A Measurement Model for Investigating Digital Natives and Their Organisational Behaviour

Research-in-Progress

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Abstract

The notion of digital natives has generated much debate, mostly outside the IS discipline, on the new habits and capabilities these individuals might have developed towards the ICT use and interaction with respect to the previous generations. Literature calls for a deeper investigation of these individuals, and for a stronger understanding of the change in progress. Within the boundaries of a larger project, the purpose of this research-in-progress paper is to contribute to the debate on digital natives within the IS field by providing a measurement model for assessing the behavioural traits of digital natives with regard to technology use. The paper reports on the definition and validation of a measurement model through a card-sorting process. Six latent variables (multitasking, ICT-mediated social relationships, speed in information processing, critical thinking, peer-to-peer collaboration, and learning in action) were identified in literature and the related indicators were created and validated.

Keywords: Latent variables, Measurement models/methodology/metrics, IS research issues, ICT
Introduction

Some studies suggest that the intense use of information and communications technologies (ICTs) in the early years of a person's life could contribute to the development of peculiar behavioural skills (Tapscott 1998; Prensky 2001a). These individuals share the chronological trait of being born after the widespread diffusion of ICTs and the behavioural trait of having intensively used them from their early years, and can therefore be considered as a cohort (Kupperschmidt 2000). They are normally identified by the terms digital natives (Prensky 2001a, 2001b, 2005), net generation (Tapscott 1998), or millennials (McMahon and Pospisil 2005). Some studies suggest that these individuals, hereafter called digital natives (DNs), who are born in a networked and digital world, with ubiquitous access to digital technologies, have probably developed skills and capabilities that allow them to use ICTs in a sophisticated and fluent way (Palfrey and Gasser 2008; Palfrey et al. 2009).

Scholars seem to agree that certain common behavioural characteristics of DNs can probably be ascribed to their intense use of technology. The interaction these individuals had with ICTs in their youth is not strictly related to professional needs, but in any case on average they have spent about 20,000 hours online using different kinds of transactional systems and decision support systems to collect information, to explore the digital world, to enter social relationships, for fun or to cooperate with others (Valkenburg and Peter 2008). Furthermore, they are also supposed by some authors to have developed a sort of addiction that reveals itself in the constant use they make of ICTs for personal, social, and professional purposes (Vodanovich et al. 2010).

The notion of DNs has spurred much public, educational, and academic debate (Ryberg and Ryberg Larsen 2012) and, after a first wave of enthusiastic and positive works, a number of studies have adopted a more critical stance toward the idea of the existence of a homogeneous generation of ICT-literate students which might instead reveal greater internal variance among their characteristics (Bennett et al. 2008). There is room for further research to clarify the nature of the potential changes that are taking place (Jones and Czerniewicz 2010), and to go beyond the uncritical use of these catchy terms to confirm or refute their underlying assumptions (Helsper and Eynon 2010).

As reported by Bennett et al. (2008), the phenomenon of intense use of ICTs in the early years has so far been investigated mainly in the field of education, because these individuals, all born at the end of the twentieth century when such technologies were already widely available, were for a long time identifiable only behind desks in schools or colleges. This is also evident from the names of the journals where these studies are usually published in (e.g. Journal of Computer Assisted Learning, British Journal of Education Technology, Computers and Education, Australasian Journal of Educational Technology, International Journal of Learning). Furthermore, many studies focus only on identifying DNs' actual use of ICT (Kennedy et al. 2008, 2010), or to review existing studies (Bennett and Maton, 2010; Bennett et al. 2008).

Now that the first DNs have entered the job market, and ICTs are more pervasive and ubiquitous than ever thanks to the use of mobile devices, we propose to investigate the phenomenon from a behavioural perspective to realise whether these characteristics of DNs affect the way in which they cooperate with peers in an organisation. This research-in-progress paper is part of a larger project devoted to the investigation of DNs from an organisational behaviour perspective, particularly concerning the potential effect of DNs' behavioural traits on emotional intelligence, a prerequisite for good leadership (Goleman 2004). Within the boundaries of this broader research project, this paper contributes to the literature by identifying and validating a measurement model composed of latent variables (and related indicators) characterising the behaviour of DNs.

