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Expectable use: An important facet of IT usage

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ABSTRACT

In this article, we add to the growing body of recent theoretical literature on usage, which remains fragmented. We propose a new concept emerging from our work – expectable use – as a dispositional facet of IT usage that may evolve over time, depending on training and context. This facet of usage represents the user's disposition, or inclination, to use any IT (digital devices, software, etc.) pro-actively and in a self-determined fashion; it includes affective, cognitive and behavioral elements that result from both individual and group factors. With a classic grounded theory stance, we use mixed data and techniques, both qualitative and quantitative, to conceptualize, define, and model this new variable; we develop a quantitative index to assess it at a given moment in time. As a result of our work, we also propose that expectable use should significantly explain effective use and utilization.

Introduction

In globalized markets, information technology (IT) has now become an intrinsic part of day-to-day social life (Jouët, 2000) and work practices (Orlikowski and Scott, 2008). IT is "everywhere" (Nolan, 2012) and organizations evolve in a competitive landscape that is "networked" (Merali et al., 2012). As a consequence, user profiles and their varying use of IT have evolved significantly during the last decade (Walsh et al., 2010; White and Le Cornu, 2011). "Digital natives" and "digital immigrants" (Prensky, 2001) have started to work side by side in organizations, but situations are not always as one might expect: Some digital natives do not appear conversant or at ease with IT, while some older digital immigrants sometimes reveal themselves as proficient and comfortable with it, their IT usage being proactive and self-determined (Walsh et al., 2010). Prensky's (2001) compelling differentiation between digital-native and digital-immigrant users is now strongly questioned (Holton, 2010; Kennedy et al., 2010; McKenzie, 2007; White and Le Cornu, 2011), including by Prensky (2009) himself. Furthermore, despite costly investments in organizations, some strategic technologies remain much underused, even though they have been carefully tested and are well adapted to help users fulfill certain tasks (Arvidsson et al., 2014; Brown et al., 2004). In other cases, some users approach IT in a proactive fashion: They carry out innovative appropriation strategies, leading to unexpected events, which can affect firms' strategic plans (Kang, 2006).

Usage is a central construct in information systems (IS) research and has received increased scrutiny in the last few years. It has been shown to involve user, system, and task (Burton-Jones and Straub, 2006), and to be a multilevel phenomenon that may be studied at individual, group and/or organizational levels (Burton-Jones and Gallivan, 2007). Usage also involves

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top-down and bottom-up processes (Nan, 2011). More specifically, effective, goal-fulfillment use has recently been investigated (Burton-Jones and Grange, 2013). In the present work, we do not examine the effective, goal-fulfillment use of a specific system; rather, we investigate dispositional IT use – that is, this other broad facet (or dimension) of IT usage linked to users' individual characteristics, their personality (Devaraj et al., 2008; McElroy et al., 2007), their IT values (Leidner and Kayworth, 2006), and their IT culture (Walsh et al., 2010).

The importance of user profiles and individual characteristics for the success of new-IT implementation, and of how users' cognition and affect must be taken into account when investigating IT usage, has long been recognized (Zmud, 1979). However, this issue has not received much interest in the IS literature for many years (Devaraj et al., 2008). Individual characteristics may be investigated through users' general disposition or their specific dispositions (Venkatesh and Windeler, 2012). General disposition is close to users' personality (Allport, 1961, 1962); it is a habitual inclination, a tendency to behave, feel or think in certain ways whatever the situation and/or context. Specific dispositions are dispositions to behave, feel or think in certain ways in relation to specific activities. Some fairly recent works (e.g., Devaraj et al., 2008; McElroy et al., 2007; Venkatesh and Windeler, 2012) have used personality, considered fairly stable over time, to investigate individual characteristics: see for instance McElroy et al. (2007), who used the "Big Five" model. Very few works have concentrated on IT-specific disposition that may, to some extent, evolve over time through training and experience. Venkatesh and Windeler (2012) did choose to investigate IT disposition. They arbitrarily chose to retain only certain IT-specific traits extracted from some of the most-cited papers on IT adoption. Although interesting, their work did not aim to be comprehensive. However, many different variables, which involve affect, cognition and/or behaviors related to any IT and may be understood to be related to IT disposition have been individually studied in the past literature.

The facet of IT usage linked to IT disposition reflects the frame of mind with which a user approaches any new IT artifact. It is a hybrid facet that includes affective components (related to feelings or emotions), cognitive components (related to information processing and understanding processes) and behavioral components; these different components sum up – with varying degrees of significance – into the user's inclination to use any IT (digital devices, software, etc.) proactively and in a self-determined fashion, regardless of the possible inherent strengths (or defects) and affordances of specific software. As such, this facet of usage appears neglected in the IS literature, which appears extremely fragmented on this subject: It has never been either defined or modeled. It is, however, strategically important for organizations to take into account when implementing new IT, as it appears at the source of some of the users' behavioral patterns when they are faced with a specific IT: Some of its components have been shown to have a strong impact on new IT acceptance and adoption (as may be inferred from works such as Devaraj et al., 2008; McElroy et al., 2007; Venkatesh and Windeler, 2012; and Zmud, 1979) and, more specifically, on effective use (as may be inferred from Beaudry and Pinsonneault, 2010, or Pavlou and Fygenson, 2006).

In the present work, which is part of a broader research project about IT acculturation, we investigate more specifically this dispositional facet of IT usage, which we name "expectable use" (the choice of this term being discussed in the article), and which reaches beyond the effective use of specific IT (Burton-Jones and Grange, 2013). We define expectable use as the ***user's disposition, or inclination, to use any IT (digital devices, software, etc.) pro-actively and in a self-determined fashion.*** While using mixed qualitative and quantitative data in an exploratory grounded-theory (GT: Glaser, 1978; Glaser and Strauss, 1967) stance, we aim to identify the dimensions of a holistic and parsimonious quantitative index to assess a user's expectable use at a given moment in time.

Our contributions are methodological, theoretical, and practical. On the methodological side, GT studies using both qualitative and quantitative data and techniques are still extremely rare in IS research (Walsh, 2014a), especially those that openly adopt a GT approach, and that avoid mislabeling and misrepresentation (Birks et al., 2013). On the theoretical side, we contribute to the IT-usage literature by clarifying and disentangling the different interrelated broad facets of IT usage whose components have been studied in IS literature; we conceptualize, define, and model a facet of IT usage that has been somewhat neglected in the past literature even though its importance has been previously highlighted. We develop new scales to assess the dimensions of this facet of usage. Through a survey with 676 participants and using quantitative techniques, we confirm the proposed measurement model and verify the external validity of the corresponding index with the help of existing literature. Then, we highlight some propositions linking the new construct to some other important constructs of IS research. Finally, on the practical side, our work provides a simple tool to identify possible "ambassadors" (Thomson et al., 2011) to help the diffusion of new IT within organizations.

The present paper is organized as follows. First, we investigate the literature on IT usage. Then, we describe the mixed design of our research and its three phases. Finally, we detail and discuss our results, before concluding.

Theoretical preview: Investigating the concept of IT usage

In this section, we: (1) address some terminological issues and describe the "core category" (Glaser, 1978; Glaser and Strauss, 1967) that emerged from our work – i.e., a dispositional facet of IT usage; and (2) search for the different facets of IT usage and related types of use investigated in the literature. Even though this literature review was conducted after the core category (expectable use) had emerged from our data, we present it *ex ante* to help readers understand our work (Suddaby, 2006).

Terminological issues

The terms "use," "usage," and "utilization" may be found in the IS literature. Some works use both "use" and "utilization" – or "usage" and "utilization" – interchangeably, neither defining nor differentiating between them (e.g., Venkatesh et al., 2003). Other works differentiate between these terms and recognize the linkages between "utilization" and "use" – e.g., Parthasarathy and Bhattacherjee (1998), who conceptualize utilization as "a function of frequency and duration of use" (page 370). As for the term "usage," "system usage" has been defined as "a user's employment of a system to perform a task" (Burton-Jones and Gallivan, 2007, page 659).

In order to understand the literature on IT usage in depth, it emerged as important from the present work to go more deeply into the meaning of the three terms ("use", "utilization" and "usage") and to fully define these terms as qualifying and descriptive elements for our literature review. We found that the term "use" is necessary to describe both utilization and usage. If we look at the definitions of "use" and "utilization," they refer to the corresponding verbs "to use" and "to utilize," which mean, respectively, "to employ, to avail oneself of" and "to put to use" (http://www.thefreedictionary.com/). Thus, we understand the utilization of a piece of IT as describing behaviors and including objective elements related to the use of a specific IT artifact – meaning that utilization can be assessed through direct and objective measures – e.g., frequency of use, length of use, and breadth of use. These behaviors have various possible causes: For instance, a user's general disposition, i.e., their inclination to behave feel or think in certain ways, their more specific disposition toward any IT artefact, and/or reasoned goal-fulfillment. Different causes sometimes lead to similar utilization. Concerning the term "usage", if we go back to its etymological sources, we find that it is derived from the Old French word *usage* and that it means a "customary way of doing something; a custom, a practice" (http://www.etymonline.com/). We thus understand the term "IT usage" as including different types of use, and as referring at the same time both to elements transmitted through group social exchanges and to elements induced by the individual's specificities, as well as to their interactions. It includes elements related to the use of the specific IT being used as well as elements related to the use of any IT. This definition is consistent with Nan's (2011) "complex adaptive systems" model of usage. It is also consistent with the position of the French branch of the sociology of usages, led by Jouët. In this school of thought, which highlights the interconnection between individual and group usages (Jouët, 2000), usage is conceptualized as a social construct that is built progressively through a process named "acculturation"; it includes some elements related to the individual user's personality and cognitive processes, some socio-cultural aspects, and their interrelationships. Thus, we understand IT usage as a broad, multifaceted, multilevel phenomenon (Burton-Jones and Gallivan, 2007) that involves top-down and bottom-up processes (Nan, 2011). The differences between the terms "utilization" and "usage" are summarized in Table 1.

Usage is made up of different facets. Different types of use are linked to the different facets of usage. For instance, effective use, which has been defined as "using a [given, specific] system in a way that helps attain the goals for using the system" (Burton-Jones and Grange, 2013, page 2) is linked to a goal-oriented and reasoned facet of usage that may be assessed to some extent through objective measures. IT usage also includes a facet that is linked to users' personality traits or general disposition (McElroy et al., 2007), their IT values (Leidner and Kayworth, 2006), and their IT culture (Walsh et al., 2010); in turn, these factors are linked to the frame of mind with which users may be expected to approach any new IT artifact (digital device or software), irrelevant of its inherent possible strengths (or defects). This dispositional facet of IT usage includes some affective, cognitive and behavioral elements, which are user-specific and refer to the use of any IT by the user (e.g., "exploration use" as suggested by Devaraj et al., 2008; "how users adapt to the technology," by Beaudry and Pinsonneault, 2005; and "willingness to buy" by McElroy et al., 2007); it is induced by the user's personality and past experiences with IT, as well as by the surrounding context and the social groups that the user belongs to. These elements are latent and are mostly difficult to assess directly. The two facets of usage described above are summarized in Table 2. In the present work, we wish to investigate the types of use that are linked to the dispositional facet of IT usage and to propose an index to assess this facet.

The dispositional facet of usage is not concerned with attaining a circumscribed goal to be fulfilled with the help of a specific system. It is not the result of conscious and logical reasoning related to some specific IT. Instead, it is linked to

Table 1
Utilization versus usage of an IT.

	Utilization	IT usage
Describes…	Behaviors, e.g., frequency, duration, breadth of use	A customary way of using IT, a practice. A broad multifaceted, multilevel (individual, group), social construct
Is induced by…	Conscious and reasoned goals about specific IT, as well as user's disposition with regard to any IT	Conscious and reasoned goals about specific IT, as well as user's disposition with regard to any IT
Includes…	Behaviors related to the specific IT being used	Objective elements related to the specific IT being used, as well as subjective elements related to user's disposition with regard to any IT
Can be assessed through…	Direct objective measures	Diverse measures, depending on which facet of usage one aims to assess
Its measures…	Can be objective	Depend on which facet one aims to assess

Table 2
Two facets of the IT usage of an IT.

	Goal-oriented and reasoned facet related to specific IT being used	Dispositional facet related to the use of any IT
Describes…	Reasoned actions/effective use: "using a system in a way that helps attain the goals for using the system" (Burton-Jones and Grange, 2013, page 2)	Affective, cognitive and behavioral elements related to the use of any IT
Is induced by…	Conscious and reasoned goals related to specific IT	The user's personality and past experiences with IT as well as the surrounding context and social groups' influence
Includes…	Objective elements related to a specific IT that is being investigated	Subjective elements related to any IT artifact
Can be assessed through…	Self-reported measures or independent ratings	Mostly self-reported measures
Its measures…	Can be objective	Are mostly subjective

individual needs to be fulfilled, personal motivation, and personality; it can mostly be assessed through subjective measures of perceptions and feelings. This facet of usage reaches beyond general dispositions/personality traits as it is more specifically linked to IT disposition and includes elements that are related to the individual but also socially constructed. The importance of this differentiation between general disposition and IT disposition is further highlighted in one of the next sections. This dispositional facet of usage emerged as the core category in our GT work and as an essential strategic dimension of usage to take into account: Different types of use might sometimes be witnessed, including exploratory/innovative versus refractory/constrained use, even though utilization and effective use might be similar. These differences could have important strategic consequences within organizations. To illustrate this point, we provide some case vignettes in Appendix A, inspired by our qualitative data set.

