



# Information Overload in Real-Time Mobile Web Applications: Student Viewpoint

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## Abstract

**Context:** The main goal of this research is to explore the views of post-graduate students in Kerman regarding information overload in real-time mobile web applications in order to provide better, more appropriate solutions for eliminating and controlling information overload.

**Methods:** The views of post-graduate students regarding information overload in real-time mobile web applications were assessed by sending/receiving questionnaires to the emails of 330 post-graduate students from the Kerman government universities who were chosen using Morgan's table sampling technique. The reliability of research questionnaires were analyzed in the SPSS software using Cronbach's alpha coefficient, which was 0.908 for this research.

**Results:** The findings showed that the students had positive views about influencing factors of information overload, moderate views about personal influencing factors in dealing with information overload, positive views about effective tools for controlling information overload, moderate views about personal influencing and environmental factors in eliminating information overload, positive views about solutions for mitigating information overload, and negative views about the effects of information overload on users ( $P=0.01$ ). This means that all the independent variables directly affect the viewpoints of graduate students.

**Conclusions:** The research results show that irrelevant information for the user, the amount of monitoring and evaluation of individuals and management of discussion groups, wrong and incorrect information, and violation of privacy are the main factors responsible for information overload. Furthermore, training programs on user interaction with information are considered as personal and environmental influencing factors in eliminating information overload. Management of personal knowledge, referring the work to professionals, and filtering the information are considered as important solutions for mitigating information overload, and informational stress and anxiety, despair and hopelessness in retrieving relevant information, informational fatigue, expenditure loss, reduced ability to think deeply, and reduced use of mental skills are considered as the most important effects of information overload on users.

**Keywords:** Information Overload, Mobile Phone, Real-Time Mobile Web Applications

## 1. Introduction

Since long ago, information has had a vital role in the lives of humans. Therefore, various communication facilities were created through time to handle the collection, storage, and distribution of information in a better way. The volume of information grows very fast, however, the consumption rate of information grows at a medium-to-low rate. This extra volume of information is called information overload. Time and energy limitations keep people from consuming all the information; in addition, given there is no balance between the production and consumption of information, we are stricken by an overload of information. Even though this information might be useful,

the user cannot absorb and consume all of it due to time limitations (1). The web and web-based real-time applications need the user to retrieve a part of their vast resources, however, the retrieved information might not be compatible with the user's mental background and might be mistaken for information overload. The problem of information overload is not limited to this phenomenon and its causes, however, it has more important implications and side effects that affect the daily life of individuals in today's world. It has direct effects on those nations and societies in which modern information networks such as mobile web applications have a definite and real presence, and indirect effects on others who are not in direct contact with these

applications; however, the cause and effect chain works in such a way that eventually all members of society, regardless of whether they use these media or not, will be affected by the implications of information overload. Real-time mobile web applications, Email, Voicemail, Outlook, and web, have made it possible to have a constant flow of information in 24 hours a day at home, work, and even during travels. Public satisfaction with most of these sources has made people obsessed with technology and made them forget about informational needs and priorities. The purpose of seeking information should be finding answers to meaningful questions. Maybe the main issue is not having too much information, however, having useless and meaningless information. Everybody has a different perspective about information overload created by these applications. People have different interests and tastes based on their personal informational needs. Sometimes the information received through a real-time mobile web application are interesting for one person and fit for their mood, however, the same information might have destructive effects on another person who is not interested in watching and hearing them, and make that person restless, confused, and unable to make appropriate decisions, and therefore, having information overload for that person. Redundant information in these applications, unwanted reception of unethical pictures or texts, and useless and valueless information that distract the user are among these overloads.