The paper unfolds as follows. The research design section provides an overview of the research-in-progress project, specifying the steps currently completed and their results, both detailed in this paper. Information on the research methodology is also provided in the same section. The section entitled 'Identification of latent variables' reports on the results of the literature review and on the latent variables identified. The results of the process for indicator definition and validation are described in the 'Measurement Model' section, and discussed in the 'Discussion and Conclusions' section, which also offers some suggestions for the next stage of the research.

Research Design

As mentioned in the introduction this paper is part of a larger research effort devoted to the investigation of DNs from an organisational behaviour perspective. More specifically the overall research project aims at investigating the potential effect of behavioural traits of DNs on the trait of emotional intelligence. Emotional intelligence is a set of social skills and abilities that allows a person to manage his/her own emotions and those of others in a
group (Jordan et al. 2002). The investigation of the effect of DNs’ behavioural traits on the trait of emotional intelligence involves the examination of multiple relationships between dependent and independent variables. These variables, being pertinent to behavioural traits, are latent variables that cannot be measured directly. It is possible to measure them indirectly by using a measurement model with scales composed of reflective indicators (Hair et al. 2009; Hardy and Bryman 2009; Dijkstra 2010).

Although the emotional intelligence construct is extensively studied in the literature, and several measurement models are already available (see for example Schutte et al. 1998; Jordan et al. 2002; Conte 2005), the same does not hold true for DNs’ behavioural traits. Currently only one measurement model for measuring DNs’ behavioural traits has been proposed (Theo 2013). This model covers teaching and learning aspects, and it is aimed at providing instructors with a self-report (typically a survey) instrument to measure whether, and how much, students can be described as DNs.

For the completion of the overall research project it is therefore necessary to have a measurement scale for DNs that targets the behavioural traits meaningful in an organisational behaviour setting. In this regard the present paper contributes to the literature by proposing a validated measurement model for the investigation of the most salient behavioural traits of DNs that shape their interaction with technology and with other people. To achieve this objective a literature review was performed to collect relevant contributions discussing the phenomenon of interest.

As regards the literature review we followed the process devised by Webster and Watson (2002). The literature search was carried out with Scopus, a large citation database of peer-reviewed literature. Scopus indexes a vast body of literature outside the borders of the IS discipline. Despite the fact that this could increase the bias in the results, we specifically chose it for literature selection because, as mentioned in the introduction, the debate on DNs started mainly outside the field of IS. To provide evidence for this, the individual searches for the keywords ‘digital native’, ‘net generation’, and ‘millennials’ in abstracts, keywords, or titles in the senior scholars’ basket of journals, the preferred source suggested by Webster and Watson (2002), produced only two results (in Information Systems Research and in the Journal of Strategic Information Systems). The latter was a false positive. In Scopus the queries with the same terms produced, respectively, 167, 154, and 174 results with some duplicates.

The final selection was made by: (1) combining these three sets and removing duplicates (162 papers retained), (2) reading all the titles and removing all the false positives (148 papers retained); (3) repeating this last selection process at the abstract level (68 papers retained). Six papers out of this sample were not accessible through our university library and were excluded from the analysis. After a full text reading, only a few (16) papers of the remaining sample of 62 were found to be pertinent to our research aim and they are discussed here. The reading of these papers helped to identify another 10 relevant works, also discussed here, from their reference sections (what Webster and Watson (2002, p. xvi) call ‘backward search’).

We read each paper separately, trying to single out one or more key concepts possibly related to our research objective. We then proceeded to match and discuss our understanding of the papers, in order to derive a paper/concept matrix. The more frequent and clearly depicted concepts emerging from discussion over the final matrix allowed us to identify the six latent variables needed to proceed with the next steps.