In the next section, we investigate the literature, searching for the different facets of usage and related types of use highlighted by our terminological enquiries.

Different facets of usage investigated in the literature

We first revisited and reinterpreted the review conducted by Barki et al. (2007); though unpublished, this review led to their groundbreaking article in 2007 concerning IS use-related activity. This review was structured to include articles published in *Information Systems Research* and *Management Information Systems Quarterly* from 1992 until 2007. Henri Barki kindly provided us with the review. He explained that he and his co-authors had read all articles in the two chosen outlets from 1992 to 2007, and that they had then selected those that, in their own reading, investigated phenomena that they considered as related to IT usage at an individual or organizational level. As we are concerned in this study with IT usage at an individual level, we excluded any papers that investigated usage solely at organizational level, as well as theoretical articles with no empirical data. As Barki et al.'s review ended in 2007, we conducted an additional review of all articles that were published in the same outlets between 2007 and 2012 and contained "use," "usage," or "utilization" in their titles. After also removing from this last selection those works that in no way studied system usage at an individual level, and theoretical articles with no empirical data, we were left with an overall set of 59 articles. We read and analyzed all the articles within this database.

We looked at whether each article investigated IT as a generic tool or studied a specific IT; which variable/phenomenon related to usage was explained/assessed; whether the article was related to intention/utilization/effective use (as defined in the previous section) or to the dispositional facet of usage that had emerged as the core category of our work; which type of data was used (qualitative, quantitative, or both); and whether the measures were objective (e.g., computer log) or subjective (i.e., reported). These elements are summarized in Table 3, and we also further investigated the explanatory variables/phenomena that were studied in each of these articles (see Appendix B). We first put aside those 18 articles that investigated an intention (as not the subject of our investigation). Beyond objective measures of frequency, duration, and/or breadth of use (utilization: 23 articles), or of conscious and reasoned goal-fulfillment use related to a specific IT being investigated that may be assessed through objective measures (effective use: six articles), we found that IT usage at an individual level has also been investigated in the literature as including some other latent elements that are important to consider but difficult to assess directly (12 articles): measures in these 12 articles are self-reported or interpreted and always subjective.

Thus, system usage has mostly (41 articles out of 59) been explained in IS research as intention to use (18 articles) or utilization (23 articles). Like Burton-Jones and Grange (2013), we found that very few articles (six) explained effective use. Finally, we found 12 articles (shown by the lines shaded in gray at the end of Table 3) that aimed to explain some aspects of usage linked to the dispositional facet of usage highlighted in the previous section, and different from intention, utilization, or effective use.

These twelve texts of particular interest to us are: Beaudry and Pinsonneault (2005), Devaraj et al. (2008), Lee (1994), Mackay and Elam (1992), Majchrzak et al. (2000), McElroy et al. (2007), Nan (2011), Oborn et al. (2011), Orlikowski (1996), Sun (2012), Walsham (2002), and Webster (1998). Three of these texts (Devaraj et al., 2008; Lee, 1994; Orlikowski, 1996) assess dispositional usage solely through some behavioral components and one text (Nan, 2011) solely

Table 3
Highlighting the dispositional and cultural facet of usage in the literature.

Citation	IT as a generic tool	What did the dependent variable actually assess?				Data used		Measures	
		Intention	Utilization	Effective use	Dispositional elements	Quanti	Quali	Subjective	Objective
Srite and Karahanna (2006)	✓	✓				✓		✓	
Compeau and Higgins (1995a)	✓		✓			✓		✓	
Compeau and Higgins (1995b)	✓		✓			✓			✓
Compeau et al. (1999)	✓		✓			✓		✓	
Goodhue and Thompson (1995)	✓		✓			✓		✓	
Igbaria et al. (1997)	✓		✓			✓		✓	
Moores and Chang (2006)	✓		✓			✓		✓	
Pinsonneault and Rivard (1998)	✓		✓			✓	✓	✓	✓
Agarwal and Karahanna (2000)		✓				✓		✓	
Agarwal and Prasad (1998)		✓				✓		✓	
Bhattacherjee (2001)		✓				✓		✓	
Gefen et al. (2003)		✓				✓		✓	
Hong and Tam (2006)		✓				✓		✓	
Karahanna et al. (1999)		✓				✓		✓	
Kim (2009)		✓				✓		✓	
Mithas et al. (2008)		✓				✓		✓	
Po-An Hsieh et al. (2008)		✓				✓		✓	
Sykes et al. (2009)		✓				✓		✓	
Turel et al. (2011)		✓				✓		✓	
Van der Heijden (2004)		✓				✓		✓	
Venkatesh (2000)		✓				✓		✓	
Wixom and Todd (2005)		✓				✓		✓	
Bhattacherjee and Premkumar (2004)		✓				✓	✓	✓	
Cenfetelli and Schwartz (2010)		✓				✓	✓	✓	
Lawrence and Low (1993)			✓			✓		✓	
Adams et al. (1992)			✓			✓		✓	
Agarwal et al. (2009)			✓			✓		✓	✓
Brown et al. (2012)			✓						
Gefen and Straub (1997)			✓			✓		✓	
Kim et al. (2005)			✓			✓		✓	
Kang et al. (2012)			✓			✓		✓	
Parthasarathy and Bhattacherjee (1998)			✓			✓		✓	
Rai et al. (2002)			✓			✓		✓	
Straub (1994)			✓			✓		✓	
Venkatesh and Ramesh (2006)			✓			✓		✓	
Venkatesh (1999)			✓			✓		✓	
Venkatesh et al. (2008)			✓			✓		✓	
Taylor and Todd (1995a, 1995b)			✓			✓			✓
Venkatesh et al. (2012)			✓			✓			✓
Venkatesh and Morris (2000)			✓			✓			✓
Venkatesh et al. (2003)			✓			✓			✓
Arnold et al. (2006)				✓		✓	✓	✓	✓
Beaudry and Pinsonneault (2010)				✓		✓	✓	✓	
Zack (1993)				✓		✓	✓	✓	
Pavlou and Fygenson (2006)				✓		✓			✓
Taylor and Todd (1995a, 1995b)			✓	✓		✓		✓	
Ye and Johnson (1995)				✓		✓		✓	✓
Devaraj et al. (2008)					✓	✓		✓	
McElroy et al. (2007)			✓		✓	✓		✓	
Sun (2012)					✓	✓		✓	
Beaudry and Pinsonneault (2005)					✓		✓	✓	
Mackay and Elam (1992)					✓		✓	✓	
Majchrzak et al. (2000)					✓		✓	✓	
Oborn (2011)					✓		✓	✓	
Walsham (2002)					✓		✓	✓	
Orlikowski (1996)					✓		✓	✓	
Lee (1994)					✓		✓	✓	
Nan (2011)					✓	✓	✓	✓	
Webster (1998)					✓	✓	✓	✓	

through some cognitive components i.e., related to the user's information processing and understanding processes. Five texts (Mackay and Elam, 1992; Majchrzak et al., 2000; Oborn et al., 2011; Sun, 2012; Walsham, 2002) call upon both cognitive and behavioral components. Finally, the last three of the twelve texts highlighted by our review (Beaudry and Pinsonneault, 2005; McElroy et al., 2007; Webster, 1998) include in their assessment, some cognitive and behavioral dimensions as well as some affective ones i.e., related to the user's feelings or emotions. This is summarized in Table 4.

Table 4
Some components of the dispositional facet of IT usage as investigated in the literature.

Citation	Affective	Cognitive	Behavioral
Beaudry and Pinsonneault (2005)	√	√	√
Devaraj et al. (2008)			√
Lee (1994)			√
McElroy et al. (2007)	√	√	√
Mackay and Elam (1992)		√	√
Majchrzak et al. (2000)		√	√
Nan (2011)		√	
Oborn et al. (2011)		√	√
Orlikowski (1996)			√
Sun (2012)		√	√
Walsham (2002)		√	√
Webster (1998)	√	√	√

Hence, some elements that are affective (related to the user's feelings or emotions), cognitive (related to the user's information processing and understanding processes) and behavioral, have been empirically studied and tentatively explained in the literature as parts of IT usage, but only as related to a specific IT that was being investigated and not with regard to any IT artifact. For example, McElroy et al. (2007) investigate the Internet, Oborn et al. (2011) investigate the electronic patient records, and Sun (2012) investigate Microsoft Office. None of the 12 texts identified in the literature as directly relevant to our work, investigates IT as a generic tool. In the literature, those few works that do not study a specific IT but study IT considered as a generic tool (see the first eight lines in Table 3) aim to explain either intention (Srite and Karahanna, 2006) or utilization (Compeau and Higgins, 1995a, 1995b; Compeau et al., 1999; Goodhue and Thompson, 1995; Igbaria et al., 1997; Moores and Chang, 2006; Pinsonneault and Rivard, 1998). To complicate issues further, in some of the works investigated during our literature review, some dispositional components of usage are studied as explanatory variables and not as explained variable e.g., anxiety (affect): Compeau et al. (1999) or personal outcome expectations (cognition): Compeau and Higgins (1995b) (see Appendix B). Furthermore, in the twelve texts more specifically highlighted by our literature review, different dimensions of the dispositional facet of usage are described, assessed and/or explained, using different means of data collection (e.g., surveys versus interviews), different types of data (quantitative – e.g., Devaraj et al., 2008; qualitative – e.g., Majchrzak et al., 2000; or both quantitative and qualitative – e.g., Nan, 2011), and different techniques (such as structural equation modeling – e.g., McElroy et al., 2007; descriptive statistics – e.g., Webster, 1998; and/or qualitative coding – e.g., Oborn et al., 2011).

Expectable use: One of the facets of IT usage

Nan (2011) has highlighted the fact that IT usage is a complex phenomenon, and not a simplified all-encompassing construct as previously portrayed in some of the IS literature. Our literature review shows that usage includes a facet that reflects the frame of mind with which users may be expected to approach any new IT artifact. This facet includes affective, cognitive and behavioral components. The necessity of giving this new facet of usage the right name is of utmost importance, as "to name is to know" (Charmaz, 2008, page 128, quoting Strauss).

Contrary to users' general dispositions/personality traits (Allport, 1961), and despite being linked to them, users' IT disposition is not fully stable over time. To some extent, IT disposition may evolve, sometimes rapidly, depending on context, training, and previous IT experiences (see Walsh et al.'s theory of culture creep, 2010). This element made us eliminate the possibility of naming this facet of usage "dispositional use": Doing so could have been misleading, through implying a static facet that could not evolve over time (which we found to be mostly untrue in our empirical data).

The term "expected" means "considered likely" (http://www.websters-online-dictionary.org/), and "expectable" means "predictable or foreseeable" (http://www.websters-online-dictionary.org/). Use that is related to a specific IT, whose affordances have been carefully and objectively assessed, for a reasoned goal-fulfillment purpose (i.e., effective use) may be expected in a given situation. But the facet highlighted in the present work reaches beyond the effective use of a specific IT. We therefore chose to name this facet of usage "expectable use", because (in our reading) "expectable" is a stronger word than "expected". Although it may evolve over time, an individual's expectable use is predictable and foreseeable at a given moment in time for any IT, as it is related to the user's IT disposition, i.e., their disposition with regard to any new IT (digital devices, software, etc.), irrelevant of the possible inherent strengths (or defects) and affordances of specific software that the users are supposed to employ. Expectable use is made up of various components (cognitive, affective and behavioral) that are related to the use of any IT.

The results of our terminological differentiation and of the resulting literature review are summarized in Fig. 1.

The double arrows in this diagram illustrate the constant interactions between the different elements illustrated. These interactions have been highlighted in the literature (Burton-Jones and Gallivan, 2007; Burton-Jones and Straub, 2006; Jouët, 2000; Nan, 2011). The strategic importance of effective use has been witnessed in the literature (Burton-Jones and Grange, 2013). It can also be inferred from the literature investigated that some of the components/dimensions of expectable use

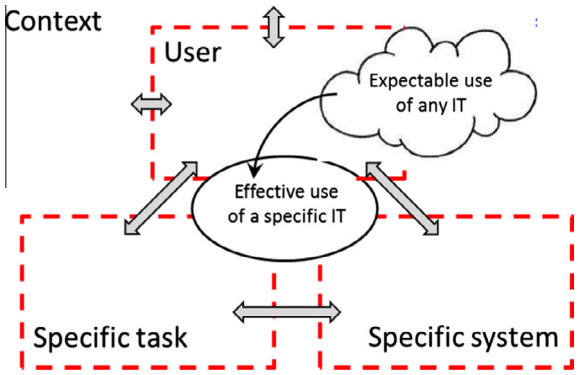

Fig. 1. Usage as a complex phenomenon. (The cloud that surrounds the expectable use of any IT in the diagram indicates the current "fuzziness" of this facet of IT usage in the literature.)

have a significant impact on effective use: For instance, Taylor and Todd (1995a) and Pavlou and Fygenson (2006) show that subjective norm has to be taken into account to explain effective use (see Appendix B). Hence, expectable use is a facet of usage that strategically deserves further investigation as, based on existing literature, it should significantly impact effective use: This is illustrated by the curved arrow in Fig. 1.