Previous studies on this subject that we have used in our paper can be divided into domestic and foreign. In one study, information overload on the web has been assessed and content analysis and survey research methods were used to conclude that information overload on the web has destructive effects on different aspects of personality, especially mental, and physical (2). In another study, it was concluded that information overload and too much collective information are among the most important issues that managers have to deal with (3). Another study predicts the future of information networks (4). In addition, another study concluded that when too much information enters the brain without any logical order, it has destructive effects and leads to informational anxiety in humans (5). In a study, the author concluded that Internet shopping might be affected by information overload and create serious problems for inexperienced users (too much information). Another study investigated information overload in Email communications, and used media for reducing user confusion, training, and increasing users' knowledge in order to counter information overload (6). The results show that all three dimensions of overload were significant stressors that influence SNS fatigue. Regarding the predictors of overload, the characteristics of the SNS system significantly influenced the features of system

overload, while information equivocality positively influences information overload (7). We present the results of this investigation. We posit that people with a high level of information overload would experience lowered well-being. Four measures of well-being were used. The data confirmed our hypothesis: the more information stress one feels, the less happy one is with his life. We have also found that conscientiousness (personality trait) mediates this relation (8).

The main aim of this study is to study the views of post-graduate students regarding information overload in real-time mobile web applications in order to provide better, more appropriate solutions for eliminating and controlling information overload.

## 2. Methods

This study uses a descriptive-survey method; web-based questionnaires were used for data collection. In order to collect data related to the research questions, web-based questionnaires were designed and sent to the study population via Email. This questionnaire contains 60 questions. Primary questions are designed to get an overview of the overall information overload. A total of 54 other questions are designed in five options (very high, high, somewhat, low, very low). In this research, the questionnaire designed by the author and the questionnaire used in the research paper "Reviewing the opinions of information specialists about information overload in web" by Alami were used (2). After studying the data related to information overload, the initial questionnaire was created. It was later revised through consultation with teachers and specialists. The questionnaire was designed using "Google Docs" (1) software and was finally put on the web as "the questionnaire for reviewing the opinions of specialists about information overload in mobile applications". Research tools are usually validated by people specialized in the research subject. Therefore, the opinions of five university teachers of library and information sciences were used to correct the problems and complexities in the questionnaire. The reliability of research questionnaires were analyzed in SPSS software using Cronbach's alpha coefficient, which was 0.908 for this research.

The statistical population of this study is Kerman graduate students, between 2015 and 2016. The study includes 1700 students of Shahid Bahonar University of Kerman, 1000 students of Kerman University of Medical Sciences, and 650 students of Kerman University of Technology, 3350 students in total. The statistical sample was extracted using Morgan's sampling table and includes 330 students. A total of 330 web-based questionnaires (Internet questionnaires) were sent to students' Emails and the answers were

received. The collected data were described using various statistical criteria such as tables, charts, and data frequency; regression analysis was performed to assess the views of post-graduate students about information overload.

The study was reviewed and approved by the Local Research Ethics Committee of Shahid Bahonar University of Kerman. The questionnaire was distributed among the students. The researchers informed all students who participated in the study about the objectives of the study and they were given the chance to discuss any questions or issues, written informed consent was obtained from each participant. For ethical considerations, each participant's information was given a secret code and saved as confidential. On average, participants took 15 – 30 minutes to complete each study

### 3. Results

In this section, we examined the findings for each research question in order to describe the questionnaire, then, the attitude of the users is analyzed using the data obtained from the questionnaire. According to the demographic data, 80.7% of the sample were women and 19.3% were men. Most of the respondents (62.1%) are in the age group of 20 to 25 years. Of these, 286 students were in master studies (64.6%) and 44 (13.4%) were in PhD studies. According to the survey, 33 people (8%) attended training programs on real-time mobile web applications, and 297 people (92%) did not attend the training programs. A total of 265 people (80.7%) did not need to be trained to use real-time mobile web applications and 65 people (19.3%) needed to be trained to use real-time mobile web applications. Accordingly, 113 people (50%) consider real-time mobile web applications to spread infected information and 113 (50%) believed that professional needs could not be searched for in these software applications, and that using these mobile web applications was not necessary.

#### 3.1. What Are the Views of Post-Graduate Students About Influencing Factors for Information Overload in Real-Time Mobile Web Applications?