For each of these six latent variables identified in the literature we created indicators. To validate the measurement model we followed the card-sorting method that Moore and Benbasat used for the development of a measurement model on a different topic (1991). We adopted it since, to the best of our knowledge, it provides methodological foundations for the development of a measurement model simultaneously addressing unambiguity, and convergent and discriminant validity. For each of the six latent variables we created a set of nine to ten indicators. These indicators underwent three card-sorting cycles organised as follows:

1. First cycle: four independent judges (two researchers/experts and two DNs) were provided with an unordered list of indicators and were asked to classify them in six latent variables (each latent variable was composed of a caption and a brief descriptive text).

2. Second cycle: identical to the first one, the only difference being that some indicators were revised following the results of the first round. Four new independent judges (two researchers/experts and two DNs) were again provided with an unordered list of indicators and asked to classify them in six latent variables (each latent variable was composed of a caption and a brief descriptive text).

3. Third cycle: four judges (two researchers/experts and two DNs) were provided with the list of indicators modified and classified according to the results of the first and the second cycle, and were eventually
asked to provide a caption and a descriptive text for each of the six groups.

Following Moore and Benbasat (1991) the group of judges involved in the sorting cycles were always equally composed of researchers/experts and subjects to be investigated. At the end of the process 12 different judges (six researchers and six DNs) were involved in the card-sorting procedure. To avoid biases and memory effects judges were changed in every cycle, so no judge classified indicators twice. Moreover, as the process related to linguistic comprehension, and in order to avoid any bias in this regard, all the used texts had to be in the language (Italian) shared by all the involved judges. Only after the end of the process were the final texts translated into English.

Two statistical indexes, the Cohen’s K and the hit target index proposed by Moore and Benbasat (1991), were used to assess the goodness of the classification made, and to identify the need for a further cycle during the classification. More specifically we used Cohen’s K to measure the level of agreement of the classification made by each judge against that of every other judge in the same cycle (inter-rater reliability). We used the hit target index to assess how much the classifications of indicators into latent variables by the judges were concordant with what we expected (researcher-rater reliability). This would have allowed us, in the opposite case, to identify potential problems. For every round we used average values for both indexes, and we established the minimum threshold of 0.80 for the Cohen’s K index (the highest one, corresponding to excellent agreement among judges), and tried to maximise the hit target index, as suggested by its authors.

**Identification of latent variables**

As mentioned in the previous section we performed a literature review in order to identify DNs’ most frequently cited behavioural traits. While analysing the literature we were particularly interested in papers discussing behavioural aspects of digital natives who could be significant from an organisational behaviour perspective. The six latent variables identified in the literature review are presented below.

**Use of different tools simultaneously**

The simultaneous use of different tools for different activities by the DNs was one of their most frequently cited characteristics in the considered papers. The definitions often included the term ‘multitasking’ (Oblinger and Oblinger 2005; Brown 2000; Vodanovich et al. 2010; Prensky 2001a, 2001b; Jones et al. 2010) and underline the widespread habit, which for some becomes a pleasure (Prensky 2001a) or a preference (Vodanovich et al. 2010), of performing several tasks simultaneously ‘using more media at a time’, like: ‘listening to music, talking on a cell phone, using the computer’. This appears to have a strong effect on DNs’ learning processes (Prensky 2001a; Ryberg and Ryberg Larsen 2012). The same authors also underline the possible changes that a ‘ubiquitous computing environment’ may produce on a young person’s brain, thanks to its plasticity, as suggested by neurologists. Yet some scholars claim that, even if clearly observable in DNs, multitasking is not unique to them (Bennett et al. 2008).

On this basis we identified a latent variable that we named ‘Multitasking’, initially describing it as the ‘habit of using different ICT tools and digital media at the same time’.

