from competition and gain a loyal customer base. Without means to evaluate user experience, it is impossible to manage experience related aspects. As the need for systematic user experience evaluation is high both in industry and academia, user experience

evaluation has gained increasing attention in Human-Computer Interaction (HCI) [6],[9],[11].

It is still unclear what the appropriate methods and metrics are for assessing user experience. This is partly due to the fact that there is still not an agreed definition for user experience, although standardization work is ongoing. There are for example methods for assessing person's momentary emotions or emotional trajectories [1] during interaction, which provide interesting information for content developers such as game narration designers or movie directors.

Not all products are designed to trigger a specific emotion, however, but to provide valuable and meaningful experiences in a broader sense [2]. For example, a mobile journalist might aim at generating a certain story experience for the audience, but the text and image capturing and editing tools that s/he uses are not targeted to raise specific emotions. A work tool is often primarily seen as a means to an end, having instrumental value. Not surprisingly, the evaluation of user experience with questionnaires in mobile work context has concentrated mainly on usability aspects with a few exceptions reaching beyond it [10], [15], [21].

The field work of news journalists and photographers has always been highly mobile. Advances in mobile technology, with converged devices, interoperability and fast mobile and broadband network connections enables journalists and photographers to use mobile tools for news reporting from the field. These tools can be used for capturing of photos or videos, creating stories, and submitting or even publishing them directly from the field. Instead of a van full of equipment, light tools such as a laptop or even a mobile phone can be used for producing the stories. Journalists and photographers do not necessarily return to the newsroom to deliver their stories but for example email them to the newsroom or even publish them right from the field [20], [22]. The ad-hoc and timely nature of mobile reporting brings a new flavor to journalism.

We conducted a field study with a mixed methods research design [18] to explore user experience with a mobile journalism system. Nineteen participants used a multipart mobile system based on a mobile multimedia phone for submitting and publishing news items to an online publication on two project days. One of the goals in the study was to create a questionnaire for assessment of users' perceptions of mobile system qualities and overall judgment of mobile systems used in the context of mobile news journalism. Our intention was to use the questionnaire for corroboration and expansion of the results from the qualitative data and to build a tool to be used

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in the evaluation of user experience in our future studies in the context of mobile news journalism.

We chose Hassenzahl's model of user experience [5] as a starting point for the questionnaire development. We started by analyzing the collected observation and interview data with Hassenzahl's model as a guiding theory. Based on the findings we refined the model and developed the Attrak-Work questionnaire. Questionnaire was conducted at the end of the field study as one part of an online survey targeted at the participants of the study.

In this paper we present the theoretical background and the phases of the questionnaire development as well as exemplary results of using the Attrak-Work questionnaire. We also discuss critically many of the limitations in the development of the Attrak-Work questionnaire, which reflect the challenges of fitting questionnaire development into a relatively short period of time.

## 2. THEORETICAL BACKGROUND

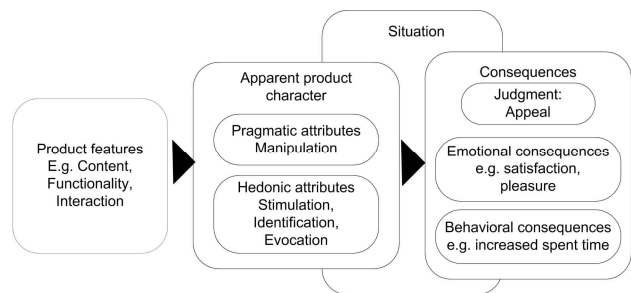
Questionnaires are frequently used in various types of user studies in HCI. A variety of questionnaires have been developed for evaluating users' emotions. The affect grid [14] assesses emotional states with a 9 x 9-matrix that is surrounded by eight adjectives describing different emotions. A Semantic Differential Scale [13] is a type of a scale with which users can rate the system based on bipolar word couples. For example Mehrabian and Russell [12] have used the Semantic Differential Scale with 18 adjective pairs for emotion assessment against valence, arousal and dominance. Instead of words pictures have been used in emotion assessment questionnaires to avoid language difficulties [3], [8].

Emotion assessment is not the only way to evaluate user experience. When we aim to improve a system or want to gain an understanding of the user experience, we are also interested in users' perceptions of the product's qualities and their overall evaluative judgments of it. To be able to reach beyond studying the instrumental aspects, practical tools that support the assessment of user experience are needed. One approach is to include hedonic aspects in the measurement, like in the HED/UT scale [16], [19] or the AttrakDiff questionnaires [6], [7]. These questionnaires aim to assess users' perceptions of the product or system qualities.