However, and even though the valuable works found in the literature helped us to interpret our data set, and to position our results within existing literature, the literature review we conducted tends to show that there is little possibility of founding a truly overall, cumulative, integrative tradition to holistically investigate expectable use, and propose an index for it, unless one chooses a novel path. In the present article, this facet of usage is investigated through a typological approach.

A typological approach to expectable use

In this section, summarized in Table 5, we investigate: (1) what a typology is; (2) the user typologies that may be found in IS literature; and (3) more specifically, a recent user typology. Finally, (4) we summarize the typological approach of the present work.

Typology versus taxonomy

As highlighted in Walsh (2014a), the significant role of typologies to organize the knowledge of a field of research, and to "allow researchers to postulate on the relationships among the concepts" (Nickerson et al., 2013, page 336) has been recognized in the IS literature (e.g., McKnight and Chervany, 2002; Williams et al., 2008).

The words "typology" and "taxonomy" have been used interchangeably in the literature; for a full discussion on this, see Nickerson et al. (2013). In the present work, we use Doty and Glick's (1994) differentiation between the two terms. For these authors, taxonomy means a classification system "that categorizes phenomena into mutually exclusive and exhaustive sets with a series of discrete decision rules" (page 232), and provides rules for assigning cases to groups. However – and even though typologies may be used to classify a population – they are much more than classification systems: "typology refers to conceptually derived interrelated sets of ideal-types" (Doty and Glick, 1994, page 232). Each ideal-type represents a unique combination of attributes that explain an outcome of interest – i.e., a dependent variable. The ideal-types identified in a typology are developed with respect to this specific outcome. Typologies include two types of constructs: second-order ideal-types, and first-order dimensions (attributes) that are used to describe the ideal-types.

Thus, typological efforts often lead to conceptualizing multidimensional constructs (MDCs: For a full review and classification of MDCs, see Law et al., 1998, and Edwards, 2001; and for a summary, see Appendix C.1). Such efforts have led to the development of latent models, e.g., Doll et al. (1994); aggregate models, e.g., Lawler (1983), Walsh (2009), and Walsh and Gettler-Summa (2010); and profile models, e.g., Myers Briggs and Myers (1995); and Walsh et al. (2010).

User typologies in the IS literature

The IS literature has investigated user profiles and proposed different user typologies; for a detailed review, see Walsh et al. (2010). Several studies concentrate on specific profiles (e.g., Lawless and Price, 1992, who study "technological champions"), others investigate specific IT (e.g., Boullier, 1997, who focuses on mobile IT), and a few investigate the full array of possible user profiles related to the usage of any IT (e.g., Jouët, 1987; Orlikowski and Gash, 1994; Prensky, 2001; Raz and Goldberg, 2006; Rogers, 2003; Walsh et al., 2010). Among these last studies, some are outdated (e.g., Jouët, 1987), as IT and its related usage have evolved at an exponential rate, meaning that user profiles might also have changed considerably. Some other studies are built on a single variable (e.g., age – Prensky, 2001; position – Raz and Goldberg, 2006; and time of

Table 5
Typological approach.

	Works	Data used	First-order dimensions/ideal types attributes	Second-order ideal-types	Second-order MDC	Outcome of interest	Index proposed	Type of MDC
Literature	Walsh et al. (2010)	Qualitative	18 dimensions related to users' needs and motivations	User profiles with needs and motivation attributes	IT culture (ITC)	Expectable use of any IT	–	Close to a profile MDC
	Walsh (2009), Walsh and Gettler-Summa (2010)	Mixed qualitative and quantitative	Eight dimensions related to users' needs and motivations	User profiles with needs and motivation attributes			ITC: level of IT acculturation	Aggregate MDC
	Von Stetten et al. (2011) and Walsh (2014b)	Quantitative		–			ITC (verification)	Aggregate MDC
Present work	Phase 1	Qualitative	12 dimensions related to users' disposition (cognition/affect/behavior) with respect to any IT	User profiles with dispositional attributes related to the use of any IT	Expectable use	Effective use of specific IT	–	Close to a profile MDC
	Phase 2	Mixed qualitative and quantitative	Six dimensions related to users' disposition (cognition/affect/behavior) with respect to any IT	User profiles with dispositional attributes related to the use of any IT			Expectable use	Aggregate MDC
	Phase 3	Quantitative	Six dimensions related to the dispositional use of any IT	–			Expectable use (verification)	Aggregate MDC

Key: ITC = IT culture; MDC = multidimensional construct.

adoption – Rogers, 2003); this excessively simplifies the complex reality of IT usage, and limits the scope of the studies. Orlikowski and Gash's (1994) groundbreaking work highlights the concept of technological frames to differentiate between two very broad user groups (technologists and users) in an IT firm. Although this concept has subsequently been extended (see, for instance, Mishra and Agarwal, 2010), it represents a narrower, less holistic concept than the one we are aiming to discuss in this article. The concept of technological frames, also referred to as "cognitive schemas," is mostly linked to cognition, and to rational and reasoned goals that relate to a specific IT in a specific context. We aim in the present work to investigate individuals' disposition with regard to any IT (i.e., not one specific IT); this disposition takes into account individuals' cognition but also (more broadly) their personality, including affect (see McElroy et al., 2007 who differentiate between the two approaches involving cognition and personality) and cultural group influences (Walsh et al., 2010) and their behaviors.

A user typology anchored to their IT culture

The user typology proposed by Walsh et al. (2010), subsequently amended by Walsh and Gettler-Summa (2010), is of specific interest in the present study as it is fairly recent, aims to identify all possible user profiles in some detail, and describes their corresponding usage of any IT. Walsh et al. (2010) used qualitative data and, based on Law et al.'s (1998) classification of MDCs (see Appendix C.1), proposed an IT-culture user-profile model defined through users' needs and motivations (18 attributes/dimensions). Using mixed quantitative and qualitative data, Walsh (2009) and Walsh and Gettler-Summa (2010) extended this profile model to a more parsimonious aggregate model (with 8 attributes/dimensions) of IT culture as a weighted sum of its needs-related and motivational dimensions, thus leading to an IT culture index. In the typologies proposed by these authors, the ideal-types are user profiles, and the corresponding second-order aggregate construct is the IT-culture (ITC) construct proposed by Walsh (2009), and verified by Von Stetten et al. (2011) and Walsh (2014b). The attributes of these ideal-types are users' needs and motivations, which correspond to the first-order dimensions of ITC. Walsh and Gettler-Summa (2010) used cluster analysis to group IT users into meaningful clusters. They found three main attitudinal groups: proactive, passive, and refusal. Proactive users participate voluntarily in new IT projects; they investigate new IT even where immediate practical needs are sometimes obscure. Passive users must be compelled to use IT; their involvement with IT is forced and mandatory. For users in the refusal group, IT is an imposition to be avoided at all cost. These attitudinal groups tend to be linked to users' ITCs: The higher the ITC index is for a user – i.e., the more IT-acculturated a user is, the more self-determined their IT usage becomes, and the more inclined users are to use any new IT proactively. In turn, the three main attitudinal groups include a non-user cluster, named "dodgers 1", and eight other clusters – studious, interested, disciplined, frightened, disenchanted, constrained, players and dodgers 2 – each with specific combinations of attributes/characteristics related to their needs and motivations (for full details, please see Appendix C.2). Walsh and Gettler-Summa (2010) related the new ITC aggregate model to the profile model previously developed by Walsh et al. (2010), by using the 4 mark of their 1-to-7 Likert scales to dichotomize the final dimensions they proposed as dimensions of the ITC construct. Walsh et al. (2010) showed that, within organizations, users have a tendency to group following their ITC, and that ITC will creep from one group to the next.

For instance, during new IT implementation, highly IT-acculturated studious users will naturally form a group of facilitating "ambassadors" (Thomson et al., 2011) who, given the right circumstances (Walsh, 2014b), will help "frightened" (Walsh et al., 2010) users master new IT. Within these ITC groupings, users tend to have similar usage patterns related to the way they welcome and approach any new IT artifact.

The outcome of interest – the dependent variable that the user profiles, and subsequently the ITC index highlighted in the literature, explain – is a dispositional facet of IT usage that emerges as very close to the facet that we named "expectable use": It is socially constructed through a progressive IT-acculturation process – i.e., a cultural learning process resulting from exposure to, and experiences with, IT (Walsh, 2010); this learning process, which also involves users' personality traits and cognition, results in users having specific IT disposition.

Trait theory has identified and focused on dispositional traits of "central or dominating importance" (Allport, 1962); between five and ten of these are considered sufficient to capture the essence of individuals' general disposition and to describe their personalities (Allport, 1962). Thus, one can assume that an index for expectable use, with between five and ten attributes/dimensions should be suited to capturing the essence of users' IT disposition at a given moment in time. Furthermore, to be valid, any such index proposed to assess expectable use should be correlated to the ITC index.

The typological approach of the present work

In the present work, we first use the qualitative data set used by Walsh et al. (2010) to highlight some new affective, cognitive and behavioral attributes of user profiles that are related to the dispositional facet of IT usage. This leads us to propose these dispositional attributes as components/dimensions of the expectable use of any IT, which in turn may explain the effective use of specific IT. At this stage, mostly due to the limitations of our qualitative data set, our results lead us again close to a profile MDC (Law et al., 1994). However, adding supplementary mixed quantitative and qualitative data during the last two phases of our research, we develop a composite index for expectable use, conceptualized as an aggregate model of various dispositional attributes/dimensions. Our grounding in the literature and our typological approach are summarized in Table 5, and our research design is further detailed in the next section.

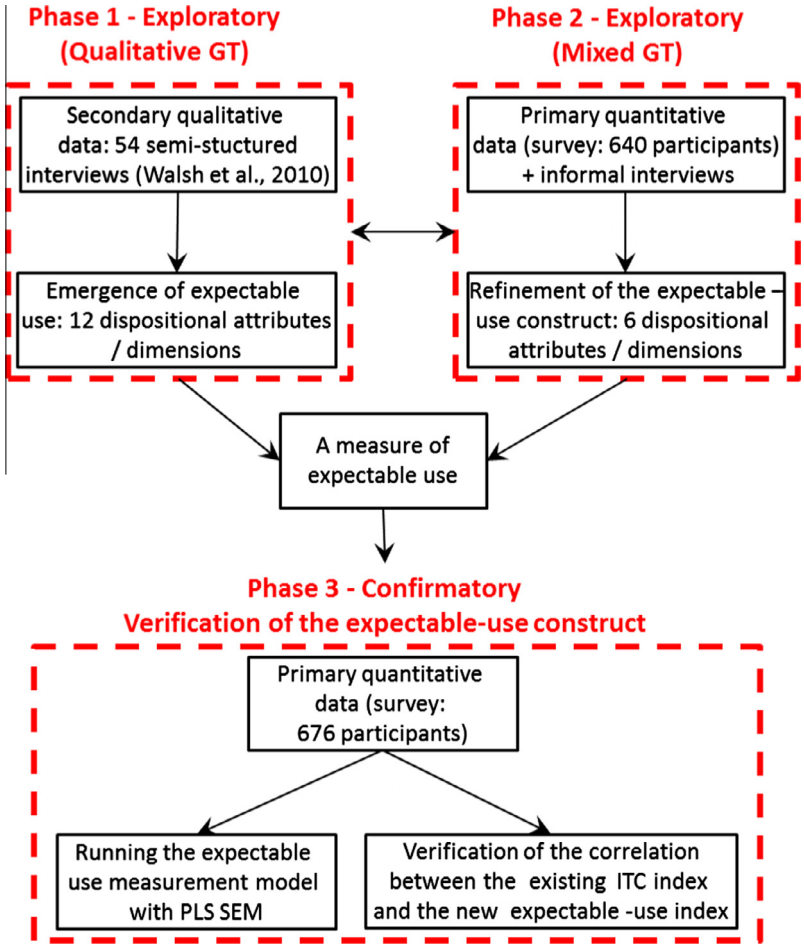

Fig. 2. Our research design. Key: PLS = partial least squares; SEM = structural equation modeling.

Research design

Our work is divided into three main phases: The first two phases are conducted in an exploratory GT stance (Glaser, 1978; Glaser and Strauss, 1967) and result in our proposing a measure for the expectable-use construct; the third (confirmatory) phase serves the purpose of verifying the results of the previous two phases. Our design is detailed in this section and summarized in Fig. 2 below.

Data collection

During the exploratory phases of our research, we first used secondary qualitative data previously collected through 54 semi-structured interviews (Walsh et al., 2010) (phase 1). We then added primary mixed data: quantitative (a survey with 640 participants) and qualitative (informal interviews) (phase 2). We used further primary quantitative data (676 participants) during the last, confirmatory phase (phase 3).