According to [Table 1](#), it is possible to sort these influencing factors in descending order: irrelevant information for the user (average 3.85), amount of monitoring and management of discussion groups (average 3.81), wrong and incorrect information (average 3.81), violation of privacy in real-time mobile web applications (average 3.80), redundant information (average 3.78), the speed of real-time mobile web applications in accessing information (average 3.70), technical support and updates for information search in real-time mobile web applications (average

3.64), increasing number and diversity of channels to access information such as high numbers of groups (average 3.61), lack of advanced data saving methods in real-time mobile web applications (average 3.59), worthless information for the user (average 3.57), too much information (average 3.31), ease of accessing information in real-time mobile web applications (average 3.29), and bugs and issues in some real-time mobile web applications (average 3.28).

A number of items were used to assess the views of post-graduate students. Items' priority, average, and standard deviation are presented in the next tables based on Likert spectrum (Likert scale). For the final sorting of the views of post-graduate students, the scores of items related to each view were combined into a final score. The results were sorted again according to the highest and lowest possible scores and three levels were presented (positive, moderate, negative) to describe the views of respondents towards to subject.

#### 3.2. What Are the Views of Post-Graduate Students About Personal Influencing Factors (Personal Reactions) When Faced with Information Overload in Mobile Web Applications?

According to [Table 2](#), it is possible to sort these personal influencing factors in descending order: necessity of finding specific information (average 3.54), I have enough skill in retrieving information (average 3.45), sometimes I do not pay enough attention to relevant information (average 3.44), I can receive information from different channels (average 3.37), when faced with a lot of unwanted information or parasite, I get distracted from the relevant information (average 3.35), I have enough skill in controlling and assessing the retrieved information (average 3.32), I can use mind skills such as critical thinking, creative thinking and so on to deal with information (average 3.30), I have enough language skills when searching for information (average 3.20), I have specialized knowledge regarding the search subject (average 3.19), I can make appropriate decisions when faced with relevant information (average 3.16), I get very tired when searching for a lot of information (average 3.15), and I am able to assess relevant and non-relevant information when searching (average 2.98).

#### 3.3. What Are the Views of Post-Graduate Students About Tools for Controlling Information Overload in Mobile Web Applications?

According to [Table 3](#), we can sort the effective tools for controlling information overload in descending order: editing and removing irrelevant information (average 3.33), using smart and selective information systems (average 2.92), and using filtering (average 2.64).

**Table 1.** The Views of Post-Graduate Students About Influencing Factors for Information Overload<sup>a</sup>

Item	Priority	Mean (from 5) ± SD
Too much information	1	3.31 ± 0.98
Increasing number and diversity of channels to access information such as high numbers of groups	2	3.61 ± 0.73
Amount of monitoring and management of discussion groups	3	3.81 ± 0.77
Violation of privacy in real-time mobile web applications	4	3.80 ± 1.08
The speed of real-time mobile web applications in accessing information	5	3.70 ± 0.95
Ease of accessing information in real-time mobile web applications	6	3.29 ± 0.85
Technical support and updates for information search in real-time mobile web applications	7	3.64 ± 0.85
Wrong and incorrect information	8	3.81 ± 0.74
Redundant information	9	3.78 ± 0.91
Worthless information for the user	10	3.57 ± 0.89
Irrelevant information for the user	11	3.85 ± 1.04
Lack of advanced data saving methods in real-time mobile web applications	12	3.59 ± 0.63
Bugs and issues in some real-time mobile web applications	13	3.28 ± 0.73

<sup>a</sup> Scale: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high; mean = 3.6; standard deviation = 0.89.

