Information Seeking Behaviour in Online Shopping

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Abstract. Prior literature has established that information seeking is crucial part of the process of online shopping. However, information seeking behaviour is usually treated as a black box and there is a dearth of studies about the information seeking behaviour of consumers during online shopping and its influence on online purchase intention. Our study aims to fill that gap by employing Ellis' model of information seeking behaviour as our theoretical lens to understand this phenomenon. Ellis' model has eight features or stages related to information seeking behaviour: starting, chaining, browsing, differentiating, monitoring, extracting, verifying and ending. We first conducted a survey to measure these features. We then constructed a measurement model to validate the survey instrument. We found that only three features passed the validity and reliability tests which were starting, monitoring and verifying. We then used structural equation modeling for hypotheses testing and found a significant relationship only for the verifying feature. In other words, only verifying was positively associated with online purchase intention.

Keywords: Information seeking behaviour · Online shopping · Ellis' model of information seeking behaviour

1 Introduction

The online experience today has brought a new dimension to our information-searching practices, providing a wide variety of options for users. A significant amount of data has moved from print media and is now electronically available for the public. Thus, several people automatically associate information and related events with the internet [1]. Understanding users' information searching behaviour is an active area of research that has broad implications on the design of information systems. Information scientists have always been interested in explaining people's information seeking behaviour as it will help in designing better information systems that are easy to use [2]. This has huge implications for both commercial and academic purposes. Understanding people's information seeking behaviour in an online context is therefore, important because it will help increase our understanding of web information spaces, its design and maintenance [1].

Online shopping has evolved dramatically over the years and has become a daily trend in various product categories owing to an increase in internet connectivity and use [3]. Global e-commerce sales reached 3.53 trillion USD in 2019 and is expected to

reach 6.54 trillion USD by 2022 [4]. Online shopping thus, has become one of the most popular online activities worldwide. Due to internet technology, people today have easy access to information available in the online domain. As the Internet increases in reach and popularity, more and more people become familiar with it and use it as a tool for information finding and online shopping [5, 6]. Previous research indicates that for many users, the Internet has become a significant source of information [7–9].

The purchasing behaviour of consumers is complex in different ways and is affected by various factors. Prior literature shows many attempts to build models for explaining consumer decisions and their decision-making process. Amongst many factors that influence a user's purchase decision, information search is widely considered as being one of the critical factors [10]. Due to its role in the process of consumer decision-making and marketing communications strategy, a number of researchers and marketing experts have long analysed consumer search behaviour before purchasing items [11–13]. Thus, information search is an essential part of consumer decision-making process and purchase behaviour.

In the context of online shopping, one relies mainly on the information provided on the website. This information can consist of brand, online advertisements, online vendor suggestions, online expert reviews and product comparison [10]. Investigating user's information seeking behaviour during online shopping is therefore crucial for understanding user's online purchase behaviour. Information search has been established in literature to be an antecedent of online purchase intention [14–18]. However, the literature does not elaborate on the process of consumers' information search behaviour. Specifically, the relationship between information seeking behaviour of users with online purchase intention. Thus, we see that there is a gap in literature in describing the details of information seeking behaviour of consumers during online shopping. Ellis' model is one of the seminal models and widely cited as best describing the ways users search for information [19, 20]. It is based on solid empirical analysis and has been subsequently validated in many studies in different contexts. Our study aims to fill the literature gap by using the Ellis' model to examine the information seeking behaviour of users when shopping online, specifically, in relation to online purchase intention.

2 Information Seeking for Online Shopping

Information seeking has seen in literature to influence online shopping in a variety of ways. For example, Chaturvedi et al. [21] reported information seeking to be an antecedent of online apparel shopping. Kang and Johnson [22] found that users who were value conscious and social browsers (people who browse for social purposes) used online social shopping for the purpose of information-seeking. Hjorthol [23] studied the relationship between online shopping, information seeking and travel activity. This research showed that different kinds of groups use the Internet to search for information in order to purchase different kinds of products. Kau et al. [24] found that most groups search for information before making an online purchase. Seock and Bailey [25] conducted a survey analysis of college students and found that the shopping orientation of the participants was substantially related to their on-line search for

information for online shopping. Esch et al. [26] found that information seeking has a positive moderating effect on perceived product satisfaction during online purchasing. Finally, Zha et al. [27] found that self-efficacy in collecting information influenced perceived decision quality and satisfaction with online shopping.