AttrakDiff questionnaires are based on the user experience model presented by Hassenzahl [5], which is illustrated in Figure 1. We chose this model as the basis for the development of the tool for user experience evaluation in the context of mobile news journalism. Hassenzahl's model enables a relevant approach to studying aspects of user experience in work context, since the theory covers not only pragmatic (utilitarian) aspects, but also hedonic (non-utilitarian) aspects. For professionals not only the functional aspects of the used technology are important, but also how it relates to being stimulating, supports and enables creativity and, on the other hand, what kind of symbolic value it possesses.

Hassenzahl's framework is based on the assumption that product character can be described by two attribute groups, namely pragmatic and hedonic attributes [5]. Each person constructs her own personal version of the product character based on the product features and on her personal standards and expectations. *Pragmatic quality* is *instrumental* and related to the product's *usability and utility* when the product

is used for tasks. On the contrary, *hedonic quality* is related to the user's self, such as autonomy, competence, relatedness to others, or security [4],[5].



**Figure 1. Key elements of Hassenzahl's model of user experience from the user perspective. Source: [5]**

*Hedonic quality* focuses on aspects of stimulation, identification, and evocation [5]. *Stimulation* is related to personal development, that is, to curiosity, personal growth, development of skills and proliferation of knowledge. *Identification* addresses the expression of self and the user's personal values to relevant others through objects and is therefore social. An example of this in the context of journalism is a photographer's systems camera and the big camera case(s) he carries with him, which serve as symbols of his profession. *Evocation* refers to the product's ability to provoke memories such as important past events or relationships.

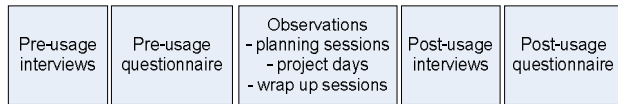
According to Hassenzahl, the subjective perception of the product character leads to consequences such as judgments about the product's appeal, goodness and beauty [4], [5], as well as emotional and behavioral consequences. As examples of emotional consequences Hassenzahl discusses satisfaction and pleasure [4],[5]. Based on the model, Hassenzahl presents two versions of AttrakDiff questionnaires, for assessing the attractiveness of products [6], [7]. The first version, AttrakDiff includes two attribute groups, that is, one group for pragmatic and another for hedonic, as well as one group for the judgment of appeal [7]. The second version, AttrakDiff2, separates the hedonic attribute group into two groups, one for stimulation and the other for identification [4], [6]. In addition, evaluative constructs such as goodness and beauty have been included in subsequent studies [4]. AttrakDiff questionnaires use a Semantic Differential Scale to assess the pragmatic and hedonic attributes as well as items in judgment of appeal and the evaluative constructs.

Although AttrakDiff questionnaires have been used by several researchers in studying user experience, we decided to use the original model as a basis for questionnaire development instead of using the AttrakDiff questionnaires. This decision was made, since when we used Hassenzahl's model as a guiding theory in analysis of the data, our findings on hedonic aspects differed considerably in their representation from the attributes in AttrakDiff questionnaires. Therefore, we used our findings in the development of the questionnaire. In the following sections, we first present the study and continue by describing the development of the questionnaire within it.

## 3. STUDY

We used the case study approach [23], which was carried out with a mixed methods research design [18]. Data was collected during a field trial by qualitative (semi-structured interviews,

observations) and quantitative (questionnaires) methods. Questionnaires were used in the research design to corroborate and expand the results obtained from observations and interviews. Data was collected before, during, and after the usage of mobile system. Figure 2 illustrates the data collection methods used in different phases of the study.



**Figure 2. Data collection of the study.**

Study was made in conjunction with a graduate level university course on web publishing in the Department of Journalism and Mass Communication at the University of Tampere, Finland. Data collection centered around two project days, when the students produced short news stories and videos for a web publication using a mobile journalism system based on mobile multimedia phones. The mobile system consisted of a mobile multimedia phone (Nokia N82), a wireless Bluetooth keyboard (Nokia SU-8W) and a mature prototype of a mobile journalism software application running on the mobile phone. Application enabled the creation of news stories with text and multimedia items (photos, audio and video clips) on a mobile phone and submitting of these stories to the publication platform.