**Influence of ICT tools on social relationships**

Several authors claim that DNs have a marked social nature (Oblinger and Oblinger 2005; Brown 2000; Hargittai and Hinnant 2008). In this regard, the wide availability of tools like mobile phones, computers, internet, e-mail, instant messengers (IM), social networks and so on offers to young people really powerful instruments to nurture their social nature everywhere and continuously (Oblinger and Oblinger 2005; Prensky 2001a). They are said to tend to ‘be networked most or all of their lives’, which has a potentially strong influence on their relationships with other people. Thanks to ICT tools, DNs can ‘contact teachers and schoolmates about class work’, they ‘stay in touch, often daily, with school and childhood friends’ after leaving college (Oblinger and Oblinger 2005; Bennett et al. 2007; Salaway et al. 2008), they can maintain relationships with many more people than in the past. Research by Margaryan and colleagues (2011) suggests a link between learning discipline and level of social tool use. Possibly an even more interesting symptom of ICT tools' influence on the nature of relationships is that DNs regard inclusiveness differently; for example, admitting a person to a group on the internet without knowing him/her personally (Oblinger and Oblinger 2005), although face-to-face interaction is still seen as valuable (Ryberg and Ryberg Larsen 2012).

We called this second latent variable ‘ICT-mediated relationships’, which we described as the ‘tendency to relate
to other people through ICT tools and digital media’.

**Coping with speed and information**

The terms ‘speed’, ‘fast’, and ‘quick(ly)’ are frequently used in most of the papers analysed. They are almost always used to depict the ‘twitch-speed world’ in which DN have grown up and live in: everything related to information and communication is fast, and faster than before. Speed appears to be one of the major distinctions of DN. DN are presented as totally immersed in this world, and perfectly adapted to it. With regard to information, both the speed in providing and in processing are mentioned (Vodanovich et al. 2010; Prensky 2001a, 2001b; Oblinger and Oblinger 2005; Jones et al. 2010). Coping with speed and information is both presented as a predilection (‘they prefer receiving information quickly’, ‘they like to parallel processes’), and an attitude (‘they are used to the instantaneity of hypertext’, ‘are adept at processing information rapidly’), which someone even links to a brain adaptation (Prensky 2001a).

A third latent variable was called ‘Speed in information processing’, and given the following description: ‘the habit and need to obtain and process information to accomplish tasks really fast’.

**Evaluation of online sources of information**

A concern frequently present in the considered papers, probably because they mostly deal with education and teaching, concerns the ability of DN to profit fully from the overwhelming quantity of information available on the internet where there is ‘overabundance of untrustworthy information’. DN are generally considered to be competent at searching the web, although Hargittai and Hinant (2008) report less assertive data in this regard, and Bennett et al. (2008) urge caution in treating all DN as a group of replicants. Many scholars, however, highlight the gap between the ability to do research on several sources and the capacity to assess the quality of each source or the trustworthiness of the obtained information (Oblinger and Oblinger 2005; Lorenzo and Dziuban 2006; Bennett et al. 2008; Brown 2000), citing DN’s lack of critical thinking (Lorenzo and Dziuban 2006; Bennett et al. 2008). Critical thinking is an essential skill for evaluating the authority, relevance, quality, and coverage of online sources (Lorenzo and Dziuban 2006), and not making ‘hasty, random choices with little thought’.

‘Critical thinking’ is the name given to the fourth identified latent variable, whose description is: ‘the ability to critically evaluate online resources and to choose the most authoritative ones’.

**Collaboration with peers**

As already mentioned many authors remark the strong social nature of DN (Vodanovich et al. 2010, Jones et al. 2010, Oblinger and Oblinger 2005, Brown 2000). Modern ICT tools, like for example social networks, forums etc., support and reinforce relationships among peers, allowing them to stay continuously in touch, or find help fast when needed. This suggests DN’s ‘preference for working in teams or interacting peer-to-peer’ (Oblinger and Oblinger 2005) and the belief that being always connected to their peers is ‘part of their personalities’ (Vodanovich et al. 2010). Vodanovich and colleagues (2010), building on Tapscott (2008), claim that this has possible consequences for organisations when DN enter the workplace, as they will look for a model based on engagement and collaboration rather than one more traditionally based on ‘command and control’.