However, current literature does not elaborate on the process of consumers' information search behaviour. Only few studies have attempted to capture the information seeking behaviour of users. For instance, Detlor et al. [28] studied consumer preferences for Web-based product information display across browsing and searching tasks. They found that information about price, product and vendors were essential for both searching and browsing. While searching emphasized on product information, browsing focused more on vendor information. They concluded that website design and how it displayed information could be instrumental in promoting online shopping. Benn et al. [29] studied consumers online behaviour when shopping online and found browsing was preferred over searching and pictorial information was relied upon more than textual information. Kim and Eastin [30] found that online shopping behaviour was influenced by pre-purchase browsing time and that the pre-purchase browsing time has a positive relationship with online buying frequency. The study also found a positive relationship between purchase intention and perceived quality of information. Thus, we see that there is a gap in literature in describing the information seeking behaviour of consumers during online shopping. Our study aims to fill that gap by using the widely influential and seminal Ellis' model to examine the information seeking behaviour of users when shopping online.

3 Ellis' Model of Information Seeking Behaviour

Based on the study of information seeking behaviour of academics, Ellis [19, 20] proposed a generic model of information behaviour. This model had eight "features" which were various activities involved in information seeking patterns. These included starting, chaining, browsing, differentiating, monitoring, extracting, verifying and ending [19]. Ellis studied and reported the search activity of 60 social scientists who searched for paper-based information in a library environment.

The robustness of Ellis' model was subsequently proved in multiple studies involving academics, chemists, engineers and physicists [31–38]. The information seeking behaviour model developed by Ellis was based on information seeking in library environments using paper-based information sources, not electronic or online library catalogues. However, he did not rule out the possibility of this model being applied to hypertext systems.

Various processes of Ellis' model are described below:

Starting: Starting activity is characteristic of the initial search for information and involves identifying the initial materials to search through and select starting points for the search.

Browsing: Browsing involves a semi-directed searching in an area of potential interest as a monitoring activity going through the scanning of journals and tables of contents etc., to find the something of particular interest.

Chaining: Chaining is when the information seeker follows the chains of citations or other forms of referential connection between materials to identify new sources of information. Chaining can be forwarded where the user is looking for new sources that refer to the initial source or follows footnotes and citations in an information source.

Differentiating: Differentiating is characterized by activities in which the user ranks the information sources based on their relevance and value to his or her information need.

Monitoring: Monitoring is similar to searching for the information for current awareness purposes where the user maintains an awareness of developments in his field of interest through the monitoring of particular sources.

Extracting: The user systematically works through a particular source to locate material of interest in the extracting mode. This implies the selective identification of relevant material in an information source and represents a major feature of the information-seeking patterns of many researchers.

Verifying: Verifying involves checking the accuracy of information obtained by the user from various sources.

Ending: Ending involves 'tying up the loose ends' through a final search.

This model focusses on the different characteristics of information seeking behaviour of users. These features or characteristics do not take place in any sequence and maybe performed in different patterns at different times during the information search process of a user. The strength of Ellis' model is that it is based on robust empirical research and has been tested in multiple studies subsequently [32, 40–42]. In fact, Wilson [43] also incorporated the features identified by Ellis in his model of information seeking behaviour. Thus, Ellis' model of information seeking behaviour has been influential and prompted multiple subsequent studies to understand information search behaviour of users. In this study, we aim to understand user's information search behaviour during online shopping from the lens of Ellis' model.

4   Relating Ellis' Model to Online Shopping

Ellis proposed that hypertext-based systems could perform the activities indicated by his original model. If we consider the internet as a hyperlinked network of multiple web pages, Ellis' model already supports much of the information search activities [44]. As described by Choo et al. [41]: "An individual could begin surfing the web, from one of a few, favourite starting pages or sites (starting) follow hypertextual links to related information sources, both in backward and forward linking directions (chaining); scan the web pages of the sources selected (browsing); bookmark useful sources for future reference and visits (differentiating); subscribe to e-mail based services that alert the use of new information or developments (monitoring) also search a particular source or site for all information on that site on a particular topic (extracting)." Table 1 show possible web-based extensions to Ellis' features for information seeking behaviour. The web-based activities are labelled as "Anticipated Web Moves" and compared with

Ellis' original formulations which are labelled as "Literature Search Moves" as suggested by [41].