During the two project days graduate students worked as journalists and photographers creating news stories to the publication from the field. University course was chosen as the context of the field study, since the mobile system was a prototype. It was not feasible to set up a trial in a news organization at this phase, since potential problems encountered may had disturbed the work of the professionals considerably. Researchers did not influence the decisions on the type of stories or how or for what purposes the participants used the system. The publishing process therefore was similar to the one which is used in real news organizations with editorial meetings (here planning and wrap up sessions) and with the roles of editorial staff (online producer and art director) included. See for example [20], [22] for more details on the study.

### 3.1 Participants

Participants of the study were graduate students of journalism and visual journalism who were taking a project course on web publishing. All students had practical experience in journalistic work either full time (1-15 years, median: 1 year) or part-time (0-4 years, median: 2 years). Most of them were working as freelancers in parallel to their studies. The students of visual journalism had used mobile phones (Nokia N93) earlier in their studies for video capturing and editing, whereas the students of journalism had no prior experiences of using mobile phones in their studies. From here on we refer to the students on journalism as journalists and to the students of visual journalism as photographers.

The number of participants in the study was nineteen (10 journalists, 9 photographers). The number of respondents to the online survey, which included the Attrak-Work questionnaire, was fifteen (8 journalists, 7 photographers). All interviewees and respondents were given as a compensation a ticket to movies.

### 3.2 Data Collection

As can be seen from Figure 2, data was collected using multiple methods at various points during the study. The study centered around two separate project days in the spring 2008, which were five weeks apart. Pre-usage interviews were arranged three days before the training of the mobile journalism system for two groups separately, one for two students of visual journalism and one for three students of journalism. The goal was to familiarize with the field of the study, participants' usage of mobile phones, prior experiences of using mobile phones in news journalism, expectations as well as attitudes. Results were used in the development of a pre-usage questionnaire, which was conducted as a paper questionnaire right before the training. All 19 students answered the questionnaire which was used to collect background information of the users, their prior usage and experiences of mobile devices and services, and expectations and attitudes towards upcoming project.

Observations were made on two project days, on two planning sessions a week before each project day, and on two wrap-up sessions a week after each project day. Three researchers were involved in the field trial during the first part of the study and four researchers in the second part of the study. A total of 85 hours of observations were made both in the mobile context (journalists and photographers working) as well as in the "newsroom". Researchers made hand-written notes and took photographs when observing the work. Within three days of the first project day eleven participants and during the second project day four participants were interviewed. Interviews were semi-structured lasting from 60 to 90 minutes. All interviews were recorded. Interviews covered various user experience related themes as well as users' perceptions on the suitability of mobile phones in journalism.

The post-usage questionnaire was conducted as web survey with a deadline for completing it within ten days of the second project day. Participants of the study were sent an email asking to complete the survey two days after the second project day. A reminder was sent by email two days before the deadline. The questionnaire consisted of several parts, of which one was the Attrak-Work questionnaire which began from the second question in the survey.

### 3.3 Analysis

The data from the observations was written into electrical form for further analysis and the interviews were transcribed. Interview and observation data were analyzed by content analysis. Specifically for the case of developing the questionnaire, data analysis was guided by theory to identify themes and attributes related to pragmatic and hedonic aspects (stimulation and identification) of the mobile system usage. For this article we used Cronbach's alfa for testing the internal consistency reliability of the scales and nonparametric Mann-Whitney U test for identifying statistically significant differences between the user groups on their perceptions of the system's qualities and overall judgment of appeal.

### 4. DESIGNING THE QUESTIONNAIRE

The process of developing the user experience questionnaire for mobile news journalism included several phases: first, gaining an understanding of the factors affecting user experience with exploratory, qualitative methods. We used Hassenzahl's model of pragmatic and hedonic product qualities

as a guiding theory in the analysis phase. We then built a framework for the instrument development from our findings and based on earlier theories [5],[11]. Finally, we developed the questionnaire based on our framework and on the findings from qualitative data. This section gives an overview of these phases.

## 4.1 Findings from the qualitative data

In this sub-section we present a short overview of the findings related to the pragmatic and hedonic aspects of using the system based on the observations and interviews.