**Table 2.** The Views of Post-Graduate Students About Personal Influencing Factors When Faced with Information Overload<sup>a</sup>

Item	Priority	Mean (from 5) ± SD
Necessity of finding specific information	1	3.54 ± 0.77
When faced with a lot of unwanted information or parasite, I get distracted from the relevant information	2	3.35 ± 0.84
I have enough skill in retrieving information	3	3.45 ± 0.60
I have enough skill in controlling and assessing the retrieved information	4	3.32 ± 0.76
I can receive information from different channels	5	3.37 ± 0.89
Sometimes I don't pay enough attention to relevant information	6	3.44 ± 0.92
I get very tired when searching for a lot of information	7	3.15 ± 0.87
I can make appropriate decisions when faced with relevant information	8	3.16 ± 0.78
I have specialized knowledge regarding the search subject	9	3.19 ± 0.85
I can use mind skills such as critical thinking, creative thinking, etc., to deal with information	10	3.30 ± 0.95
I have enough language skills when searching for information	11	3.20 ± 0.90

<sup>a</sup> Scale: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high; mean = 3.29; standard deviation = 0.85.

**Table 3.** The Views of Post-Graduate Students About Effective Tools for Controlling Information Overload<sup>a</sup>

Item	Priority	Mean (from 5) ± SD
Using filtering	1	2.64 ± 1.36
Editing and removing irrelevant information	2	3.33 ± 0.93
Using smart and selective information systems	3	2.92 ± 1.07

<sup>a</sup> Scale: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high; mean = 2.9; standard deviation = 1.17.

#### 3.4. What Are the Views of Post-Graduate Students About Personal and Environmental Influencing Factors in Eliminating Information Overload in Mobile Web Applications?

According to [Table 4](#), it is possible to sort the personal and environmental influencing factors in eliminating in-

formation overload in descending order: knowledge training on user interaction with information (average 3.75), skill training on user interaction with information (average 3.72), technical skill training on the retrieval of valu-

able information and its application (average 3.72), cultural and social training on user interaction with information (average 3.67), information retrieval by experts (average 3.65), careful input of information (average 3.47), and upgrading the standards for information storage and retrieval (average 3.33).

### 3.5. What Are the Views of Post-Graduate Students About Solutions for Mitigating Information Overload in Mobile Web Applications?

According to [Table 5](#), it is possible to sort the solutions for mitigating information overload in descending order: management of personal knowledge (average 4.21), assigning the work to experts (average 3.92), using advanced and authentic mobile applications (average 3.92), prioritizing the information (average 3.83), using advanced network features (average 3.83), and filtering information (average 2.63).

### 3.6. What Are the Views of Post-Graduate Students About Effects of Information Overload on Users in Mobile Web Applications?

According to [Table 6](#), it is possible to sort the effects of information overload on users in descending order: informational stress and anxiety (average 3.70), despair and hopelessness in retrieving relevant information (average 3.62), informational fatigue (average 3.56), expenditure loss (average 3.48), reduced ability to think deeply and reduced use of mental skills (average 3.44), time loss (average 3.44), negative effect on professional responsibilities (average 3.42), delay in decision making (average 3.42), negative effect on personal life (average 3.31), destructive effect on mental health (average 3.29), hesitation in distributing information (average 3.17), reduced value of users' information (average 3.13), and destructive effect on physical health (average 3.11).

Apart from constant factors, other factors including factors responsible for information overload, personal influencing factors for dealing with information overload, effective tools for controlling information overload, personal and environmental influencing factors in eliminating information overload, solutions for mitigating information overload, and the effects of information overload on users all have a statistical significance of 0.01. The aforementioned factors are the independent variables of this research and have directly affected the views of post-graduate students. The  $R^2$  coefficient was 0.98, which shows that the independent variables of the model account for approximately 98% of variability in dependent variables.