To collect the quantitative data for the last two phases, we decided not to use e-questionnaires: We aimed to capture/take into account all possible user profiles, including those who might be reluctant to use IT and/or might feel ill at ease and less inclined to respond to an e-questionnaire. Respondents therefore hand-filled the questionnaires and answers were subsequently hand-computed. Demographic variables (gender, age, position, etc.) were included in the questionnaires: This allowed us to keep track of our population.

The quantitative data were collected using three classes of undergraduates[1] (two of our own classes, and a colleague's class) and their entourage. In order to cover the full array of possible user profiles, our aim was to theoretically sample

[1] These classes were in an international, French business school with a population of approximately 40% foreign visiting students every year. Questionnaires were administered and interviews conducted in French or in English: The participants chose the language they were most comfortable with.

(Glaser and Strauss, 1967; Glaser, 1978) survey participants as socially different as possible and in diversified settings: Each student was asked to collect data from up to ten respondents in their entourage, after first validating this assignment with their parents. Instructions were given to students to choose respondents as diversified as possible in terms of social background, age, gender, position, and education. 640 respondents participated in our survey during the second (exploratory) phase of our research, and 676 respondents during the last (confirmatory) phase. The students were allocated extra credit in their final exam for this work.

As most of the quantitative data were collected by students, when the students remitted their data, we warned them that we had statistical means to detect outliers, and that if they had been tempted to falsify data, they would be heavily penalized; as this data collection was a voluntary exercise, we also made it clear that if they told us beforehand they had done so, they would not be penalized but would not obtain the extra credit. We were sufficiently convincing that two students came forward (during the last, confirmatory phase); consequently, their data were not taken into account.

Exploratory phases: A classic GT stance

GT is particularly helpful in developing new perspectives on well-established theoretical research areas (Sousa and Hendriks, 2006) – e.g., IT usage. During the exploratory phases of our research, we chose a "classic" or "Glaserian" GT methodological approach.

Two main distinct variants of GT may be found in the literature. One of these variants is favored by Glaser and the other by Strauss (Melia, 1996; Urquhart et al., 2009), with the main differences involving coding issues and the role of the literature review. Our stance is closer to Glaser's. Concerning coding issues, we would refer the reader to Glaser's (1978) broad coding proposal – i.e., substantive coding, which includes open codes (coding data into categories that are not preconceived), selective codes (coding those variables that relate to the core variable), and theoretical coding (coding for relationships between substantive codes to be integrated as propositions/hypotheses into a theory). On the literature review, Glaser's logical position is that if a researcher enters a field with an open mind and without preconceptions, they cannot conduct a relevant literature review before their core category has emerged from the data.

Glaser also always strongly maintained that GT could use all forms of data: qualitative and/or quantitative data, and primary and/or secondary data. His official website includes the following statement: "Although many call Grounded Theory a qualitative method, it is not. It is a general method even though quantitative data are rarely used with a GT approach" (Grounded Theory Institute: http://www.groundedtheory.com/what-is-gt.aspx). Finally, and as highlighted by Glaser and Strauss (1967), "caches of useful materials are everywhere in the library" or "[in] actual [secondary] interviews" (page 167), and "sometimes, after the large-scale descriptions have been accomplished, the director of the study returns to his data to engage in secondary analysis for generating a theory on an idea initially stimulated by the earlier descriptive phase" (page 187). Hence, secondary data may also be used in a GT stance, as covered by Andrews et al. (2012) in the *Grounded Theory Review*, a research journal initiated and still overseen by Barney Glaser.

During the first two exploratory phases, we remained in a classic GT stance: We constantly compared and analyzed all available data until our results made sense with our full data set.

Phase 1

During the first phase, we theoretically sampled secondary qualitative data, and we qualitatively recoded (open coding) the interviewees' dispositional attributes related to their use of any IT until a new core category (the dispositional facet of IT usage, which we named "expectable use") emerged. With the help of Microsoft Excel, the qualitative data were then further selectively and theoretically coded, concentrating on these dispositional attributes and their interrelationships; this allowed us to identify 12 types of dispositional use, which are highlighted in the results section. However, at the end of the first phase, the categories appeared not to be fully saturated, and some of them appeared redundant, although the available qualitative data did not allow us to address these issues. Therefore, we decided to collect further data.

Phase 2

During the second phase, we developed items for the 12 types of dispositional use. These items were inspired by verbatim extracts from the qualitative "slice" (Glaser and Strauss, 1967), used during the first phase. We developed scales while at all times respecting classic GT "foundational pillars" (Walsh et al., 2015), i.e., theoretical sampling, emergence, and constant comparative analysis, as detailed below.

As we saw above, when collecting quantitative data, we did not aim at a population with a normal distribution, but rather at a population as diversified as possible (theoretical sampling).

The questionnaires that we administered during phase 2 included items corresponding to the 12 dispositional attributes highlighted during the first phase (the final scales are provided in Appendix D.2), and also items corresponding to the ITC dimensions, as proposed in the literature (Von Stetten et al., 2011; Walsh, 2009, 2014b; Walsh and Gettler-Summa, 2010). All items were pooled and randomly ordered in the overall instrument that was administered. We used seven-point Likert-type response options, where 1 represented "not true at all" and 7 "completely true." The selective and the theoretical coding of quantitative data were done with the help of exploratory factor analysis of the new items we had developed, without informing the software with an expected number of factors. Thus, we did not force our statistical

results into preconceived categories; we remained in an exploratory stance and avoided considering what solutions might be in line with the qualitative results obtained during the first phase of the present research (emergence).

We constantly analyzed and interpreted all qualitative and quantitative data collected as one set (constant comparative analysis). We kept coding and recoding our whole data set as we collected the quantitative data from a total of 640 respondents: These respondents belonged to one of our own undergraduate classes and one class of a colleague, as well as to their immediate entourage. It meant that we conducted not only one pre-test, but many pre-tests as questionnaires were returned (see Appendix D.1 for some results of one of the pre-tests). Coding was helped by the investigation of construct reliability through Cronbach's alphas, and by the discriminant and convergent validities of the factors resulting from the factor analyses. During this second phase, informal interviews were also conducted with some of the participants, who came forward voluntarily to provide us with some comments; these interviews were conducted on the spur of the moment, immediately after participants had filled their questionnaire and we did not keep precise track of them, except through memos. The wording of some items was adjusted, some items were dropped, and some constructs were merged to improve reliability and validity of the scales. To eliminate redundant constructs, all items loading to the same factors were analyzed; the qualitative importance of each item in the corresponding construct, the item–item correlations within each scale, the effects on Cronbach's alpha if each individual item was deleted, and the item standard deviation scores were all used to determine which items were to be deleted from each pair of merged scales. An illustration of the adjustments we made to the items/constructs during this phase is provided in Appendix D.1 and is further elaborated on in the results section.

This second exploratory phase allowed us to reduce the number of possible dimensions for the expectable-use construct from 12 to six, and to streamline our results toward parsimony. At the end of the second phase we coded our qualitative data once more in order to tentatively identify the expectable use corresponding to each user-profile ideal-type that had been identified in the literature.

Confirmatory phase

The last phase of our research was confirmatory. We collected a further "slice" (Glaser and Strauss, 1967) of quantitative data through a survey with 676 participants. All relevant information concerning the final scales developed for the present study are provided in the results section and in Appendix D.2.

For this final survey, we used the scales and quantitative measures proposed in the literature to assess the construct of ITC and, for the expectable-use construct, the new scales developed during the previous phases described above. We first asked 67 students from another of our undergraduate classes (different from those used for the pre-tests) to answer the final questionnaire in order to confirm (or disconfirm) the validity and reliability of the final questionnaire through factor analysis and Cronbach's alpha investigations. Once we were comforted by these preliminary results, we proceeded to collect further quantitative data. The data for the last confirmatory phase of our research were collected by these 67 undergraduate students, whose answers to the questionnaire were also included in the second quantitative main data slice. A simple preliminary question identified 27 individuals who declared that they did not perceive needs for any IT and did not use IT (dodgers 1: Walsh and Gettler-Summa, 2010). These individuals were not taken into account, as we wished to study IT usage (and not non-use) in the present study. This left us with a final population of 676 respondents who used IT (see Appendix D.3 for demographic details of the population investigated during the last confirmatory phase).

We first used PLS SEM to verify the measurement model of expectable use, with bootstrapping as a resampling technique (100 random samples) to generate t-statistics (Chin, 1998). The XLSTAT software was used. PLS analysis was preferred because it does not require data with a normal distribution (Fornell and Cha, 1994), and it supports both reflective and formative constructs (Gefen et al., 2000). We also verified the external validity of our work by assessing the correlation between the existing ITC index and the new expectable use index we had developed.

Results

In this section, we describe the results obtained during each phase of our research.

Phase 1: Highlighting users' dispositional attributes

Even though Walsh et al. (2010) described the different ways in which each of their proposed user profiles employs IT, they stopped short of conceptualizing and naming the users' dispositional attributes related to the use of any IT. Through the recoding of the qualitative data slice, and once the new core category of "expectable use" had emerged from our data, we were able to do this, moving from description to conceptualization, as deemed essential by Glaser (1978). During the first phase, we aimed to identify interviewees' dispositional attributes (affective, cognitive and/or behavioral) related to their use of any IT, which could give clues as to whether they would voluntarily engage in any IT at their disposal, witnessing at least external motivation with identified regulation (Deci and Ryan, 1985), i.e., with some amount of self-determination.

During the first phase of this research, twelve categories related to the use of any IT emerged from the recoding of the secondary qualitative data set as possible dimensions of our core category (expectable use). We named these categories: compulsive use, disenchanted use, efficient use, extensive use, fearful use, limited use, non-use, opportunistic use,

Table 6
Illustrations of the selective coding of the secondary qualitative data slice effected during the first phase.

Verbatim	Attribute	Category	User profile
"At home, that's all I do. I have nothing else to be doing; that's all I do. I look for things on my computer; I'm on my computer all the time." [Store worker]	Behavioral	Compulsive use	Studious
"I used to like IT. I spent a lot of time on IT when we first computerized our firm. But I have had such bad experiences that now I don't fully trust IT anymore."[CEO1]	Cognitive	Disenchanted use	Disenchanted
"I use IT because it enables me to save time…I am more efficient when I use IT." [Production manager]	Cognitive	Efficient use	Constrained
"Since I learned about IT, it's a passion: a pleasure, a passion. You see, I use it for everything." [Store worker]	Affective/ Behavioral	Extensive use	Studious
"I consider IT fairly essential and I prefer not to have to do without it." [CEO2]	Cognitive	Extensive use	Disciplined/
"I don't know enough about it: I am afraid of making mistakes. And if I do, I start panicking." [CEO2]	Affective	Fearful use	Frightened
"I am always terrified to strike the wrong key and lose all my data." [CFO]	Affective	Fearful use	Frightened
"I only use some IT, like the school platform, when I have no other alternative." [Professor/consultant]	Behavioral	Limited use	Constrained
"I only use new software at work if I have been trained on it…And I only use the functionalities that I have been shown." [Editorial assistant]	Behavioral	Limited use	Constrained
"She doesn't have a computer, she doesn't have a cell phone, or DVDs; even television…her boyfriend had to bring one with him because she never watched TV…We offered her a cell phone; she gave it to a cousin. She does not use automatic ticketing in the subway, because she considers it's 'inhuman' and she prefers to wait in line for an hour for contact." [Student, describing her aunt]	Behavioral/ Affective/ Cognitive	Non-use	Dodger 1
"Things that I have to do in my work and that used to take up a lot of time are much faster now, since I use IT." [PR manager]	Cognitive	Opportunistic use	Disciplined
"I like to know about things. Usually I like to find – to discover – answers for myself when I have questions; it's the same when I have questions about software that I use." [Law student]	Affective/ Cognitive	Self-enhancing use	Studious
"I like it that people look at me differently because I am good with computers." [Baker]	Affective	Self-indulging use	Studious
"He liked the power that his IT knowledge gave him over the rest of us." [Production assistant, talking about a logistics manager who left the firm]	Affective/ Cognitive	Self-indulging use	Interested
"[I use IT] to keep in touch with people I don't see much…The Internet is great for that. You can share all kinds of information, communicate with people that you know." [Arts student]	Behavioral/ Cognitive	Socializing use	Disciplined
"Through social networking on the Web, one has the feeling of being connected to others, of being part of a community." [Law student]	Affective	Socializing use	Studious
"When I use some software, I try to use all functionalities, or at least to understand their purpose. If some functionality that I need does not appear to work properly, I need to understand why. I always try and solve problems, or at least get around whatever the problem is." [CEO]	Behavioral/ Cognitive	Thorough use	Studious

self-enhancing use, self-indulging use, socializing use, and thorough use. Some illustrations of the coding of verbatim extracts are provided in Table 6. For each verbatim that we coded, we also indicated the user-profile ideal type closest to the respondent's profile, based on all qualitative data available for each respondent.

However, the secondary qualitative data set was not sufficient to parsimoniously saturate the emerging categories. For example, the different instances of extensive use versus compulsive use were difficult to assess; differentiating between users who investigate and avail themselves of all possible affordances of the IT at their disposal beyond those they have been trained to use (thorough use) and users who use IT to improve themselves (self-enhancing use) was also difficult. Therefore, we proceeded to collect supplementary data.