### 4.1.1 Pragmatic quality

Themes that were emphasized by several participants regarding pragmatic aspects of the mobile journalism system were for example ease of use, learnability, reliability, intuitiveness of use, performance and effectiveness. Support for the task, work process-related themes such as effect on working, and, in particular, reaching higher level goals of news journalism were discussed. On the mobile system level, these themes addressed the features and functionalities of the used mobile system as an entity or its sub-components, such as the keypad, camera or the mobile journalism application. Users described the usability-related aspects for example with words like *easy, intuitive, cumbersome, unreliable and fluent*. Furthermore, the themes related to carrying out the tasks or achieving goals covered for example effect on working and on the speed of publishing, support for working and the efficiency of the system.

### 4.1.2 Hedonic quality - Stimulation

In addition to pragmatic aspects, participants mentioned several aspects related to the hedonic qualities of the system and its usage. Participants described the usage of the system as *interesting, (un)motivating, spontaneous, liberating, enchaining, exciting, frustrating and restricting*. These aspects were clearly related to the user's own self and his or her experience of using the system for capturing the material and for making the publication. Journalists took a very practical stand to using the mobile system, whereas photographers were more negative and reserved towards the system. Participants also emphasized that technology is essential for photographers to do their job. Due to the limitations in the technical capabilities of the mobile phone, photographers expressed that it restricts or even enchains their expression and creativity, and they found it non-motivating not to be able to achieve what could be achieved with "proper" tools. On the other hand, some photographers commented that using a simple device with limited capabilities was also in some sense liberating for them. However, both journalists and photographers expressed that using the mobile phone for capturing videos gave them new possibilities for news making and it was therefore found interesting and motivating for the specific purpose.

### 4.1.3 Hedonic quality - Identification

Themes of hedonic identification that were emphasized in this study were related to communicating profession and status. For photographers, the systems camera, besides being a practical means and an important enabler of their job, is a symbol of their profession in a social context. It *communicates professionalism* both to the interviewees and other outsiders, including other professionals. Photographers and journalists also talked about the *reactions of outsiders* to using the mobile phone for multimedia capture. Participants described the

reactions of outsiders to vary from neutral to surprise and disbelief. References to outsiders addressed two different groups, that is, the people they were interviewing and shooting photos and videos of, and other outsiders, either ordinary people or other professionals that were present in the usage situation.

When using mobile phones, in this study both photographers and journalists expressed that interviewees who were laymen and may had never been interviewed or photographed before by the media were more at ease with the small and everyday like device than with a systems camera. Participants felt that interviewees were also less reluctant to be interviewed and photographed. Participants therefore *reflected on outsiders' reactions and comments* as well as *anticipated reactions and attitudes towards mobile phone users*.

### 4.1.4 Evaluative judgments - Appeal

As exemplified above, we found both pragmatic (utilitarian) and hedonic (non-utilitarian) themes and qualities related to the use of the studied mobile journalism system in mobile news journalism. The perceptions of these qualities are subjective, and they are related to a person's overall judgments of the mobile system. Based on the findings from qualitative data, there is a difference between the two user groups of the study, journalists and photographers, regarding the perceived hedonic qualities and appeal. Based on the observation and interview data, journalists were more positive than photographers towards the mobile system. On the individual level, there are, however, large differences in users' perceptions and overall judgments.

## 4.2 Description of the Attrak-Work questionnaire

As described in Section 2, we chose Hassenzahl's model as the starting point in the development of the questionnaire. We first created a model from our findings and earlier theories for the questionnaire development. The created model is presented in Figure 3, and it presents two groups of user perceptions of product characteristics, that is, the perceptions of pragmatic and hedonic qualities. Mahlke [11] refers to these as components of user experience and uses the terms utilitarian and non-utilitarian instead of pragmatic and hedonic. In our model, the user's perceptions of the pragmatic and hedonic qualities affect the overall judgment of the system, which in the Attrak-Work questionnaire is measured as appeal [7].

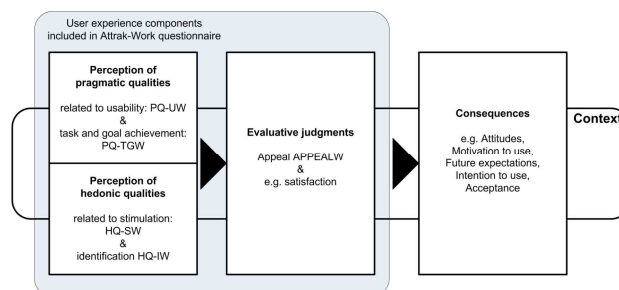


Figure 3. Model of user experience components in the development of the Attrak-Work questionnaire.