Table 1. Information seeking behaviours and web moves [41]

	Starting	Chaining	Browsing	Differentiating	Monitoring	Extracting
Literature Search Moves (Ellis et al., 1989, 1993, 1997)	Identifying sources of interest	Following up references found in given material	Scanning tables of contents or headings	Assessing or restricting information according to their usefulness	Receiving regular reports or summaries from selected sources	Systematically working a source to identify material of interest
Anticipated web moves	Identifying web sites/pages containing or pointing to products one wishes to purchase	Following links on starting pages to other content-related pages	Scanning top-level pages: lists, headings, site maps	Selecting useful pages and sites by bookmarking, printing, copying and pasting, etc.; Choosing differentiated, preselected site	Receiving site updates using e.g. push, agents, or profiles; Revisiting 'favorite' sites	Systematically searches a local site to extract information of interest at that site

Thus, we can adapt Ellis' model easily for studying online shopping and how it influences user's purchase intention. Each of the new information-seeking behavioural features identified by Ellis can be easily adjusted in the context of online shopping when searching for pre-purchase information while retaining its original and basic function (as can be seen in Table 1).

In order to build and sustain the successful consumer relationship, an online shopping website should therefore consider the consumers ' purchasing behaviours Kim and Hong [45]. Ajzen [46] indicates that intentions are believed to reflect how eager people are towards performing a particular behaviour. Research has shown that lack of intention to purchase online is the main hindrance to e-commerce [47]. In a study by Laohapensang [48], it was seen that difficulty of shopping online was the most influential factor that affected online purchase intention. Thus, we see that there is a link between purchasing intention and actual purchasing behaviour.

It has been established in literature that users' search for information before making a purchase is critical in their decision-making process [10, 11]. Ellis' identified various features of information search process. Choo et al. [41] theoretically extended how Ellis' features could be used in an online system. By applying Ellis' model, we therefore expect that each of these features (starting, chaining, browsing, differentiating, monitoring, extracting and verifying) will directly and positively influence user's purchase intention as part of their information search activities. Purchase intention is known to be a determinant of purchase behaviour [47–50]. Therefore, we formally hypothesize for each of the features of Ellis' model:

Table 2. Factor structure

Construct	Item	Factor loading
Starting = 0.725	Before making an online purchase, I start surfing the web for finding websites which sell the product/item of my interes	.914
	I identify multiple online sources from which I could potentially purchase my item/product of interest before making the actual purchase	.816
Monitoring = 0.514	I usually keep abreast with developments for my item/product of interest by regularly visiting related web pages	.752
	I sometimes use google alert feature or push notifications to keep me updated regarding my item/product of interest	.763
Verifying = 0.653	I check the accuracy of information given by reading my item/product of interest's reviews before making an online purchase	.687
	I check the accuracy of information given by checking how many other people have bought my item/product of interest before making an online purchase	.864
Purchase Intention = 0.809	I choose to buy items/products online	.845
	I will frequently purchase product online in future	.860

H1: The starting feature of Ellis' model is positively related to online purchase intention

H2: The chaining feature of Ellis' model is positively related to online purchase intention

H3: The browsing feature of Ellis' model is positively related to online purchase intention

H4: The differentiating feature of Ellis' model is positively related to online purchase intention

H5: The monitoring feature of Ellis' model is positively related to online purchase intention

H6: The extracting feature of Ellis' model is positively related to online purchase intention

H7: The verifying feature of Ellis' model is positively related to online purchase intention

5   Research Methodology

5.1   Data Collection

Two studies were conducted to test the proposed hypotheses. Study 1 uses a survey methodology to validate the constructs in the research model and to gain some initial insight about Ellis' model of information seeking behaviour. In study 2, structural equation modelling was used for hypotheses testing.

Since there are no existing scales that measure each of the features of Ellis' model of information seeking behaviour, we designed and administered a survey, based on literature review, to capture the information search behaviour of users during online shopping and how it influences their purchase intentions. A set of measurement items was adapted to the context of this research, and a 21-item questionnaire was implemented. The responses of the survey participants to each of the items were measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The total number of responses was 108. 66% of the respondents were male while 34% were female. 61.2% of participants were 26–30 years old, 36% participants were 20–25 years old, 5.2% were 31–35 years old and the rest were above 35 years. Of these, 41.4% shopped online every month, 26.7% shopped online every two weeks, 9.5% shopped online every week, 2.6% shopped twice a year and 0.9% shopped once a year. Thus, we see that the sample pool comprised of young people who shopped regularly and were familiar with the process of online shopping.

5.2 Data Analysis

Next, the convergent and discriminate validity of the constructs and the individual reliability for each item was established (Table 3). The convergent validity of each construct is acceptable for a loading higher than 0.505 [51]. The individual reliability for each item is given by loadings or correlations between the item and the construct. Since many items failed to meet the acceptable criteria for factor loading, they were removed.