Phase 2: Saturating parsimoniously the dimensions of the expectable-use construct

During the first qualitative phase of our research, and if we eliminate the non-use attribute, we had identified 11 dispositional attributes related to the use of any IT/possible dimensions for the expectable-use construct (constrained use, compulsive use, disenchanted use, fearful use, limited use, opportunistic use, extensive use, self-enhancing use, self-indulging use, socializing use, and thorough use). We did not attempt to use existing scales, as no other scale found in the literature attempted to assess this new construct as such and "however well validated an instrument may have been in its original form, excising selected items from a validated instrument does not result in a derivative instrument" (Straub and Curtis, 1989; page 153). Therefore, during the second phase of our research, using the results of the coding obtained during the first phase and related verbatim, we developed items for each of the 11 emerging dimensions that we modeled as reflective, and quantitatively investigated these further.

After multiple pre-tests done with up to 640 participants,[2] and informal interviews with some of the participants, the wording of some items was adjusted and some items were dropped to improve reliability and validity of the scales. Exploratory factor analysis helped us to eliminate completely five of the possible dimensions as redundant: compulsive use, disenchanted

[2] Illustrations of some of the preliminary scales, pre-test results, and scale adjustments are provided in Appendix D.1.

use, efficient use, limited use, and thorough use. Efficient use (use to gain time) and opportunistic use (originally modeled as use to improve self-efficiency) cross-loaded on each other: The two constructs were merged as one: opportunistic use (this construct was amended and is described below). Disenchanted use (use without trust in the instrument) and limited use (use of few functionalities) cross-loaded on several other constructs and were completely eliminated. Thorough use (use of all possible functionalities of available software) and self-enhancing use (this construct was amended and is described below) also cross-loaded on each other. Finally, compulsive use was found to describe an extreme case of extensive use (this construct was amended and is described below) and these two constructs also cross-loaded. The six resulting dispositional attributes related to the use of any IT that were finally retained, as well as the non-use attribute, are detailed below, and linked where possible with existing literature.

Non-use relates to users who have no perceived needs for IT, and no incentive to use IT. Other means are substituted in order to achieve what users have to do. Use and non-use strategies have been studied in the past literature (e.g., Alavi and Henderson, 1981), and are attracting renewed attention (e.g., Satchell and Dourish, 2009; Stein et al., 2015). However, the concept of non-use proposed here is circumscribed: It is induced by the individual's non-perception of any form/degree of IT needs. Although this might nowadays be considered as extremely rare, Walsh et al. (2010) found individuals who still refused to use any form of IT ("I do not need a computer. I can certainly do without": pharmacist); we also found respondents who declared that they did not need IT and used no form of IT (27 in the quantitative data set used during the third phase of the present study: See the "Research design" section). Focused investigation into the non-user profile is beyond the present work, but would certainly be extremely interesting. However, as we are investigating IT usage, the non-use ideal-type was not taken into account in our quantitative analyses.

Extensive use IT use is extensive when IT is considered essential and used in most aspects of life ("I use IT for everything": store worker). Extensive users would rather not have to do without their IT ("I prefer not to have to do without it": CEO). In some instances, IT is considered as an extension of the self ("My IT tools are so much part of my life...of myself...that I feel 'truncated' when I don't have them": Assistant Professor). In extreme cases of extensive use, IT use sometimes becomes close to an addiction, and use becomes compulsive: A great proportion of time is spent using IT, while everything else in life tends to be neglected, and users tend to lose track of time, with IT taking priority over many other elements of their private lives ("As soon as I wake up, I look for my computer": Baker). Although computer addiction is now a recognized medical issue (Wieland, 2005), it has rarely been integrated into mainstream IS models (Turel et al., 2011). For computer addicts, IT use may be perceived to be as essential as fulfilling primary, biological needs – such as eating and drinking (Maslow, 1954; Winter, 1996).

Fearful use is related to a phenomenon referred to in the literature as "general computer anxiety" (Brown et al., 2004). Such anxiety has been widely studied (e.g., Brown et al., 2004; Compeau et al., 1999; Venkatesh and Morris, 2000; Venkatesh et al., 2003). Fearful use is often induced by the users' need to comply and fit in with their work group or peer group (Maslow, 1954; Winter, 1996) while being insufficiently trained (Walsh et al., 2010) ("Everybody around me uses these tools. I am keen to use them, but I am always afraid of making mistakes...there are so many things that I still have to learn about it": CFO in an SME).

Opportunistic use involves extrinsic motivation, with identified and/or external regulation (Deci and Ryan, 2008), and, hence, differing degrees of self-determination. It fulfills the users' aim to improve efficiency in their tasks or jobs ("[with IT], I can do some of the things I have to do better and much faster": professor). IT is seen as instrumental in practical-needs fulfillment. When opportunistic use is high, IT is used to achieve tasks more efficiently (identified regulation: Deci and Ryan, 2008 – "Since I started to use IT, I am much more efficient in my work": CEO). When the assessment of this type of use is low, usage is mostly limited to a few software functionalities, in order to comply with hierarchical instructions in a reward-punishment approach (external regulation: Deci and Ryan, 2008 – "I use only the functionalities I am told I have to use for my job by my boss": PR manager). In this case, it may then be considered as resulting from "subjective norm" – that is, the perceived social pressure to perform (or not perform) a given behavior (Ajzen, 1991; Davis et al., 1989; Fishbein and Azjen, 1975; Mathieson, 1991; Taylor and Todd, 1995a, 1995b).

Self-enhancing use involves the fulfillment of self-accomplishment needs (Maslow, 1954; Winter, 1996). Users want to discover, understand, and learn for themselves about any IT that they use ("He learned by himself because he really wanted to; he kept asking everybody and anybody around him questions about it, until he had all the answers he needed": journalist, talking about one of his friends). They do this to enhance their own development and to fulfill their general desire to discover, understand, and learn ("I like to know about things, to discover new things...Computers and software help me do this": student). Self-enhancing use is often accompanied, at least after initial training has been completed, by self-training ("I learned about IT on my own...completely...I learned because I wanted to. It was not very difficult. First, I learned to type, and then I found things out": retired executive) and a thorough use of most functionalities of any software utilized (Walsh et al., 2010). This type of use might be considered as linked to the exploration use investigated by Devaraj et al. (2008), the dimensions of usage investigated by Sun (2012) ("trying new features," "feature substituting," etc.), and the finesse dimension highlighted by Munro et al. (1997).

Self-indulging use refers to the use of IT to fulfill needs for power and prestige (Maslow, 1954; Winter, 1996). This type of use results from the importance of image, as defined by Moore and Benbasat (1991). The use of IT as a power symbol has been widely studied in the literature (Jasperson et al., 2002; Jouët, 2000). In the secondary qualitative data available, we found that the needs for power and prestige were often combined with sharp ambition and, when also combined with the users' perception of some lack of recognition, led to abusive behavior: Some of the users chose not to share their IT

knowledge fully with others in order to boost and retain their own power and prestige ("After he left, I discovered why people who worked with him could not do their job properly and why they kept complaining about him…He kept purposely withholding parts of the information needed to operate the system…This way, we always needed him to be around and it boosted his ego": CEO, talking about a logistics manager who had left the firm). However, these last elements would need to be confirmed in further research, as we were not able to confirm them with the quantitative data we collected.

Socializing use: This dispositional attribute is related to affiliation needs (Maslow, 1954; Winter, 1996). Users employ IT to keep in touch with people, to communicate/exchange information with their social groups (personal or work-based), and/or to be part of a community (e.g., social networks or virtual work teams) ("I need IT to talk to my friends, my family, to exchange with my work colleagues…I use emails, Facebook": comedian; and "[With IT], you can communicate with people that you know": arts student). The use of IT to socialize and communicate through emails, intranets, and social networks has tremendously increased during the last decade (Boyd, 2008; Flanagin and Waldeck, 2004).

Thus, during the second phase of our research, we used mixed qualitative and quantitative data to formalize (Glaser, 2007) and streamline toward parsimony (Walsh, 2014a) the components/dimensions of expectable use (extensive use, fearful use, opportunistic use, self-enhancing use, self-indulging use, and socializing use).

This phase also allowed us to further code the secondary qualitative data. We found in our qualitative data multiple hybrids of the six dispositional attributes; these hybrids were clearly linked to user-profile ideal types highlighted in the literature and their corresponding IT culture. We tentatively established a correspondence table between user profiles as identified in the literature and their expectable use (see Table 7). However, more qualitative data are needed to fully formalize (Glaser, 2007) these detailed results.

The final scales developed for the dispositional attributes highlighted during the second phase of our research can be found in Appendix D.2. This second phase allowed us to model the aggregate MDC of expectable use, and corresponding index, during the last phase of our research.

Phase 3: An instrument to assess expectable use

During the last phase of our research, (1) we propose a measurement model of expectable use that we test and (2) we verify the external validity of the index proposed to assess expectable use.

The expectable-use measurement model In the measurement model that results from our work (see Fig. 3), the direction of the relationships flows from the attributes/dimensions to the construct of expectable use, as we found that, for a given user, any change in one of the identified dimensions caused changes in the underlying construct, but a change of expectable use did not imply changes in all dimensions. For instance one CFO, whom we interviewed several times, migrated from a passive, mandatory IT disposition to a more proactive, self-determined disposition. This was due mainly to the fact that there had been adequate overall IT training and socializing around IT within her firm during the period between interviews. This user's fearful use diminished dramatically during this period of time, but the other dimensions appeared fairly stable. Conversely, a CEO's self-enhancing use appeared to diminish dramatically over several years, due to very bad experiences with some new software in his firm and to his unnecessarily losing a lot of valuable time because of it. However, his opportunistic use also increased dramatically during the same period, resulting in similar overall inclination, to use any IT pro-actively and in a self-determined fashion for both periods of time.

The overall construct of expectable use is at the same conceptual level as its dimensions; it is a single overall theoretical representation of all dimensions and cannot be expressed solely through one of them. Thus, we modeled the new expectable-use construct as an aggregate MDC, with the various dispositional attributes as its dimensions. As a construct, expectable use may be expressed as the weighted sum of its dimensions; the dimensions are aggregated to form the general concept of expectable use: Hence, expectable use is conceptualized as a second-order formative construct (Gable et al., 2008), with six first-order reflective dimensions: See Fig. 3.

Table 7
User ideal types and their expectable use.

User ideal types identified in the literature	Dispositional attributes related to the use of any IT	
Dodgers 1	None	
Dodgers 2		–
Constrained		Opportunistic use
Disenchanted		Self-enhancing use and sometimes self-indulging use
Frightened		Fearful use, opportunistic use and sometimes self-indulging use
Player	Socializing use	Extensive use of entertainment-purpose software[a]
Disciplined		Opportunistic use, self-enhancing use, extensive use and sometimes self-indulging use
Interested		Opportunistic use and sometimes self-indulging use
Studious		Self-enhancing use, opportunistic use, extensive use and sometimes self-indulging use

[a] This is a conjecture as no secondary qualitative data was available on this profile.

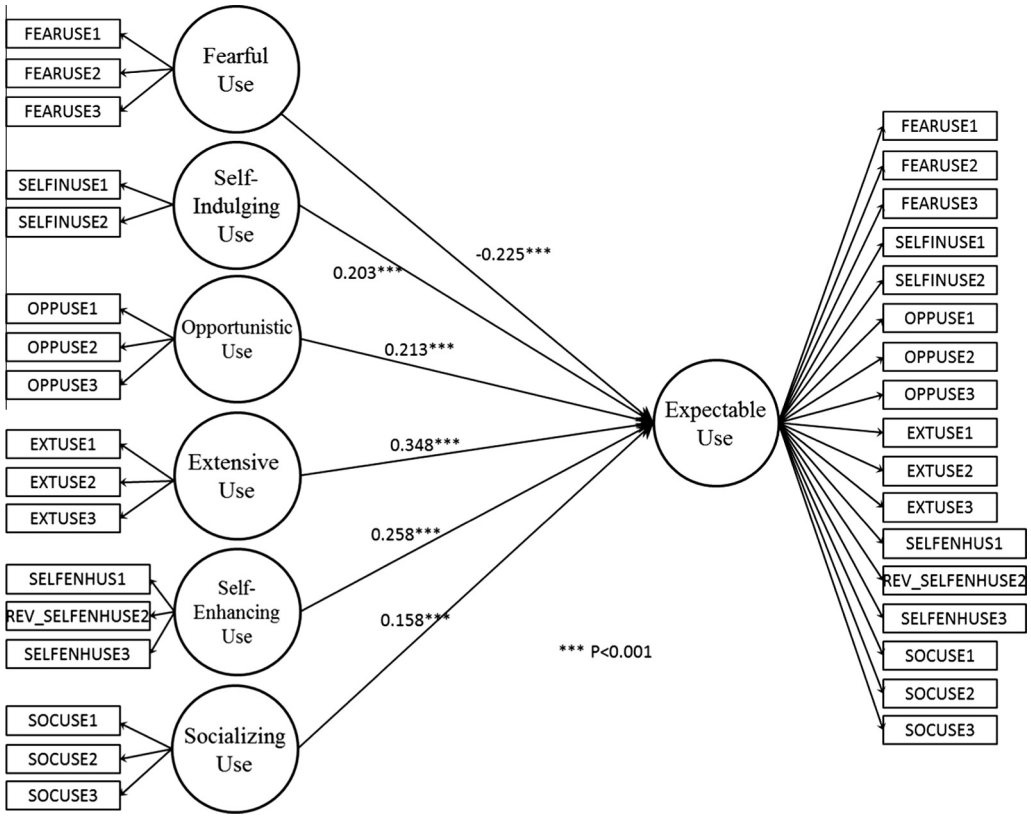

Fig. 3. The measurement model of expectable use.

