Development of a General Internet Attitude Scale

Mary Joyce, Jurek Kirakowski

School of Applied Psychology,
University College Cork, Ireland
{m.joyce, jzk}@ucc.ie

Abstract. This paper presents findings on the recently developed General Internet Attitude Scale (GIAS). Fundamental aspects of attitude in Social Psychological literature outlining appropriate definitions and theoretical frameworks are first presented. Previous issues in Internet attitude research are then reviewed with a focus on the validity of such proposed scales as measurement of attitude. The consideration of such issues in the development of the new attitude scale is then outlined, and the development process of the GIAS is summarized. Although studies with GIAS found difference between age groups, the effect sizes for differences between the genders were extremely small.

Keywords: Internet, Attitude, Measurement, Validity, Scale development, Gender differences, Age factors.

1 Introduction

Because the Internet has become so ubiquitous, the need to measure how individuals relate to the Internet has become an extremely important aspect of Human-Computer Interaction. However, the measurement of users' attitudes towards the Internet is a poorly researched topic. There have been few attempts at developing an Internet attitude scale in the last number of years [1-3]. These attempts have produced unsatisfactory means of measuring Internet attitudes and have raised issues that serve to obfuscate rather than clarify. Principal failings in the research to date stem from a lack of clarity regarding how attitudes in general are conceptualized. Issues include: the absence of a theoretical framework to measure attitudes; a lack of distinction between the terms 'attitude' and 'self-efficacy'; and inclusion of Internet *uses* as statements of Internet *attitude*.

The primary aim of this research was to develop a statistically reliable and psychometrically valid scale which accurately measures *attitudes* towards the *Internet*. In order to do so, guidelines for the development of attitude scales must be adhered to. With this in mind, this paper outlines briefly the fundamental background from Social Psychology attitude literature as it pertains to the development of the Internet attitude scale. Following this, the four main issues in previous Internet attitude literature are reviewed. The paper concludes with a brief outline of the newly developed General Internet Attitude Scale.

1.1 Definition of Attitude

Since the beginnings of attitude research, agreement on a definition of attitude has excited much debate amongst psychologists. Numerous definitions of attitude have been proposed since early characterizations of attitude at the beginning of the 20th Century. Fishbein and Ajzen's [4] description of attitude became the accepted definition for a considerable time, where they define an attitude as "a person's feelings toward and evaluation of some object, person, issue, or event" (p.12). Note the emphases on feelings toward and evaluation in their definition. In more recent times, Eagly and Chaiken [5] define an attitude more generally as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p.1). This research favors Eagly and Chaiken's more general definition of attitude and defines an Internet attitude as "a psychological tendency that is expressed by evaluating the Internet with some degree of favor or disfavor".

1.2 Theoretical Models of Attitude

Various models of attitude have also been proposed since the beginning of attitude research. These models have close connections to the definitions of attitude which have been proposed throughout the duration of attitude research. One, two and three component models of attitude have all been proposed by various researchers; the three component model being the dominant paradigm in attitude research for much of the last fifty years. The three component attitude model consists of *affect, behavior* and *cognitive* elements as first proposed by Katz and Stotland [6]. However, in recent times, Fishbein & Azjen [7] challenged the notion of the three-component model of attitude. The authors suggest that: "theory and measurement have converged on a unidimensional conception of attitude" (p.77). This unidimensional structure focuses on the "unitary evaluative dimension with respect to an object" (p. 76) [7]. However, there are arguments against such a position. Eagly and Chaiken [5] propose that while it may be the case that the proposed attitude components do not produce three separable omnipresent components of evaluation tendencies, an individual's experience with an attitude object might be *formed* or *expressed* on the basis of any one of three types of processes. Feelings, experiences and beliefs inform attitude; thus an individual's attitude to the Internet might be informed by their feelings towards it, their intended behavior to it, or what they think about it.

While it is possible to continue with theoretical propositions on the structure of attitudes, empirical evidence in the investigation of such theories is necessary. However, such evidence in support of these propositions has been minimal. Thus, it is imperative to empirically test the three-component model of attitudes to identify the underlying structure of attitudes.

This research favors Eagly and Chaiken's [5] position that affect, behavior and cognition ought to be considered in terms of the evaluative response that the attitude object elicits, and attitudes can be formed on the basis of any one, or a mix of the three types of processes involved. As a result, the three-component model is the theoretical framework applied to the development of the Internet attitude scale. Analyses

of the scale will not only tell us information about the underlying structure of *Internet attitudes,* it should also provide suggestions about the underlying structure of attitudes in general.