Table 3. Validity and reliability of survey

	CR	AVE	MSV	MaxR (H)	Monitoring	Purchase intention	Starting
Monitoring	0.920	0.893	0.013	1.757	0.945		
Purchase Intention	0.820	0.697	0.206	0.865	−0.030	0.835	
Starting	1.141	1.141	0.063	1.141	−0.043		
Verifying	0.741	0.614	0.206	0.984	0.116	0.454	0.250

Only four constructs cleared the criteria for validity and reliability both which were monitoring, purchase intention, starting and verifying as shown in Table 2.

Following the establishment of reliability and validity of the constructs, the structural model is examined. It can be seen that out of seven hypotheses were constructed for each of the features of Ellis' model of information seeking behaviour. However, only four constructs were passed the validity and reliability criteria. A reason for this can be that Ellis' model is more than twenty years old and not all the features maybe relevant today in the context of online shopping. Structural equation modelling in AMOS version 23 was used to test the relationship in H1, H5 and H7. Only H7 was found to be significant (Table 4).

Table 4. Result of structural equation modelling

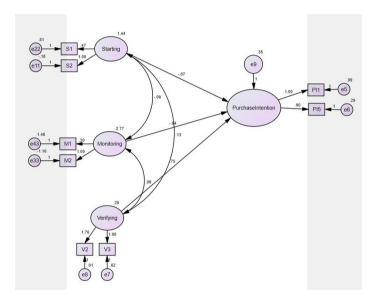| Variable	Estimate	S.E	P-value
PurchaseIntention ← Starting	−.072	.068	.289
PurchaseIntention ← Monitoring	−.038	.085	.659
PurchaseIntention ← Verifying	.747	.203	***
S1 ← Starting	.473	.241	.050
M1 ← Monitoring	.200	.413	.628
PI5 ← PurchaseIntention	.900	.180	***
V2 ← Verifying	1.756	.562	.002

Fig. 1. Structural Model

6 Discussion and Conclusion

This purpose of this study was to understand the information seeking behaviour of consumers during online shopping, specifically in relation to online purchase intention. Prior research has established that information search behaviour is a determinant of online purchase intention. However, there is a dearth of studies about the information seeking behaviour of consumers during online shopping. Information seeking behaviour is usually treated as a black box in literature. Our study aims to shed more light on consumer's information seeking behaviour by employing Ellis' model as our theoretical lens to understand this phenomenon in the context of online shopping. Ellis' model has eight features or processes related to information seeking behaviour: starting, chaining, browsing, differentiating, monitoring, extracting, verifying and ending.

We first conducted a survey to measure these features. We then constructed a measurement model to validate the survey instrument. We found that only three features passed the validity and reliability tests which were starting, monitoring and verifying.

Next, we conducted hypothesis testing for the hypotheses relevant to starting, monitoring and verifying. We found significant relationship only for the feature verifying. In other words, only verifying was positively associated with online purchase intention.

Thus, we see that not all features of Ellis's [20] original eight feature model of information seeking behaviour are relevant today in relation to consumer's purchase intention in the context of online shopping. The information seeking behaviour model developed by Ellis [19] was based on information seeking in library environments using paper-based information sources, not electronic or online library catalogues. Hence it cannot be directly applied to the consumer's purchase intention during online shopping. Nonetheless, Ellis' model remains broadly valid even today. Three features of the model continue to be valid for consumer's purchase intention during online shopping are: starting, monitoring and verifying in the context of online shopping. Of these, only verifying is positively associated with purchase intention in the context of online shopping. This suggests that a user may start the process of information search but it may not always lead to a positive purchase intention. Furthermore, even if a user monitors a product or item of interest, it does not mean that user will definitely buy it. However, if a user is in the process of verifying the information then it implies a positive purchase intention.

The implications of this study are manifold. First, the process of looking for information, especially online, is different and more research is needed to capture the new dimensions. Second, users place a lot of focus on verification of the information. This might be because the product is being bought online and is intangible. With the changing landscape of shopping from brick and mortar to click and mortar, the information seeking behaviour of users is also changing. Third, we need a different information seeking model to capture all the dimensions of online search behaviour of users. Towards this end, Meho and Tibbo [52] revised Ellis' model and to include new features called accessing, networking, verifying and information managing. Their paper was based on the faculty of social sciences, which studied stateless nations. Although their research echoed the applicability of Ellis's model, it found that a more thorough explanation of the actions of the social scientists seeking information could be found by differentiating between processes of searching for information and activities of finding information.

This study is not without limitations. First, the sample size was small and data was collected from a largely student population. Future work can expand the sample size and collect a more geographically distributed data to ensure representativeness. Second, future work can use other models of information search behaviour such as Meho & Tibbo [52] which is more apt for the context of online shopping.

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