Table 8
Convergent validity of the new scales.

	SOCUSE	FEARUSE	EXTENUSE	SELFINUSE	SELFENHUSE	OPPUSE
SOCUSE1	**0.878**	−0.229	0.384	0.253	0.183	0.361
SOCUSE2	**0.885**	−0.178	0.359	0.225	0.199	0.363
SOCUSE3	**0.876**	−0.113	0.337	0.254	0.185	0.315
FEARUSE1	−0.201	**0.920**	−0.269	−0.191	−0.488	−0.386
FEARUSE2	−0.107	**0.865**	−0.209	−0.112	−0.343	−0.251
FEARUSE3	−0.210	**0.902**	−0.253	−0.175	−0.441	−0.330
EXTENUSE1	0.388	−0.250	**0.914**	0.438	0.398	0.569
EXTENUSE2	0.374	−0.215	**0.893**	0.448	0.373	0.505
EXTENUSE3	0.338	−0.262	**0.882**	0.500	0.402	0.565
SELFINUSE1	0.272	−0.221	0.501	**0.914**	0.500	0.420
SELFINUSE2	0.234	−0.102	0.437	**0.906**	0.390	0.332
SELFENH1	0.212	−0.380	0.427	0.493	**0.886**	0.444
SELFENH3	0.210	−0.387	0.419	0.469	**0.835**	0.450
REV_SELFENH2	0.080	−0.409	0.180	0.179	**0.706**	0.236
OPPUSE1	0.382	−0.343	0.537	0.349	0.420	**0.856**
OPPUSE2	0.336	−0.337	0.512	0.346	0.425	**0.890**
OPPUSE3	0.305	−0.263	0.554	0.391	0.401	**0.875**

The indicator-reuse approach (Lohmöller, 1989; Ringle et al., 2012) was applied to test the proposed measurement model; in this, all indicators of the lower-order components are reused in the higher-order component (see Fig. 3). For the reflective constructs, item loadings, reliability, and discriminant validity (if the constructs share more variance with their own measures than with other constructs, and if indicators load more strongly on their own constructs than on others) were confirmed through factor analysis. Table 8 shows cross-loadings for all reflexive constructs. These should be greater than .707 for all items representing the same latent variable. If this is so, it shows that more than half of the variance is captured by the constructs.

Table 9
Discriminant validity and reliability of the new scales.

	SOC USE	FEAR USE	EXTEN USE	SELFIN USE	SELFENH USE	OPP USE	AVE	Cr. Alpha
SOCUSE	**0.879**	0.038	0.167	0.077	0.046	0.154	0.773	0.852
FEARUSE	0.038	**0.896**	0.074	0.032	0.225	0.130	0.803	0.874
EXTENUSE	0.167	0.074	**0.896**	0.266	0.191	0.375	0.803	0.877
SELFINUSE	0.077	0.032	0.266	**0.910**	0.240	0.171	0.828	0.792
SELFENH	0.046	0.225	0.191	0.240	**0.813**	0.227	0.660	0.740
OPPUSE	0.154	0.130	0.375	0.171	0.227	**0.874**	0.763	0.844

Table 10
Significance of the expectable-use dimensions.

Latent variable	Value	Standard error	t	$Pr > \|t\|$	f^2
SOCUSE	0.158	0.00003	4946.717	0.000	36577.001
FEARUSE	−0.225	0.00004	−6802.942	0.000	69177.902
EXTENUSE	0.348	0.00004	8786.607	0.000	115402.784
SELFINUSE	0.203	0.00004	5678.791	0.000	48204.279
SELFENHUSE	0.258	0.00004	6826.020	0.000	69648.049
OPPUSE	0.213	0.00003	5504.233	0.000	45286.373

Only one item (REV_SELFENH2) has a loading slightly below this value (.706: See Table 8) – probably because this item was negatively worded. We decided not to discard it from the analysis, as our goal was a strong nomological network, and this item does not significantly cross-load with other items (Chin, 2010).

Thus, except for REV_SELFENH2, the loadings for items of each block were similar in their representation of the underlying construct (see Table 9), confirming convergent validity. Discriminant validity was ensured through each construct square root of the AVE, which has to be greater than its correlation with other factors (Gefen et al., 2000) (see Table 9). Reliability was assessed using alphas and the AVE. Alphas should be greater than .70 (Nunnally, 1978) – and AVE greater than .50, meaning that 50% or more variance should be accounted for (Fornell and Larcker, 1981). All criteria were largely met (see Table 9). All regression coefficients were significantly different from 0 ($p < .001$: See Table 10), and our results support the internal validity and reliability of the various scales developed to assess expectable use.

ITC versus expectable use We also had to verify the external validity of the proposed expectable-use measurement model and its resulting index. We had started from a typology of user profiles with needs and motivations attributes leading to an ITC index, proposed in the literature; we saw in a previous section that it has been highlighted that the more IT-acculturated a user is (i.e., the higher the ITC index is for a user), the more self-determined their IT usage becomes, and the more inclined users are to use any new IT proactively (hence, the higher their expectable use). In the present work, we identified users' dispositional attributes related to the use of any IT, leading to the new expectable use index. Hence, if the dimensions proposed for the expectable use construct and the resulting index are sufficiently comprehensive, the ITC index and the expectable use index should be highly correlated. This was the case as witnessed by a significantly high overall correlation coefficient: 0.86 ($p < 0.001$). However, the sample of respondents used for our work had not been randomized and was not statistically representative: In the grounded theory approach that we adopted, we had chosen to theoretically sample for maximum diversity. Therefore, and in order to further investigate external validity of the new expectable use index, we also verified what could be assimilated to partial correlations (Hair et al., 2006) where the constant is the cluster membership variable i.e., we verified the correlation between the expectable use index and the ITC index within each of the eight user clusters highlighted in the literature (Walsh and Gettler-Summa, 2010).

As the scales for the ITC index have been previously validated (Von Stetten et al., 2011; Walsh, 2009, 2014b; Walsh and Gettler-Summa, 2010) and in order to avoid unnecessary length, we do not provide the details of these scales or the results for their validity and reliability here: These may be requested from the authors. Confirmatory factor analysis was conducted for the ITC dimensions and relevant variables were created by the software for each factor. Hierarchical cluster analysis, Ward method, was then conducted based on these variables corresponding to the ITC dimensions (user needs and motivations). Using Walsh and Gettler-Summa's (2010) results, we knew the number of typological clusters we were looking for: eight clusters if we eliminate the non-users/dodgers 1 cluster, as we had excluded non-users from our data set. We calculated the partial correlation coefficients between the ITC index and the expectable use index within each of the eight clusters. These were all found largely significant (see Table 11).

The graphical display of our results are provided in Fig. 4: The shape of the observations clustering clearly demonstrates the linearity of the relationship between the two indices ITC and Expectable Use.

This demonstrates that the two indices ITC and expectable use are highly correlated and verifies the external validity of the new expectable use index. Further information about the relationship between the two indices may be found in Appendix D.4.

Table 11
Correlation between ITC and expectable use within each cluster.

Cluster	Correlation	Number of observations
1	0.62	137
2	0.55	190
3	0.55	98
4	0.70	52
5	0.55	36
6	0.60	41
7	0.60	41
8	0.63	81

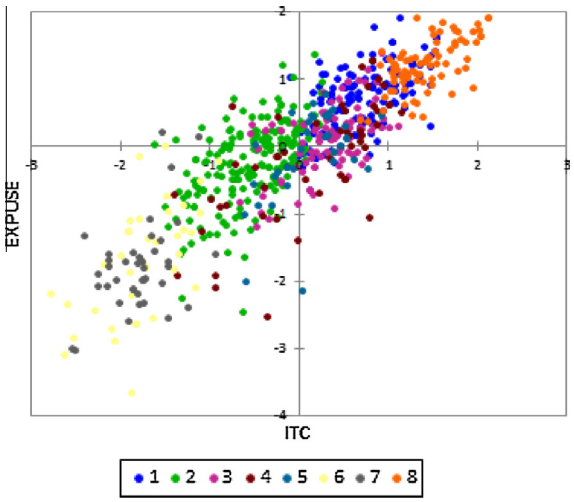

Fig. 4. Scatter plot. (The observations that are part of each of the eight clusters are represented in different colors: For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Thus, we have verified that the expectable-use dimensions, for which we have developed new scales, capture to an acceptable extent the use that is expectable from all user profiles identified in the literature.

The theory of expectable use

In this section, we discuss our results and highlight the contributions of our work, as well as the limitations and possible directions for future research.

In the present work, while using a mixed-design classic GT approach (Walsh, 2014a) and a more holistic and comprehensive approach than has been done in the past, we highlighted six dispositional attributes of user profiles previously identified in the literature. These affective, cognitive and/or behavioral attributes do not correspond to reasoned actions or result from planned behaviors related to some specific IT; they make up the dimensions of a new construct that we named "expectable use". Investigating an existing comprehensive user typology and the corresponding ITC index, we verified the external validity of the new expectable-use construct that we proposed; this verification allowed us to confirm that this new construct and its corresponding index do capture a significant slice of the IT-usage patterns that are dispositional.

The new construct that has emerged from our work reaches beyond utilization and the traditional simple, bipolar view of users' behaviors (acceptance versus resistance) or even the interesting two-dimensional view (one dimension ranging from high use to non-use, and the other from enthusiastic support to aggressive resistance) proposed by Seo et al. (2011) and Van Offenbeek et al. (2013). Closer to our approach, Stein et al. (2015) clearly stand to investigate usage patterns as induced by emotions and beyond rational, goal-oriented perspectives. However, they concentrate on the process through which emotions arise in response to stimulus events related to a specific IT rather than any IT. They investigate how these events elicit affective responses and influence usage. Thus, they do not theorize on usage itself and do not provide ways to assess the investigated usage patterns in a variance approach.

As shown in the literature (Walsh et al., 2010), the more IT-acculturated a user is, the more likely the user's inclination is to use any new IT voluntarily and in a proactive fashion. Therefore, we would propose (proposition 1) that users' IT culture has a significant influence on their expectable use and that the level of their IT acculturation (assessed through their ITC index) has a significant positive influence on the level of their IT disposition (assessed through the expectable use index).

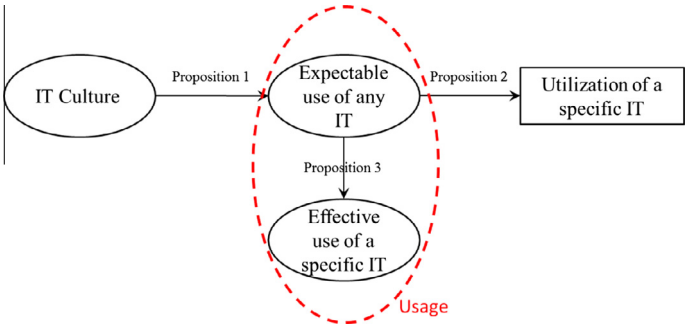

Fig. 5. The theory of expectable use.

The literature has also shown that different variables that are linked to the new expectable-use construct significantly impact utilization and effective use (see Appendix B). For instance, anxiety impacts utilization (Compeau et al., 1999), and subjective norm impacts effective use (Pavlou and Fygenson, 2006). We would therefore propose that expectable use has a significant influence on the utilization (proposition 2) and effective use (proposition 3) of a specific IT.

The elements detailed above are summarized in Fig. 5; they will need to be verified in further research. If propositions 2 and 3 are verified, it should also be verified that the contribution of the higher-order construct of expectable use exceeds that of its dimensions through hierarchical regressions (Johnson et al., 2011).

The population of digital immigrants (Prensky, 2001) has evolved, due to increasing "IT acculturation" (Walsh et al., 2010) at the national level in most developed countries. Multi-group comparisons (e.g., cross-national, in the current globalization context: Leidner, 2010, cross-organizational, and intra-organizational) of expectable use would be valuable in future research. Longitudinal studies and further work on the scope of possible variations of expectable use over time depending on context, training, and experience are also needed to shed further light on the process of IT acculturation. Even though IS is a young science, as new technologies – both hardware and software – are developing at an exponential rate, it could be envisaged that user profiles and corresponding usage might evolve alongside, if perhaps not at the same rate: The millennial digital-native generation may no longer fit with some findings in existing literature.