2 Internet Attitudes

There have been a number of attempts at developing an Internet attitude scale since the turn of the twenty-first century. None of these studies have produced satisfactory means of measuring Internet attitudes. A number of issues have been identified with such attempts which include:

- lack of a theoretical framework for the measurement of attitudes
- inclusion of items which do not represent an attitude, or a component of an attitude
- lack of distinction and clarification between 'attitude' and 'self-efficacy'

The most significant issue identified in previous research has been the absence of a theoretical framework for the measurement of Internet attitudes.

2.1 Absence of Theoretical Framework

Some previous studies [1], [2], write statements for inclusion in their scale without reference to what (implicit) theories about the Internet and its usage were being held by the sources for the statements. More often than not, this has resulted in the inclusion of items which describe idiosyncratic *uses* of the Internet, rather than *attitudes* about the Internet. For example, the initial item pool for Morse et al's Attitudes Towards the Internet Scale (ATIS) [1] was created by identifying the most common uses of Internet technologies using five subject matter experts of Internet use. Instead of following a theoretical framework for attitude measurement on which items are based, common uses of Internet technologies were used to create statements for inclusion on the scale. The item pool resulted in 42 items encompassing seven general factors: general positive attitudes, general negative preferences and preferences for the following five activities: shopping, banking, information searching, entertainment, and communication. Examples of statements from two of the factors include: Shopping: 'I would rather shop online than in a physical store'; and Banking: 'I prefer to use the Internet to pay my bills rather than sending them by mail'. Such items represent uses of the Internet (indeed the authors do point out that items were developed through identification of the most common uses of the Internet!) rather than attitudes about the Internet. Consequently, Morse et al.'s questionnaire is really attempting to measure preference for use of Internet activities. Their failure to adhere to appropriate methodologies results in questionable validity of the items as measures of Internet attitude.

Similarly, Tsai et al.'s study [2] also failed to employ a methodology or theoretical framework for the development of attitude items for their Internet Attitude Scale (IAS). Tsai et al.'s IAS was developed through the revision of Selwyn's [8] Computer Attitude Scale (1997) with the addition of 11 new items following consultation with experts in Internet technology and technology education. The four subscales as initial-

ly proposed in Selwyn's Computer Attitude Scale and reiterated as appropriate for Tsai et al.'s study were (a) perceived usefulness – perceptions about the positive impacts of the Internet on individuals and society, (b) affection – feelings and anxiety when using the Internet, (c) perceived control – confidence about the independent control of Internet usage, and (d) behavior – assessment of actual practice and frequency of using the Internet. However, neither in Selwyn's original study, nor in Tsai et. al's study is it made clear as to how the four subscales were decided upon as being representative of attitudes. Although perceived usefulness may relate to the cognitive element of attitude and affection may relate to the affective element, it is difficult to see how perceived control and actual practice of using the Internet fit into an attitudinal model.

2.2   Inclusion of Non-Attitude Items

In addition to the absence of a theoretical framework, the problem arises that proposed scale items may incorrectly represent components of an attitude. An example of this is the inclusion of the subscale 'behavior' which appears in some Internet attitude scales. Whilst behavior is proposed as one of the three components of attitude, attitude researchers have clearly outlined that the behavioral component of an attitude denotes the action *tendency* of the respondent to the object under investigation. It is well understood that very often, in the real, such a tendency to action may not be expressed in overt behavior, although it may persist over actual encounters.

Tsai et al.'s [2] statements for the subscale 'behavior' depict specific past behaviors in relation to the Internet. An example of one of these statements is 'I use the Internet regularly throughout school'. Tsai et al.'s behavior subscale consists of statements which assess students' practice and frequency of Internet use, instead of including items which refer to the intention to behave as recommended by attitude researchers. If veridically reported, actual behavior in the past may be a poor predictor of attitude toward and hence of attitude tendency at the present moment. One may have been forced to use the Internet through school, hated it, and therefore have an extreme aversion to ever using it in the future (although no doubt life will continue to inflict this painful experience over and over again in the 21st century.) As a result, such items inaccurately represent the proposed attitude components.

Additionally, statements which delineate specific past behaviors in relation to the Internet are evident in other Internet attitude scales. An example of one such item from Morse et al.'s study [1] is 'I like to sell items in Internet sites or Internet auctions'. Many items on these scales include statements which refer to specific uses of the Internet rather than attitudes about the Internet. Such statements tell us more about one's exposure to, and frequency of activity use on the Internet, rather than one's attitude about the Internet. Thus, the inclusion of such statements is unsatisfactory in attitude scales.

2.3 Lack of Distinction Between 'Attitude' and 'Self-Efficacy

A significant issue in past research is the lack of clarification and distinction between the terms attitude and self-efficacy. In Social Psychology, attitudes and self-efficacy are treated as separate constructs. An attitude is defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p.1) [5] whereas self-efficacy is described as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3) [9]. Whilst attitude is concerned with an evaluation of some person or object; self-efficacy focuses on self-evaluation of personal capabilities in achieving goals.