The evaluative judgments of the system are separated from the other consequences since judgments are related to the used system directly. As discussed earlier, in our view the perceptions of the pragmatic and hedonic qualities, the

evaluative judgments of the system as well as the other consequences are context-dependent and relative to the usage situations. Contextual dimensions [22], their elements and the actual usage situation affect the user's perception of the pragmatic and hedonic qualities and his or her overall evaluation of the used system.

The pragmatic attribute group in our elaborated questionnaire covers usability, and the hedonic attribute groups cover stimulation and identification. We also included a second group of pragmatic attributes related to task and goal achievement, since this is an important aspect affecting the user's judgment when the system is used as a work tool. Appeal was included as a fifth theme for assessing an overall evaluative judgment of the studied mobile system. We selected the Semantic Differential scale for assessing a rating for attributes. Each of the attribute groups contain seven or eight pairs of words or short statements (items) presenting opposites of qualities on a bipolar scale. We used a five anchor scale for the rating of the items, ranging from -2 to 2 when we implemented the questionnaire as part of the online survey.

It should be noted that the presented model is not intended to be a comprehensive model of user experience including all the aspects related to the phenomenon. It is a simplified model including components we used in the Attrak-Work questionnaire for measuring components of user experience. We did not for example include emotions in this model, although they could be included. However, the model presented in Figure 3 includes examples of themes related to the consequences of user experience that were found in our study and that have also been discussed in earlier literature.

In the following sub-sections we describe each attribute group in the Attrak-Work questionnaire. All attribute groups have been modified based on our findings from the observation and interview data. They therefore differ from the original items presented in AttrakDiff questionnaires, but also some of the original items are directly included in the Attrak-Work questionnaire. The items were created based on our findings, and they reflect how participants talked about the system and how they described its usage.

#### 4.2.1 Pragmatic quality – Usability (PQ-UW)

As a basis for the users' assessment of the pragmatic quality of the mobile journalism system we used the attribute group used in AttrakDiff questionnaires [6], [7]. There are altogether seven items in this group, of which two are directly from the original AttrakDiff (PQ-UW-1=PQ\_2, PQ-UW-4=PQ\_6). In addition, two items are related but not completely identical to the items in AttrakDiff (PQ-UW-2~PQ\_7, PQ-UW-3~PQ\_4). The selected items, modifications and new items reflect the findings from the qualitative data. For example, a new item on reliability was included, since reliability was strongly emphasized by the participants as one basic usability-related aspect that was essentially important in the work context.

PQ-UW-1 Monimutkainen-Yksinkertainen,  
*Complicated-Simple*

PQ-UW-2 Vaikea-Helppo, *Difficult-Easy*

PQ-UW-3 Hankala-Vaivaton, *Challenging-Effortless*

PQ-UW-4 Hämmentävä-Selkeä, *Confusing-Clear*

PQ-UW-5 Epälooginen-Looginen, *Illogical-Logical*

PQ-UW-6 Epäluotettava-Luotettava, *Unreliable-Reliable*

PQ-UW-7 Arvailua vaativa-Intuiitiivinen, *Needs guessing-Intuitive*

#### 4.2.2 Task and goal achievement (PQ-TGW)

We created a separate attribute group related to task and goal achievement, since this is an important aspect affecting the appraisal of the system in the work context. Whereas the first pragmatic attribute group is related to usability, this second pragmatic attribute group concentrates on the effect and support of the product or system on working. The items in this group were created based on the themes that were found in the qualitative data.

PQ-TGW-1 Työskentelyä hankaloittava-työskentelyä helpottava, *Makes work harder-makes work easier*

PQ-TGW-2 Tehoton-Tehokas, *Inefficient-Efficient*

PQ-TGW-3 Kompromisseihin pakottava- Tavoitteita tukeva, *Forces compromise-Supports goals*

PQ-TGW-4 Hidastaa julkaisua kentältä-Nopeuttaa julkaisua kentältä, *Speeds up publishing from the field-Slows down publishing from the field*

PQ-TGW-5 Laatua alentava-Laatua edistävä,  
*Lowers quality-Enhances quality*

PQ-TGW-6 Työprosessia estävä- Työprosessia tukeva,  
*Obstructs the workflow-Supports the workflow*

PQ-TGW-7 Työskentelyä hidastava-Työskentelyä nopeuttava,  
*Speeds up work-Slows down work*