## 4. Discussion and Conclusion

Considering the increasing usage of mobile devices and mobile web applications for sending text, audio and visual messages, and the participation of all society members in these forms of communication, as well as their infection to information overload as social media and information sources, we have analyzed them as an important subject (WhatsApp, Tango, Telegram and Viber) and identified the key factors responsible for information overload in mobile communicational web applications and the personal influencing factors for countering the problem of information overload. We have also used appropriate tools and useful strategies to control information overload. We then have focused on environmental and personal factors that are effective at eliminating information overload and have suggested appropriate measures and solutions for mitigating information overload. The overall research results show that the views of post-graduate students regarding factors responsible for information overload in real-time mobile web applications are positive, and the main factors responsible for information overload in real-time mobile web applications are irrelevant information for the user, the amount of monitoring and assessment on people and management of discussion groups, wrong and incorrect information, and violation of privacy. This is consistent with Alami's research results (2). The results also show that the views of post-graduate students regarding the main personal influencing factors (personal reactions) when faced with information overload in real-time mobile web applications are as follows: necessity of finding specific information, I have enough skill in retrieving information, sometimes I don't pay enough attention to relevant information, and I can receive information from different channels. In addition, the views of post-graduate students regarding tools for controlling information overload in mobile web applications are positive and it was concluded that editing and removing irrelevant information, using smart and selective information systems, and using filtering are the main tools for controlling information overload in mobile web applications. This is consistent with Najad Irani and Rajabzadeh's (3) and Motavali's (5) research results.

In addition, knowledge training on user interaction with information, skill training on user interaction with information, and technical skill training on the retrieval of valuable information and its application, are the personal and environmental influencing factors in eliminating information overload in mobile web applications and should be used for presenting better, more appropriate solutions for eliminating information overload. Important solutions for mitigating information overload in mobile

**Table 4.** The Views of Post-Graduate Students About Personal and Environmental Influencing Factors in Eliminating Information Overload<sup>a</sup>

Item	Priority	Mean (from 5) ± SD
Knowledge training on user interaction with information	1	3.75 ± 0.88
Skill training on user interaction with information	2	3.74 ± 0.74
Cultural and social training on user interaction with information	3	3.67 ± 0.83
Technical skill training on the retrieval of valuable information and its application	4	3.72 ± 0.77
Careful input of information	5	3.47 ± 0.60
Information retrieval by experts	6	3.65 ± 0.87
Upgrading the standards for information storage and retrieval	7	3.33 ± 0.79

<sup>a</sup> Scale: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high; mean = 3.62; standard deviation = 0.8.

**Table 5.** The Views of Post-Graduate Students About Solutions for Mitigating Information Overload

Item	Priority	Mean (from 5) ± SD
Filtering information	1	2.63 ± 1.19
Management of personal knowledge	2	4.21 ± 3.63
Assigning the work to experts	3	3.92 ± 0.84
Prioritizing the information	4	3.83 ± 0.74
Using advanced and authentic mobile applications	5	3.92 ± 0.81
Using advanced network features	6	3.83 ± 0.74

**Table 6.** The Views of Post-Graduate Students About Effects of Information Overload on Users<sup>a</sup>

Item	Priority	Mean (from 5) ± SD
Delay in decision making	1	3.42 ± 1.05
Time loss	2	3.44 ± 0.99
Expenditure loss	3	3.48 ± 1.17
Reduced value of users' information	4	3.13 ± 0.99
Informational fatigue	5	3.56 ± 1.09
Informational stress and anxiety	6	3.70 ± 0.93
Negative effect on professional responsibilities	7	3.42 ± 0.99
Negative effect on personal life	8	3.31 ± 1.27
Despair and hopelessness in retrieving relevant information	9	3.62 ± 0.84
Hesitation in distributing information	10	3.17 ± 1.19
Destructive effect on physical health	11	3.11 ± 1.06
Destructive effect on mental health	12	3.29 ± 0.96
Reduced ability to think deeply and reduced use of mental skills	13	3.44 ± 1.12

<sup>a</sup> Scale: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high; mean = 3.34; standard deviation = 1.07.

web applications include management of personal knowledge, assigning the work to experts, using advanced and authentic mobile applications, prioritizing the information, and using advanced network features and filtering information. The results also show that informational stress and anxiety, despair and hopelessness in retrieving relevant information, informational fatigue, expenditure loss,

reduced ability to think deeply, and reduced use of mental skills are the most important effects of information overload on users; this is consistent with Motavali's research results (5). These results should be used for presenting better, more appropriate solutions for eliminating information overload.

## Footnotes

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