Many studies which attempt to measure Internet attitudes include self-efficacy as a subscale, or a component of an Internet attitude. Why this should be is a mystery, especially as none of the authors who do so give any explanation of why they should expect to find self-efficacy as a component of an attitude. For example, Zhang [3] proposed an Internet attitude scale through adjustments made from a previous questionnaire used in Zhang, Dronet and VanMetre's [10] study which measured something other than Internet attitudes (although what is measured in this previous study is really unclear). Zhang explains that extensive changes were made to the previous questionnaire in an attempt to keep up with more recent technologies. Following a review of relevant literature, consultation with Internet professionals, reviews by experts in educational technology and professors who regularly use the Internet, the final version of the questionnaire consisted of forty items with ten items describing each of four proposed Internet attributes – Internet enjoyment, usefulness, anxiety, - and self-efficacy. It is unclear how these four attributes were decided upon for inclusion as subscales of the Internet attitude scale. A more cautious researcher might have attempted to find empirical evidence for the hypotheses generated by the reviewers. An Internet attitude refers to a person's *feelings,* likes and dislikes about the Internet whereas Internet self-efficacy focuses on the way a person evaluates their personal *capabilities* to achieve goals whilst using the Internet.

Self-efficacy and attitudes are constructs which are not interchangeable, and the difference between feelings and perceived capabilities indicate that self-efficacy should *not* be regarded as a component of an attitude. Therefore self-efficacy should not be included as a subscale of an attitude scale. Similarly, anxiety is not a component of an attitude but is more representative of an emotion rather than an attitude. The implicit model of Zhang's reviewers of Internet experience is a psychological one, to be sure; but it is not a model that will find resonances in any mainstream theory in Social Psychology. As a result, the validity of the statements as measures of attitude in Zhang's Internet Attitude Scale is questionable.

Having identified the primary issues in previous Internet attitude measures was a salutary experience for the researchers as we started to address the development of the new Internet attitude scale. The development of this scale is now outlined.

3 Development of the General Internet Attitude Scale

As earlier outlined, the three component model of attitude is the framework which was followed for the development of the General Internet Attitude Scale (GIAS). The three components are briefly described as: *affect* - an emotion which charges the idea; a feeling which may be good or bad when thinking about the attitude object; *behavior* – the individual's predisposition to action in regard to the attitude object; and *cognition* – the beliefs and ideas a person has about the attitude object. The GIAS will consist of items relating to *Affect* (feelings, likes/ dislikes about the Internet), *Behavior* (behavioral tendencies to act a certain way on the Internet), and *Cognition* (beliefs and cognitions of individuals about the Internet).

An initial item pool of 97 statements was used in the first stage of scale development. Statements from four previous questionnaires which attempted to assess Internet attitudes were collated. These four studies were chosen as the basis for the item pool as these studies exemplified the best attempts at creating items depicting Internet attitudes in the past decade. It was decided that it was first important to address the earlier outlined issues with previous measures and statements which focused on specific Internet uses, or referred to feelings of confidence (self-efficacy) with the Internet, were deleted. When this was completed, the theoretical framework of attitudes employed by this research was applied to the final item pool. Each of the statements was examined in detail to identify whether or not the statement represented (or could represent) one of the three components of an attitude: affect, behavior or cognition. Following this step, the final scale ready for distribution, consisted of 27 items. There were 8 statements representing the 'affect' component, 8 statements representing the 'behavior' component, and 11 statements representing the 'cognition' component of an Internet attitude. Examples of statements representing each of the three attitude components are outlined in table 1.

Table 1. Examples of Statements in the General Internet Attitude Scale

Subscale	Statement
Internet Affect	I feel intimidated by the Internet
	I feel at ease using the Internet
Internet Behavior	The less contact I have with the Internet, the better
	I would like to stay on the Internet for as long as I can
Internet Cognition	The Internet makes life more efficient
	The Internet lessens the importance of people's jobs

4 Results

The scale was distributed to participants on four different occasions for which a total of 2,600 participants completed the scale. Exploratory factor analyses were carried out on the data and revealed the presence of four underlying factors. The four factors were named as *Internet Affect, Internet Exhilaration, Social Benefit of the Internet,*

and *Internet Detriment.* The original three-component model of attitudes was not replicated in the Internet attitude scale. This in itself is a significant finding, given that the researchers attempted over and over again to include behavioral disposition items into the earlier versions. However, some interesting trends emerged. Previous literature in general attitude theory advocates that behavioral elements of attitude ought to address the *intention to behave* with the attitude object. As a result, this guideline was followed in the development of items for the current scale. Nonetheless, it seems that such items still did not hold significance for participants in the domain of Internet attitudes. So although some intention to behave items remain there is no behavior subscale per se. Intention to behave thus enriches the scope of the Affect and Cognitive factors but does not constitute a factor in its own right.