#### 4.2.3 Hedonic quality – Stimulation (HQ-SW)

For assessing stimulation as an aspect of the hedonic quality of the system, we used the presented model as the starting point for developing the items. In our study, participants described several different types of stimulation-related aspects, as described in Section 4.1 that seemed relevant to be assessed with a questionnaire. However, these themes were not covered in the AttrakDiff 2 questionnaire, and we therefore redesigned the items to fit the context of the study. The seven created items are presented in the following:

HQ-SW-1 Kahlitseva-Inspiroiva, *Restricting-Inspiring*

HQ-SW-2 Turhauttava-Innostava, *Frustrating-Exciting*

HQ-SW-3 Lannistava-Motivoiva, *Discouraging-Motivating*

HQ-SW-4 Oppimista estävä-Oppimista stimuloiva,  
*Stimulates learning-Prevents learning*

HQ-SW-5 Luovuutta rajoittava-Luovuuden mahdollistava,  
*Limits creativity-Enables creativity*

HQ-SW-6 Kehittymistä rajoittava- Haasteita tarjoava,  
*Restricts development-Offers challenges*

HQ-SW-7 Ammatillista kunnianhimoa rajoittava-Ammatillisen kunnianhimon mahdollistava, *Constricts professional ambition- Enables professional ambition*

#### 4.2.4 Hedonic quality – Identification (HQ-IW)

Similarly to the case of stimulation, we used the presented model as a theoretical background when developing the items for identification as the second group of hedonic quality. During the study, participants expressed various issues related to this theme. One item is identical to an item in the AttrakDiff2 questionnaire (HQ-IW-1=HQI-3). The other items

have been created based on the themes found in the qualitative data.

HQ-IW-1 Harrastelijamainen-Professionaalinen,  
*Professional-Amateurish*

HQ-IW-2 Epäuskottava-Uskottava, *Unconvincing-Credible*

HQ-IW-3 Luottamusta vähentävä-Luottamusta herättävä,  
*Raises trust-Lowers trust*

HQ-IW-4 Haastateltavia tai kuvattavia epäilyttävä-  
Haastateltavalle tai kuvattavalle kynnystä alentava, *Increases  
suspicion in interviewees-Lowers the threshold of interviewees*

HQ-IW-5 Ammatillista imagoa laskeva-Ammatillista imagoa  
kohottava,  
*Lowers professional image-Promotes professional image*

HQ-IW-6 Ammatillaisten silmissä väheksyttävä-  
Ammatillaisten silmissä arvostettu,  
*Undervalued by professionals-Valued by professionals*

HQ-IW-7 Vähentää työn arvostusta-Lisää työn arvostusta,  
*Lowers respect for the work-Enhances respect for the work*

#### 4.2.5 Appeal

Attribute group APPEALW in the Attrak-Work questionnaire comprises of aspects discussed by the participants that were related to the overall appeal of the system. Appeal is included also in the AttrakDiff questionnaire (2000), comprising of eight items. We included three of these items in the Attrak-Work questionnaire (APPEALW-1=APPEAL1, APPEALW-3=APPEAL2, APPEALW-4=APPEAL5). In addition, we included from the group of pragmatic quality in the AttrakDiff2 questionnaire the item of practicality PQ\_3 (APPEALW-8), since in our view this is more an overall evaluation related to appeal. The other new items reflect the findings in the field study data as well. The eight items are as follows:

APPEALW-1 Epämieluisa-Mieluisa, *Unpleasant-Pleasant*

APPEALW-2 Yhdentekevä-Tärkeä, *Insignificant-Important*

APPEALW-3 Huono-Hyvä, *Bad-Good*

APPEALW-4 Vastenmielinen-Houkutteleva,  
*Unattractive- Attractive*

APPEALW-5 Vakava-Rento, *Serious-Relaxed*

APPEALW-6 Tylsä-Kiinnostava, *Dull-Interesting*

APPEALW-7 Hyödytön Hyödyllinen, *Useless- Useful*

APPEALW-8 Epäkäytännöllinen-Käytännöllinen,  
*Impractical-Practical*

### 4.3 Issues on developing and administering the Attrak-Work questionnaire

The questionnaire was pre-tested by one researcher at two occasions during the questionnaire development. She was involved in the collection and analysis of the qualitative data, but she was not involved in the development of the questionnaire items. She was asked to point out items that were not clear, if they were not reflecting the findings, if the anchors for an item were not appropriate or if there were duplicates. The final questionnaire was pre-tested similarly by two other researchers, who were not involved in the study. Due to the tight schedule of the ongoing field study, which involved data collection, transcribing and analysis before creating the items for the Attrak-Work questionnaire, we were not able to

involve outsiders, such as the participants of the study, or other professionals working in news journalism in the pre-testing.