It would be useful in further research to collect other slices of qualitative data in order to ensure that no new dimensions of expectable use emerge. In particular, the player ideal-type's dispositional attributes were not included even though this ideal-type was highlighted by Walsh and Gettler-Summa (2010): It had not been identified by Walsh et al. (2010), whose work was the source of our secondary qualitative data set. Unsurprisingly, while we revisited the secondary set of qualitative data, we found that we did not have sufficient qualitative data to develop items corresponding to this playful use. Most IS research investigates utilitarian systems (Lin and Bhattacherjee, 2010). The hedonic dimension of IT use (e.g., Davis et al., 1992) and hedonic systems, aimed at entertainment and pleasurable experiences, have been studied in the literature, though to a limited degree (Lin and Bhattacherjee, 2010). The concept of pleasurable experience found in the literature appears too broad and could also involve other categories of IT use already highlighted through our data, for instance self-enhancing use. For this reason, we did not use items from the literature for this category of use: We argue that it would be best to develop these items from extra slices of "fresh" qualitative data, and perhaps to revisit – and possibly adapt – Webster and Martocchio's (1992) playfulness construct in order to assess the dimension of expectable use linked to those users that Walsh and Gettler-Summa (2010) named "players." Carter and Grover's (2015) interesting work might also provide grounding for possible complementary dimensions for the expectable use construct, if one uses these authors' IT identity construct as starting point, instead of the IT culture construct proposed by Walsh et al. (2010) that we used in the present research. Furthermore, we did not take into account in our work, users' biological age-related variables (Tams et al., 2014), which could also help highlight complementary dimensions for the expectable use construct; these dimensions could be linked to users' physical limitations.

In the future, when researchers investigate IT usage, it would be useful for them to identify what they really wish to investigate: (1) users' effective use of a specific IT that may be empirically observable through direct measures; or (2) their expectable use with respect to any IT in general and the way IT is embedded in their value system, leading to daily routines and habits. In the first case, one can take into consideration objectively measurable, behavioral elements related to this specific IT. It might, however, also be essential to investigate, mostly through subjective measures, other elements perceived by users as related to any IT they might come into contact with – their expectable use.

Walsh et al. (2010) showed that ITC user profiles – and hence their expectable use – do evolve through socialization and training. Before new-IT implementation in firms, and whatever the effective use envisaged, it might be useful first to investigate, during the pre-implementation phase, users' expectable use to provide some indications as to the training needed and the optimal structure of work teams in order to maximize the chances of success. In the present work, a simple 17-item instrument that may be administered in a few minutes has been developed to do so.

Conclusion

The present study used qualitative and quantitative data, methods, and techniques in a mixed-design GT approach (Walsh, 2014a) to highlight the dimensions of a new construct – expectable use – and a quantitative index to assess this dispositional facet of IT usage, which had never been previously identified/conceptualized, defined, or modeled from a holistic, comprehensive perspective. This represents a step forward in the understanding of IT usage, as this facet is strategically important: It appears to have an impact on the acceptance, adoption, and effective use of any new IT, regardless of objective assessment of this IT. Our work opens the way to numerous venues for future research. It also has important practical strategic consequences in managerial terms: When assessing a new system, the need in some situations might be to assess after implementation whether the system is being used objectively for time-gained or data-centralization purposes, in which case the assessment of the system's effective use would answer the identified need. However, for training purposes, or if a new system is flexible and open to voluntary innovative and exploratory use, the need might also be to investigate *ex ante* expectable use as a broader aspect of local usage, in order to identify possible "ambassadors" (Thomson et al., 2011) and to ensure that such a system helps the organization achieve competitive advantage.

Acknowledgements

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Appendix A. Some illustrations of differing utilizations, effective uses, and usages

Illustrative case vignettes	Comparison of each pair of individuals'		
	Utilization	Effective use	Dispositional use
Paul and Mark have the same job in the same firm. They use the same CRM implemented in their firm throughout their working day. Due to their different inclinations and resulting perceptions of the CRM, they use different functionalities and different features of the system to help them do different tasks that are parts of their jobs; furthermore, Paul uses his thorough knowledge of this new tool as a power instrument, whereas Mark uses it as a way to improve team work	Similar	Different	Different
Mary and Christina are commercial staff in the same firm. They utilize the local ERP software during their working day, for approximately the same amount of time. They both use the same features of this software to help them provide their clients with a better service. However, Mary tries to understand how the software works and explores some of the ERP functionalities she has not been shown. Christina tries only to do her job. She applies what she has been shown and told to do with the system without going any further	Similar	Similar	Different
Kate has grown up in a house filled with computers and various other digital artifacts. She is quite comfortable utilizing her computer endlessly, to chat with friends on Facebook. Patrick utilizes his computer only for a short time every day to complete his school assignments, but he is anxious when he does so: He is afraid of hitting the wrong key and losing all his data. More generally, he is ill at ease with digital devices	Different	Different	Different

Key: The data were color-coded to help the reader understand our coding/interpretation (yellow for utilization, green for effective use and pink for dispositional use).

Appendix B. Further details about usage as investigated in the literature

Citation	Explanatory and other variables/ phenomena investigated	Name of the explained variable/ phenomenon of interest	What did this explained variable/ phenomenon assess?	Coding
Adams et al. (1992)	Ease of use, usefulness	Usage	Number of emails received and sent	Utilization
Agarwal and Karahanna (2000)	Cognitive absorption, personal innovativeness, playfulness, self-efficacy, PU, PEOU	Intention to use	Intention to use	Intention
Agarwal and Prasad (1998)	Ease of use, usefulness, personal innovativeness in the domain of IT, computer playfulness	Intention to use	Intention to use	Intention
Agarwal et al. (2009)	Peer effect	Usage	Home Internet connection: yes/no	Utilization
Arnold et al. (2006)	User expertise, learning from use	Adherence and explanation access	Number of explanations accessed by user during session, user's final likelihood estimate (0–100%) of following decision recommended by software	Effective use
Beaudry and Pinsonneault (2010)	Seeking social support, venting anger, psychological distancing, task adaptation	Use	Informational use, resource-allocation use, negotiation use, figurehead use	Effective use
Beaudry and Pinsonneault (2005)	Primary and secondary appraisals of IT event	Adaptation strategies	How users adapt to technology	Expectable use (Affect, Cognition and behavior)
Bhattacherjee and Premkumar (2004)	Disconfirmation, satisfaction, beliefs, attitude, usefulness	Intention to continue to use	Intention to continue to use	Intention
Bhattacherjee (2001)	PU, satisfaction, confirmation	IS continuance intention	Intention to repurchase	Intention
Brown et al. (2012)	Expectation, experience	Use	Number of hours of use	Utilization
Cenfetelli and Schwarz (2011)	Usage inhibitors	Usage intention	Intention to use website	Intention
Compeau and Higgins (1995a)	Computer self-efficacy, encouragement by others, others' use, support, affect, anxiety, outcome expectations (performance, personal)	Usage	Frequency and duration of use	Utilization
Compeau and Higgins (1995b)	Behavior modeling, performance outcome expectations, personal outcome expectations, self-efficacy	Performance	Hands-on exercises scored by independent grader	Utilization
Compeau et al. (1999)	Self-efficacy, outcome expectations, affect, anxiety	Use	Frequency and duration of use	Utilization

(*continued on next page*)

Appendix B (*continued*)

Citation	Explanatory and other variables/ phenomena investigated	Name of the explained variable/ phenomenon of interest	What did this explained variable/ phenomenon assess?	Coding
Devaraj et al. (2008)	Openness, neuroticism, agreeableness, conscientiousness, extraversion, computer self-efficacy, etc.	System use	Exploration use and exploitation use measured through action counts	Expectable use (Behavior)
Gefen et al. (2003)	PU, PEOU, trust	Intended use	Intention to purchase and provide information	Intention
Gefen and Straub (1997)	Social presence/information richness factor, PU, PEOU, gender	Use	Self-reported email use: number of emails sent and received	Utilization
Goodhue and Thompson (1995)	Task characteristics, technology characteristics, task-technology fit, performance impacts	Utilization	Perceived dependence	Utilization
Hong and Tam (2006)	PU, PEOU, perceived enjoyment, need for uniqueness, social influence, perceived monetary value, perceived service availability	Behavioral intention to use	Intention to use	Intention
Igbaria et al. (1997)	Intra-organizational factors (internal computing support, internal computing training, management support); inter-organizational factors (external computing support; external computing training)	Use	Frequency, number of hours/day, number of tasks for which computer is used, number of software applications used	Utilization
Kang et al. (2012)	PU, PEOU, consensus on appropriation, faithfulness of appropriation, task performance	Collaborative technologies use	Intensity of use, frequency of use, general dependency on the system	Utilization
Karahanna et al. (1999)	Behavioral beliefs, normative beliefs, attitude, subjective norm, perceived voluntariness	Intention to adopt or continuation to use	Behavioral intention to use	Intention
Kim et al. (2005)	Utilitarian value, hedonic value, social value, usage intention, past use, target experience	IT usage	Frequency of visits in the past month to online information service and average time spent per week visiting online information service site	Utilization
Kim (2009)	Reason-oriented action, sequential updating, feedback, habit	Continued use	Intention to use	Intention
Lawrence and Low (1993)	User representativeness, attitudinal factors (perception of top management support, current expectations of the system prior to implementation, previous experience with computer systems)	User satisfaction	Number of hours/times system is used, percentage of voluntary use	Utilization

Appendix B (*continued*)

Citation	Explanatory and other variables/ phenomena investigated	Name of the explained variable/ phenomenon of interest	What did this explained variable/ phenomenon assess?	Coding
Lee (1994)	Richness of media, user	Use	Role of users in communication richness of electronic mail	Expectable use (Behavior)
Mackay and Elam (1992)	Functional business expertise, spreadsheet-software expertise	Usage	Relation between business expertise, software expertise, and use	Expectable use (Cognition and Behavior)
Majchrzak et al. (2000)	Alignments between organizational environment, group, and IT structures	Use	Appropriation and adaptation process, success of adaptation process	Expectable use (Cognition and Behavior)
McElroy et al. (2007)	Agreeableness, conscientiousness, extraversion, neuroticism, openness to experience, etc.	Internet use	Frequency, comfort in use, willingness to buy, willingness to sell	Utilization and expectable use (Behavior, affect and cognition)
Mithas et al. (2008)	Procurement-process digitization, suppliers' sales-process digitization, organizational perceptions of technological uncertainty, etc.	Likelihood of reverse-auction use	Intention to use	Intention
Moores and Chang (2006)	Moral recognition, moral judgment, moral intention, buying behavior, age, gender	Using behavior	Frequency and breadth of use of computer software: frequency of use, daily time spent using, use for specific tasks, types of pirated software used	Utilization
Nan (2011)	Agents, interactions, environment	Bottom-up IT-use processes	Assimilation, learning rates, performance	Expectable use (Cognition) and utilization
Oborn et al. (2011)	Idiosyncratic use, extensive use, backroom repository use, limited use, etc.	Electronic patient record use in multidisciplinary practice	Tendencies toward unity in practice or diverse use	Expectable use (Cognition and Behavior)
Orlikowski (1996)	Unanticipated breakdowns and contingencies, opportunistic shifts in structure, coordination mechanisms	Usage	Change enactment	Expectable use (Behavior)
Parthasarathy and Bhattacherjee (1998)	Sources of influence, discontinuance, compatibility, ease of use, usefulness, network externality	Utilization	Frequency of use and typical duration	Utilization
Pavlou and Fygenson (2006)	Attitudinal beliefs, normative beliefs, controllability beliefs, self-efficacy beliefs, attitude, subjective norm, perceived behavioral control, intentions	Behavior	Obtaining information about product from company web site, and actual purchase of product on website	Effective use

(*continued on next page*)

Appendix B (*continued*)

Citation	Explanatory and other variables/ phenomena investigated	Name of the explained variable/ phenomenon of interest	What did this explained variable/ phenomenon assess?	Coding
Pinsonneault and Rivard (1998)	Informational roles, decisional roles, interpersonal roles	Use	Intention to use	Intention
Po-An Hsieh et al. (2008)	Hedonic outcomes, government influence, peer influence	Continued use intention	Intention to continue using Internet TV	Intention
Rai et al. (2002)	System quality, information quality, user satisfaction, perceived usefulness	IS use as a behavior	System dependence	Utilization
Srite and Karahanna (2006)	PEOU, PU, subjective norm, espoused masculinity/femininity, espoused individual collectivism/individualism, espoused power distance, espoused uncertainty avoidance	Behavioral intention to use	Intention to use	Intention
Straub (1994)	Social presence and information richness, perceived usefulness, ease of use	Media use	Numbers sent and received, choice of use (scenarios)	Utilization
Sun (2012)	Other people's use, changes in environment, personal innovativeness, etc.	Adaptive system use	Trying new features, feature substituting, feature combining, feature repurposing	Expectable use (Cognition and Behavior)
Sykes et al. (2009)	Coping, influencing, adoption	System use	Aggregate amount of active time spent per week by employee	Utilization
Taylor and Todd (1995a)	Perceived usefulness, ease of use, subjective norm, attitude, behavioral intention, perceived behavioral control	Behavior	Total number of visits per user, total time spent, total number of projects completed	Effective use
Taylor and Todd (1995b)	EOU, PU, compatibility, attitude, influence (peers and superiors), subjective norm, self-efficacy, facilitating conditions (resource and technology), perceived behavioral control, behavioral intention	Usage behavior	Self-reported information about use (software used, number of pages printed, etc.)	Utilization
Turel et al. (2011)	PU, PEOU, addiction, enjoyment	Behavioral usage intentions	Behavioral intentions	Intention
Van der Heijden (2004)	PU, PEOU, perceived enjoyment	Intention to use	Intention to revisit website	Intention
Venkatesh and Morris (2000)	PU, PEOU, subjective norm, gender, experience, behavioral intention	Behavior	Frequency: number of user queries	Utilization
Venkatesh and Ramesh (2006)	Content, ease of use, promotion, made for the medium, emotion	Site use	Number of times the site was visited in the past three months, amount of time spent on each visit, assessment of intensity of use	Utilization