Then we drew a fifth latent variable with the name ‘Peer-to-peer collaboration’, with the following description: ‘the habit of looking for collaboration with peers rather than isolation’.

**Learning by doing**

Brown (2000) claimed that the web allows concrete rather than abstract learning, and is a medium for the social creation of understanding. Prensky (2001b) introduced the idea that greater student engagement could be reached through the use of tools they were used to, like video games. Other authors developed such notions in different, but coherent, ways. Oblinger and Oblinger (2005, p. 2.6) stated that DN ‘prefer to learn by doing rather than being told’, gaining a better comprehension through directly participative discovery, alone or together with peers, and stimulating creative uses of retained information. They also suggest that growing up with video games might have a role in it, albeit this is unclear. Other authors suggest however that interest in active learning does not mean that students ask for greater use of technologies during classes (Waycott et al. 2010; Bennett et al. 2010; Salaway et al. 2008)
We called the sixth and final latent variable ‘Learning in action’, describing it as the ‘preference for learning something through a form of experience (i.e., watching and discussing a film), rather than from an abstract dissertation (i.e., a textbook or a traditional class)’.

**Measurement Model**

Once the six described latent variables were singled out, an initial set of 9 or 10 indicators for each one was defined, and the validation process was started. We made use of the card-sorting technique, Cohen’s K (K) and the Hit Target (HT) by Moore and Benbasat (1991) as indexes of reliability.

The results of the first card-sorting round are shown in Table 1a and 1b. Table 1a shows the Cohen’s K indexes measuring the level of agreement between pairs of judges, together with the total average in the first sorting round. It should be noted that a Cohen’s K value beyond the 0.60 threshold is generally considered as good, and a K value greater than 0.80 is considered as excellent. In Table 1b the HT values are reported: each of them corresponds with the overall frequency of an indicator being placed by the four judges into the same variable as that with which we intended to classify it. As regards HT, no guidelines are provided to evaluate it, which is more an index to use for identifying areas of possible problems. We thence tried to maximise it.

Notwithstanding the high values of Cohen’s K, we decided to go for a second round as the variable ‘Learning in action’ showed an HT value significantly lower than the others. We then proceeded with careful rewording of the most frequently misplaced indicators and submitted the renewed set of indicators to a different group of judges for a second sorting round.

The indexes obtained from the second card-sorting round are respectively shown in Table 2a and Table 2b. Having noticed that all the K values still stayed over the excellence threshold and that the HT values were extremely high and no longer showed areas of possible problems, we decided to stop the card-sorting at this stage, proceeding with the caption and description collection, involving four new judges. In this round we asked judges to provide a label and a description for the validated indicators.

Labels and descriptions provided in round 3 (see Table 3) were highly coherent between themselves and with the targeted ones. This stopped the validation process, and after a slight revision of labels and description, the set of latent variables and indicators was finalised, and eventually translated into English (see the Appendix).
Table 3. Labels provided by judges in Round 3.

<table>
<thead>
<tr>
<th>Target label</th>
<th>Judge 1</th>
<th>Judge 2</th>
<th>Judge 3</th>
<th>Judge 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multitasking</td>
<td>Multitasking</td>
<td>Multitasking</td>
<td>Multitasking</td>
<td>Multitasking</td>
</tr>
<tr>
<td>ICT mediated relationship</td>
<td>Multimedial communication</td>
<td>ICT relationships</td>
<td>Strongly mediated communication</td>
<td>eSocial</td>
</tr>
<tr>
<td>Speed in information processing</td>
<td>Information quickness</td>
<td>Information speed</td>
<td>Information dependence</td>
<td>Information fast food</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>Natural selection</td>
<td>Web sources selection</td>
<td>Information selection</td>
<td>Good or bad information</td>
</tr>
<tr>
<td>Peer to peer collaboration</td>
<td>Networking</td>
<td>Team working</td>
<td>Collaborative working</td>
<td>Teamwork</td>
</tr>
<tr>
<td>Learning in action</td>
<td>Practice</td>
<td>Learning in practice</td>
<td>Action propensity</td>
<td>New learning</td>
</tr>
</tbody>
</table>