For the questionnaire scale we selected the Semantic Differential Scale for assessing the participants' ratings on the items (attributes). We used in this study a five-point scale ranging from -2 to 2. The Semantic Differential Scale is known to be sensitive to selection of the anchors. Selecting a "wrong" pair has an effect on the responses and the reliability of the results. As described earlier, by pretesting we aimed to find these problems. However, we consider developing a second version of the questionnaire, which uses a Likert-scale instead of the semantic differential scale. Regarding the administration of the questionnaire as an online survey, each group of attributes was evaluated separately in the order presented in Section 4.2. In the future studies we will group the pragmatic qualities into one group and mix the items, and do the same for the hedonic items as well.

## 5. EXEMPLARY RESULTS FROM ATTRAK-WORK QUESTIONNAIRE

In this section, we present and discuss an example of the results when the Attrak-Work questionnaire was used within our study. Our findings from the qualitative data indicate clearly, that the photographers perceived the mobile system more negatively than the journalists especially regarding the hedonic qualities. We were therefore interested in whether we could find a statistically significant difference in the perceptions of the pragmatic and hedonic qualities and overall judgment between the user groups by using the responses collected with the Attrak-Work questionnaire. However, we want to stress, that even if we cannot find a statistically significant evidence for an emerging theme or finding in the qualitative data, it does not mean that it is not important or it does not exist in real-life. Care must therefore be taken when interpreting the results and not to overweight the meaning of the questionnaire results in comparison to the qualitative data, which in this case study has the main emphasis.

For getting an overall evaluation of the mobile journalism system, we used the five attribute groups (PQ-UW, PQ-TGW, HQ-SW, HQ-IW, APPEALW) as scales. First, to gain a scale value for the perceived qualities and appeal for each respondent, we calculated the mean of the ratings for items (attributes) within an attribute group. We then tested the internal consistency reliability of the scales with Cronbach's alpha for all five attribute groups. We selected the items for the scales based on the corrected item-total correlation values ( $\geq 0.3$ ) and Cronbach's alpha value ( $> 0.7$ ). The scales PQ-TGW ( $\alpha = 0.886$ ), HQ-SW ( $\alpha = 0.870$ ), and HQ-IW ( $\alpha = 0.845$ ) include the seven original items presented in the previous section. For scale PQ-UW we removed two of the original seven items, that is, PQ-UW-3 and PQ-UW-6 ( $\alpha = 0.809$ ). In addition, for scale APPEALW we removed two of the eight original items, that is, APPEALW-2 and APPEALW-6 ( $\alpha = 0.819$ ). We then recalculated the scale values.

To test if there is a statistically significant difference between the perceptions of the journalists and photographers on the perceived qualities and appeal we used the non-parametric Mann-Whitney U test. We first calculated the arithmetic mean of the scale values for both user groups. We then calculated the Mann-Whitney U test using the professional role (user group) as a grouping variable. The results of the significance test for each scale are shown in Table 1. The results show that for

perceived hedonic quality of identification (HQ-IW), we found statistically significant difference between the user groups ( $U=8.5$ ,  $p<0.05$ ). For perceived pragmatic qualities PQ-UW and PQ-TGW as well as for overall judgment APPEALW, we did not find statistically significant difference. For perceived hedonic quality of stimulation HQ-SW ( $U=11.5$ ,  $p<0.1$ ), we found a trend, but it cannot be interpreted in strict statistical sense showing significance.

**Table 1. Results of the Mann-Whitney U test for scales with professional role as a grouping variable.**

	PQ-UW	PQ-TGW	HQ-SW	HQ-IW	APPEALW
Mann-Whitney U	22.0	18.0	11.5	8.5	13.5
Exact. Sig.	.536 <sup>a</sup>	.281 <sup>a</sup>	.054 <sup>a</sup>	.021 <sup>a</sup>	.189 <sup>a</sup>

a. [2\*(1-tailed Sig.)], not corrected for ties.

## 6. DISCUSSION

Developing a questionnaire is tricky. Phases of the development include for example selecting or developing a framework or theory or using earlier findings as the basis for development, operationalizing the chosen theory and concepts, preparing the questions, selecting an appropriate scale and pretesting the questionnaire. In addition, when developing a questionnaire one has to consider carefully the goal of the development and consider the context it is intended for.