Appendix B (*continued*)

Citation	Explanatory and other variables/ phenomena investigated	Name of the explained variable/ phenomenon of interest	What did this explained variable/ phenomenon assess?	Coding
Venkatesh et al. (2003)	Performance expectancy, effort expectancy, social influence, facilitating conditions, gender, age, experience, voluntariness of use	Behavior	Duration of use via system logs	Utilization
Venkatesh et al. (2008)	Behavioral expectation, facilitating conditions, experience, intention, gender, age	Use	Duration, frequency, intensity	Utilization
Venkatesh et al. (2012)	Social influence, hedonic motivation, habit, etc.	Use behavior	Use frequency for a variety of software	Utilization
Venkatesh (1999)	Game-based training, traditional training, perceived usefulness, perceived ease of use, behavioral intention to use	Actual system use	Duration of use	Utilization
Venkatesh (2000)	Self-efficacy, perception of external control, computer anxiety, computer playfulness, perceived enjoyment, objective usability, PU, PEOU	Behavioral intention to use	Intention to use	Intention
Walsham (2002)	Culture, structure, conflicts, reflexivity, change	Use	Cross-cultural software development and use	Expectable use (Cognition and Behavior)
Webster (1998)	Multiple variables	Use	Social influence, medium symbolism, medium experience, fit, etc.	Expectable use (Affect, Cognition and Behavior)
Wixom and Todd (2005)	PU, PEOU, information quality, system quality, information satisfaction, system satisfaction, attitude	Intention to use	Intention to use as routine at every opportunity, to increase use	Intention
Ye and Johnson (1995)	ES explanations	Users' acceptance	Change in belief, choice of explanation, elapsed reading time	Effective use
Zack (1993)	Appropriateness of communication modes: match between richness of medium and ambiguity/equivocality of message	Effectiveness of usage	Effectiveness of communication	Effective use

Appendix C. The literature

C.1. Multidimensional constructs (MDCs (Edwards, 2001; Law et al., 1998))

Models	MDC is understood as…	Relationship between MDC and dimensions is…	Dimensions of MDC…	MDC exists… (relational level)	MDC can be manifested… (relational form)	Example
Latent (also known as "superordinate")	The commonality among the dimensions	From construct to its dimensions Analogous to reflective measures	Are simply different forms manifested by the construct	As a higher-level construct that underlies its dimensions	By any of its dimensions	End-user computing satisfaction (Doll et al., 1994)
Aggregate	A mathematical function of its dimensions	From the dimensions to the construct Analogous to formative measures	May be combined algebraically	At the same level as its dimensions	Not solely through one of its dimensions (no dimension alone being able to represent the construct)	Job satisfaction (Lawler, 1983; Locke, 1969)
Profile	A set of profiled characteristics of its dimensions	From the dimensions to the construct	Are dichotomized May not be combined algebraically	At the same level as its dimensions	Not solely through one of its dimensions (no dimension alone being able to represent the construct)	Myers–Briggs Type Indicator (Myers and McCaulley, 1985)

C.2. IT-culture user profiles and their needs/motivations attributes (Walsh, 2009; Walsh and Gettler-Summa, 2010; Walsh et al., 2010)

ITC user profiles	Fundamental needs satisfied through IT usages					IT motivation				Perceived IT needs				Probable attitude
	None	Self-accomplishment	Affiliation	Power	Primary	No motivation	External regulation	Identified regulation	To know	None	Situational	Contextual	Global	
Studious		✓	✓	Sometimes	✓			✓	✓				✓	Proactive
Interested			✓	Sometimes				✓	✓				✓	Proactive or passive

Appendix C. (*continued*)

ITC user profiles	Fundamental needs satisfied through IT usages					IT motivation				Perceived IT needs				Probable attitude
	None	Self-accomplishment	Affiliation	Power	Primary	No motivation	External regulation	Identified regulation	To know	None	Situational	Contextual	Global	
Disciplined		✓	✓	Sometimes	✓			✓	✓			✓		Proactive or passive
Frightened			✓	Sometimes				✓	✓			✓		Passive
Disenchanted			✓	Sometimes				✓	✓		✓			Passive
Constrained			✓	Sometimes			✓	✓			✓			Passive
Players		✓	✓						✓		✓			Passive when no play
Dodgers 2			Mild						Mild		✓			Refusal
Dodgers 1 (Non-users)	✓					✓				✓				Refusal

Appendix D. Details related to our quantitative investigations

We provide details of the scales developed for the present study only. The scales used for the ITC dimensions were adapted from Von Stetten et al. (2011), Walsh (2009, 2014b), and Walsh and Gettler-Summa (2010).

D.1. Illustration of some of the adjustments that we did during phase 2 (Preliminary Cronbach's alphas indicated are those calculated during one of the pre-tests with 569 completed questionnaires)

Preliminary constructs	Preliminary items	Preliminary Cronbach's alphas	Comment	Final construct	Final items
Misuse	My IT know-how gives me a certain prestige and I like that	0.678 and 0.826 without the third item	Third item had to be removed to improve reliability. Construct had to be renamed and redefined as removing the third item changed the meaning of this construct	Self-indulging use	SELFINUSE1: My IT know-how gives me a certain prestige and I like that
	I appreciate the power that my IT knowledge gives me				SELFINUSE2: I appreciate the power that my IT knowledge gives me
	When somebody asks me a question about some software that I know well, I am inclined not to give all relevant information				–
Opportunistic use	IT allows me to be more efficient	0.73 and 0.815 if second item removed	Despite acceptable alphas, constructs had to be merged into one construct as, during EFA, the two constructs crossloaded	Opportunistic use	OPPUSE1: IT allows me to save time
	IT allows me to do things I could not do otherwise				OPPUSE2: I am faster in some of my tasks when I use IT
	I would be less efficient if I did not use IT				OPPUSE3: IT allows me to be more efficient
Efficient use	IT allows me to save time	0.868			
	I am faster in some of my tasks when I use IT				
	IT globally allows me to save time while producing good quality work				
Overuse	I use IT in all aspects of my life	0.825	Despite acceptable alphas, constructs had to be merged into one construct as, during EFA, the two constructs crossloaded	Extensive use	EXTUSE1: I use IT in all aspects of my life
	I consider IT essential to every aspect of my life				EXTUSE2: I consider IT essential to every aspect of my life
	I use IT so much that I often think it takes an overwhelming place in my life				

Compulsive use	It is a passion for me I cannot do without IT I don't do anything anymore without my computer	0.758	EXTUSE3: I use IT so much and for so many things that I do not want to be without it

Key: EFA = Exploratory factor analysis.

D.2. Final scales for the dimensions of expectable use (developed for the present study)

Name of the constructs	Acronyms	Items for the questionnaire
Fearful use	FEARUSE1	When I use IT, I am always afraid of making mistakes
	FEARUSE2	When I use a computer, I am always afraid to hit the wrong key and lose all my data
	FEARUSE3	When I use a computer, there is always a moment when I panic because I have done something that I should not have
Self-indulging use	SELFINUSE1	My IT know-how gives me a certain prestige and I like that
	SELFINUSE2	I appreciate the power that my IT knowledge gives me
Opportunistic use	OPPUSE1	IT allows me to save time
	OPPUSE2	I am faster in some of my tasks when I use IT
	OPPUSE3	IT allows me to be more efficient
Self-enhancing use	SELFENH1	If I cannot manage to use a piece of software, I try to understand why
	SELFENH2[a]	If I cannot manage to use a piece of software, I will not bother to find out why
	SELFENH3	When using software, if I am confronted with a problem I do not understand, I like it when I find solutions by myself
Extensive use	EXTUSE1	I use IT in all aspects of my life
	EXTUSE2	I consider IT essential to every aspect of my life
	EXTUSE3	I use IT so much and for so many things that I do not want to be without it
Socializing use	SOCUSE1	I use IT to communicate
	SOCUSE2	I use IT to socialize with certain people
	SOCUSE3	I use IT to keep in touch with certain people without being physically face to face

[a] Item worded negatively: Prior to running the expectable-use model, this item was recomputed as REV_SELFENH2 = 8 − SELFENH2, where X is the score of the original item and Y the new score.

		Frequency	Percentage	Valid percentage	Cumulative percentage
Position	1. Employee	120	17.8	17.9	17.9
	2. Supervisor	61	9.0	9.1	27.0
	3. Manager	100	14.8	14.9	41.9
	4. Student	271	40.1	40.4	82.3
	5. Teacher/professor	31	4.6	4.6	86.9
	6. Retired	30	4.4	4.5	91.4
	7. Unemployed	21	3.1	3.1	94.5
	8. Other	37	5.5	5.5	100.0
	Total	671	99.3	100.0	
Missing	System	5	.7		
Total		676	100.0		
Gender	Male	309	45.7	45.7	45.7
	Female	367	54.3	54.3	100.0
	Total	676	100.0	100.0	
Age	15–20	74	10.9	10.9	10.9
	21–30	351	51.9	51.9	62.9
	31–40	50	7.4	7.4	70.3
	41–50	77	11.4	11.4	81.7
	51–60	92	13.6	13.6	95.3
	60+	32	4.7	4.7	100.0
	Total	676	100.0	100.0	
Education	No academic diploma	5	.7	.7	.7
	High-school graduation	90	13.3	13.4	14.1
	High-school diploma	70	10.4	10.4	24.6
	One-year third-level education	25	3.7	3.7	28.3
	Two-year third-level education	90	13.3	13.4	41.7
	Three-year third-level education	126	18.6	18.8	60.4
	Four-year third-level education	132	19.5	19.6	80.1
	Five-year third-level education or more	134	19.8	19.9	100.0
	Total	672	99.4	100.0	
Missing	System	4	.6		
Total		676	100.0		

D.4. Comparison between the two indices within each cluster

	Descriptive Statistics	Cluster 7 Dodgers2	Cluster 6	Cluster 2	Cluster 5	Cluster 4	Cluster 3	Cluster 1	Cluster 8 Studious
ITC INDEX	Observations	41	41	190	36	52	98	137	81
	Minimum	−2.536	−2.779	−1.612	−0.604	−1.390	−0.662	−0.104	0.688
	Maximum	−0.934	−0.902	0.385	0.917	1.152	1.118	1.543	2.122
	1st quartile	−2.007	−1.918	−0.840	−0.127	−0.371	0.076	0.361	1.166
	Median	−1.778	−1.790	−0.500	0.146	0.409	0.350	0.660	1.387
	3rd Quartile	−1.551	−1.398	−0.200	0.378	0.711	0.565	0.984	1.687
	Mean	−1.791	−1.749	−0.545	0.114	0.140	0.301	0.677	1.420
	Variance	0.122	0.196	0.185	0.150	0.494	0.161	0.169	0.117
	Standard deviation	0.350	0.443	0.430	0.387	0.703	0.402	0.411	0.342
EXPUSE INDEX	Minimum	−3.034	−3.653	−2.458	−2.144	−2.518	−1.188	−0.653	0.382
	Maximum	0.208	−0.001	1.377	0.779	1.288	1.399	1.903	1.903
	1st quartile	−2.122	−2.207	−0.615	−0.341	−0.702	−0.173	0.288	0.993
	Median	−1.782	−1.625	−0.215	0.020	−0.049	0.183	0.710	1.226
	3rd Quartile	−1.607	−1.096	0.131	0.437	0.533	0.352	1.032	1.507
	Mean	−1.777	−1.657	−0.253	−0.109	−0.153	0.116	0.664	1.216
	Variance	0.448	0.693	0.360	0.441	0.782	0.263	0.240	0.144
	Standard deviation	0.669	0.832	0.600	0.664	0.885	0.513	0.490	0.380

The cluster numbers in this table were provided 'at random' by the software XLSTAT. We reordered the columns in the table from lowest to highest ITC mean. The variations of the expectable use means followed those of the ITC means except for Clusters 4 and 5 (Grey highlights in table above). In our quantitative data, we have identified Dodgers2 (Cluster 7: lowest ITC and expectable use means) and Studious (Cluster 8: highest ITC and expectable use means). Qualitative data at our disposal together with the quantitative data are not sufficient to fully reconcile without conjectures the remaining six clusters, with user profiles identified in the literature; this would be inappropriate, more especially as Walsh and Gettler-Summa (2010) highlighted the fact that some of the user groups were not completely differentiated using solely the IT culture dimensions (e.g. the disciplined and the interested user groups)

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