Discussion and Conclusions

This paper contributes to the literature by proposing a validated measurement model to investigate the behavioural traits of DNs. As already mentioned, according to the results of the literature analysis, only the scale for measuring DNs behavioural traits recently proposed by Theo (2013) is available in the literature. Our work adopts a different perspective, since we identified six latent variables pertinent to the behavioural sphere of DNs, and in particular we focus on variables that might be used to investigate the behaviour of DNs in professional environments in relationships with other colleagues.

The measurement model here proposed is the result of research devoted to investigating the effect of behavioural traits of DNs on the traits of emotional intelligence, a prerequisite for good leadership (Goleman 2004). The proposed latent variables and indicators were validated with the card-sorting process described by Moore and Benbasat (1991) and employed judges including experts/researchers and DNs.

We must mention some partial limitations related to the present stage of the model, and urge caution about the use of the final results. As regards the former, we are aware of both a partial limitation and of a potential bias of the model at this stage. Regarding the partial limitation, we have to acknowledge that we did not have access to six (out of 68) of the papers that were in our selected sample. Moreover, despite the accredited validation process adopted, in the current stage of research we did not yet perform a test survey with the proposed indicators. We will address this last gap in a future research step by running a test survey on a sample of DNs. The potential bias in the creation of the indicators must be ascribed to the language. We ran the complete card-sorting process using latent variables’ names, descriptions and indicators in Italian. Then we translated the final validated version of latent variables’ names and descriptions as well as indicators into English, possibly causing some confusion at this stage. The original material (in Italian) is available from the authors on request.

As regards the caution urged about the final results obtainable with the model, it should be noted that ICT influence on DNs’ behaviours may, or may not be, biased by other elements of the context in which they live (e.g. culture, census, level of instruction, and others), possibly engendering differences in the relationship between ICT and young people of diverse communities. At present, we cannot make any assumptions in this regard, as such differences might emerge as a result of investigations using the measurement model proposed here in different countries. As we encourage such investigations, we advise researchers to be aware when designing their projects of the potential effect on DNs’ behavioural traits of aspects like those mentioned above.

Since this is a research in progress, further actions will be necessary to complete the study of the effect of DNs’ behavioural traits on emotional intelligence. The next immediate step is the mentioned creation of a test survey to be administered to a small sample of DNs. This test survey will first serve to finally validate the measurement model here proposed. If problems with clarity in indicators or latent variable formulations are identified, interviews with respondents will be held to identify the necessary amendments. Data collected through the test survey will also be used to confirm the judges’ classification of the indicators into the latent variables through confirmatory factor and principal component analysis. After completion of this phase, the validated scale will finally be used to investigate the effect of DNs’ behavioural traits on emotional intelligence. We plan to survey a sample composed of both natives and immigrants (to investigate potential differences between these two groups), making use of structural equation modelling for the analysis.
## Appendix