The primary goal of the questionnaire development in our study was to develop a practical tool for assessment of user experience in a work context, specifically in mobile news journalism. We developed the questionnaire to corroborate and expand the findings from observation and interview data in a field study. In addition we aimed to develop a tool for our future evaluations of mobile systems in the context of mobile news journalism. In the field study graduate level students of journalism and visual journalism used a multipart mobile system during two project days to publish an online publication directly from the field. The system consisted of a mobile multimedia phone, a wireless Bluetooth keyboard and a mobile application developed for creating stories and submitting or publishing them directly.

When developing the Attrak-Work questionnaire, we used Hassenzahl's model of user experience (see Figure 1, [5]) as a guiding theory in the analysis of the observation and interview data, but also looked for other related themes. Based on the findings we refined Hassenzahl's model by including task and goal achievement as a second attribute group for the assessment of the pragmatic qualities. The created model (see Figure 3) separates the evaluative judgments of the product, such as appeal and satisfaction from the other consequences, such as acceptance, motivation to use and intention to use. The findings from the qualitative data were used in the development of the items for the five groups of attributes, that is, for 1) pragmatic quality – usability PQ-UW, 2) pragmatic quality – task and goal achievement PQ-TGW, 3) hedonic quality – stimulation HQ-SW, 4) hedonic quality – identification HQ-IW and 5) for overall judgment of appeal APPEALW.

The developed Attrak-Work questionnaire was used at the end of the field study to assess the perceived pragmatic and hedonic qualities and the overall judgment of appeal of the

used mobile journalism system. Attrak-Work questionnaire was administered as part of an online survey targeted to the participants of the field study. The qualitative data shows a clear difference in the perceptions of the hedonic qualities related to stimulation and identification as well as appeal between the photographers and journalists in the study. As an exemplary result for using of the developed Attrak-Work questionnaire we found statistically significant difference for the hedonic quality identification HQ-IW ( $U=8.5$ ,  $p<0.05$ ).

We found the Attrak-Work questionnaire to be a useful tool in an exploratory study of user experience for several reasons. First, since it is often not possible in a field study to observe or even interview all the participants, it provides a way of accessing the perceptions of a wider set of participants. Second, using a questionnaire means that all the respondents answer the same questions, and therefore we are able to get views on each item from all respondents. Therefore, themes that may not come up in the majority of observations or interviews can still be included to the study. However, one improvement related to this could be to ask the respondents to weight or order the importance of the attributes to find out how important the less discussed themes are compared to the ones that are discussed more. Third, we can use the tool in our further studies in the same field and also for example compare results from different case studies with different participants.

There are several limitations in the development and testing of the questionnaire. Pre-testing was done with researchers, since the study was fast-paced and there was no time to involve outsiders into the development process. The use of an expert panel consisting of outsiders who preferably work as photographers and journalists would give feedback on the wording of the items and help in finding the correct anchors for each item therefore improving the validity of the items. In addition, using external experts working in news journalism would give feedback from a wider audience and improve the validity of items. A recommendable way of obtaining feedback would also be to involve the participants of the study to comment the questionnaire, its themes and individual items after filling it.

Another issue that can be seen as a limitation to the validity of the questionnaire is that the items (attributes) in the Attrak-Work questionnaire were created based on the findings from the observation and interview data. They therefore reflect this particular case study and the subjective views of its participants on the mobile journalism system and its usage. However, similar themes and attributes have arisen in our other case studies, with differences in the emphasis of themes depending on the group of participants and their backgrounds. We therefore believe, that for the context of mobile news journalism, the created questionnaire reflects well especially the hedonic aspects related to the mobile system use.

Although the current version of the Attrak-Work questionnaire is context specific especially regarding the attributes for hedonic quality identification, the themes included that are reflected by the individual items can be used as guidance when generalizing or targeting the questionnaire to another field of mobile work. Furthermore, the questionnaire can be applied to also any other type of mobile work tool in the context of journalism, be it a systems camera, laptop, audio recorder, or even pen and paper.

As a conclusion, we found the questionnaire to support our goal of corroborating and expanding the findings of the qualitative data and especially useful for capturing the perceptions of the hedonic qualities. In the future studies we are considering choosing one of the validated usability questionnaires to assess an evaluation of the pragmatic qualities either as a reference for attribute groups in Attrak-Work. In addition, we will carefully analyze the attribute group for appeal to identify possible needs for changes.

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