4.1 Examination of the Attitude Components

As can be deduced following the naming of the subscales, the subscale *Internet Affect* consisted of only 'affect' items which were proposed in the original version of the scale. However the subscale *Internet Exhilaration* contained 'affect' items and one 'behavior' item. Thus a positive attitude towards the Internet may not always be accompanied by an exhilaration component towards it – and indeed, vice versa. The exhilaration component possibly involves an intended action.

With the exception of one 'behavior' item, both the *Social Benefit of the Internet* and *Internet Detriment* subscales consisted solely of cognitive statements. We may wish to view these two scales as positive and negative beliefs about the Internet, noting that it is perfectly possible, since these factors are moderately orthogonal, that a person may at any one moment entertain both kinds of beliefs about the Internet.

What was of particular interest over the four stages of scale development was the manner in which 'behavior' items fell out during the analyses. Following numerous analyses, the original scale which had consisted of 27 items was reduced to 21 items. The majority of deleted items were 'behavior' statements which achieved unsatisfactory loadings during factor analysis or did not fit semantically on the factor on which they loaded. In the final version of the GIAS, only two 'behavior' items remain. These findings are in line with previous concerns regarding the 'behavior' element of attitudes.

4.2 Gender Differences

Much literature in the area of gender and the Internet suggest that there may be a gender gap in technology. Studies which attempted to develop Internet 'attitude' scales in the past did indeed *find* gender differences in Internet attitudes. However, as earlier outlined, previous measures of Internet attitudes are insecure and possibly invalid as a result of the failure to follow well-established methodologies for attitude measurement. It is unclear what the scales in these studies are actually measuring; thus while such studies claim to have found gender differences in Internet attitude, the results ought to be interpreted with caution.

The results of the analyses in the present studies found *no* significant differences in Internet attitudes between the males and females. Effect sizes for the differences between the sexes are so small as to be negligible.

4.3 Age Differences

While there is much speculation about gender differences in Internet attitudes, little research investigated *age* differences in Internet attitudes. This research hypothesized that older participants may have less positive Internet attitudes than younger individuals as the Internet is a relatively recent phenomenon about which older generations would have known little about until later in life. Age differences in Internet attitude *were* found in the current analyses. Participants aged *25-34 years* obtained the highest scores on Internet attitudes while participants aged *55-64 years* obtained the lowest scores on Internet attitudes. The differences between the groups were significantly different. What was surprising was the low Internet attitude scores achieved for the youngest age group (*<18 years*). However, the number of participants in the sample for this age group was extremely small ($n = 11$) so these results must be interpreted with caution. Further exploration of Internet attitudes in this age category is thus necessary.

5 Conclusion

Following extensive testing and iterative analyses of the GIAS, the current scale consists of 21 items with four subscales: *Internet Affect, Internet Exhilaration, Social Benefit of the Internet,* and *Internet Detriment*. Confirmatory factor analyses of the final scale achieved excellent goodness-of-fit of the current model and demonstrated excellent reliability with Cronbach Alpha coefficients ranging from .67 to 87 for the four subscales and a value of .86 for the overall scale. The construct validity of the questionnaire is at least positively commendable and the authors hope that other researchers interested in Internet attitude will be challenged enough by our results to want to adopt our scales in their research.

References

1. Morse, B.J., Gullekson, N.L., Morris, S.A., & Popovich, P. M. (2011). The development of a general internet attitude scale. *Computers in Human Behaviour, 27*(1), 480-489.
2. Tsai, C-C., Lin, S. S. J., & Tsai, M-J. (2001). Developing an Internet attitude scale for high school students. *Computers and Education, 37*(1), 41-51.
3. Zhang, Y. (2007). Development and validation of an internet use attitude scale. *Computers and Education, 49*, 243-253.
4. Fishbein, M., & Azjen, I. (1975). *Belief, attitude, intention and behavior: an introduction to theory and research*. Mass., USA: Addison-Wesley.
5. Eagly, A. H. & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition, 25*(5). 582 – 602.

6. Katz, D. & Stotland, E. (1959). A Preliminary Statement of a Theory of Attitude Structure and Change. In S. Koch (Ed.), *Psychology: A study of a science, Vol. III*. New York: McGraw-Hill, 1959.
7. Fishbein, M. & Azjen, I (2010). *Predicting and changing behaviour: the reasoned action approach*. New York: Psychology Press (Taylor & Francis).
8. Selwyn, N. (1997). Students' attitudes toward computers: validation of a computer attitude scale for 16-19 education. *Computers and Education, 28*(1), 35-41.
9. Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York: W. H. Freeman.
10. Zhang, Y., Dronet, V., & VanMetre, S. (1999/2000). Louisiana teachers' learning and adopting the Internet through inservice training. *Lousisiana Education Research Journal, 25*(1), 3-18.