<table>
<thead>
<tr>
<th>Latent Variable: description</th>
<th>Indicators</th>
</tr>
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</table>
| Multitasking: habit of using different ICT tools and digital media at the same time | 1. I can easily use more ICT tools and digital media at the same time  
2. I am used to interacting with different ICT tools and digital media at the same time  
3. I sometimes make use of different ICT tools and digital media at the same time  
4. Using different ICT tools and digital media at the same time is not a problem for me  
5. I feel comfortable when I make use of several different ICT tools and digital media at the same time  
6. I do not feel uncomfortable when I use different ICT tools and digital media at the same time as it is common practice for me  
7. I regularly make use of different ICT tools and digital media at the same time  
8. It is not a problem for me to use different software applications at the same time  
9. I am used to performing different activities concurrently, making use of different ICT tools and/or digital media |
| ICT tools-mediated relationship: tendency to relate to other persons through ICT tools and digital media | 1. I am used to getting in contact with other people through ICT tools  
2. I prefer technology-mediated contact with other people rather than face-to-face contact  
3. I am used to getting in touch with friends or relatives through the internet, ICT tools, and digital media  
4. I prefer to use ICT tools and digital media to get in contact with other people  
5. I communicate with other people mainly through ICT tools and digital media  
6. I frequently get acquainted with other people through ICT tools and digital media  
7. I prefer to have long chats with friends and colleagues through ICT tools and digital media  
8. In interaction with other people I feel more comfortable if ICT tools and digital media are used in communicating  
9. I do not feel uncomfortable when I communicate with other people through ICT tools and digital media  
10. I usually have recourse to ICT tools and digital media to communicate with other people |
| Speed in information processing: habit and need to obtain and process information very rapidly to accomplish tasks quickly | 1. I like to receive information really fast  
2. I prefer speed over slowness when I need information to process  
3. I prefer speed over slowness when I have to perform a task  
4. I am used to receiving information really fast  
5. Slowness in information flow disturbs me  
6. I would like to receive information quickly  
7. I would like to receive information and to perform tasks quickly  
8. I prefer to be fast rather than slow when processing information  
9. If I have to choose between receiving information at a quick or slow rate I select the first (quick)  
10. I feel really disappointed if information is slow to reach me in the ICT era |
| Critical Thinking: ability of critically evaluating online resources to choose most authoritative ones | 1. I am used to selecting information sources on the internet and evaluating their relevance  
2. I usually take a critical stance toward the information found on the internet  
3. I do not accept information found on the internet without questioning it  
4. I do not find it particularly difficult to identify the most reliable information sources on the internet  
5. I do not have any trouble deciding whether an internet information source is reliable or not  
6. It is easy for me to identify and avoid unreliable information sources on the internet  
7. I never fall into the trap of considering as reliable an unreliable information source on the internet  
8. People often consult me when they have to decide whether an information source on the internet is reliable or not  
9. I think I am capable of assessing the reliability of information sources on the internet |
### Peer-to-peer collaboration: *habit of looking for collaboration rather than working alone*

1. I prefer to cooperate with colleagues rather than work alone  
2. I prefer to establish collaborative relationships with colleagues rather than work alone  
3. I dislike not working in a team with colleagues  
4. I prefer peer-to-peer collaboration with colleagues  
5. I prefer working in a team with colleagues rather than separately  
6. I prefer to be collaborative rather than not  
7. I am more comfortable with colleagues who look for collaboration rather than with those who prefer to work alone  
8. In my activities I tend to collaborate rather than to work separately  
9. I would describe myself as a collaborative person  
10. I would not describe myself as an individualistic person

### Learning in action: *preference for learning something through a form of contextualised experience (e.g. watching and discussing a film), rather than from an abstract dissertation (e.g. a textbook or a traditional class)*

1. I prefer to be engaged in learning activities that involve action  
2. I find learning only with textbooks and traditional classes (speech and slides) boring  
3. I find learning only with textbooks not motivating  
4. I find activity-based learning more interesting than reading books or listening to lectures  
5. I find learning something while experiencing it more interesting than attending traditional classes  
6. I prefer to learn something while experiencing it rather than sitting at a table and reading a book  
7. I would prefer to join a class where the lecturer engages students in activities rather than one where the students just have to listen to the lecturer  
8. I would be more motivated when learning something through a related experience rather than only reading a book or listening to lectures  
9. I do not feel particularly motivated by listening to a lecturer in a traditional face-to-face class  
10. I do not feel particularly motivated to study when I just have to sit at a table and read a textbook
References


