How Students with Intellectual Disabilities Evaluate Recommendations from Internet Forums

Ladislao Salmerón[1], Marcos Gómez[2], Inmaculada Fajardo[1]

[1] University of Valencia (Spain)

[2] University of Alicante (Spain)

Correspondence may be sent to:

Ladislao Salmerón

ERI Lectura & Department of Developmental and Educational Psychology

University of Valencia

Avd. Blasco Ibáñez, 21. 46010 - Valencia (Spain)

e-mail: ladislao.salmeron@valencia.edu

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Abstract

Social networks enable people with intellectual disabilities (ID) to participate actively in society and to promote their self-determination. However, concerns have been raised regarding the potential limitations of people with ID to deal with untrustworthy information sources on the Internet. In an experiment, we assessed how adult students with ID evaluated recommendations in Internet forums authored by either self-reported experts or by users under pseudonyms who supported their claim either with documentary sources or their personal experience. We compared the performances of students with ID to that of students of similar ages but higher educational levels (chronological age-matched control group) and to younger students with similar verbal mental age (verbal mental age-matched control group). Participants were asked to evaluate to what extent a fictitious user should follow particular recommendations given in a forum and to justify their evaluations by writing a message to the fictitious user. Students with ID, as opposed to the two control groups, recommended the forum advice to a higher extent regardless of authorship and evidence used, and they included in their messages to the fictitious user a higher number of opinions and information sources not present in the forum without linking them to the actual discussion. The pattern of results suggested that students with ID have a limited ability to evaluate recommendations in forums and that they do not necessarily present a delay in the development of these abilities, but rather an atypical development. Finally, we discussed the potential implications for teaching digital literacy to students with ID.

Keywords: intellectual disabilities; sources evaluation; Social question answering; Internet forums

Intellectual disability (ID) is a disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains (APA, 2013). Use of online social networks holds great promise for people with ID because it can reduce or eliminate many barriers that limit their access to social activities in daily life (for reviews, see Carey, 2005; Chadwick, Wesson, & Fullwood, 2013; Stendal, 2012; Wehmeyer et al., 2004). Indeed, online social networks can be used as an alternative type of socialization. This is particularly important given that people with intellectual disabilities tend to have reduced social networks in the real world (Lippold & Burns, 2009). Previous interview studies on online social networks with users with ID revealed that they particularly value being able to express and share their thoughts and feelings online (McClimens & Gordon, 2009) and that they can chose whether to disclose their disability, an opportunity not typically available in face-to-face interactions in the real world (Bowker & Tuffin, 2002). In sum, participation in SQA may promote self-determination of people with ID, defined as the ability to act "as the primary causal agent in one's life and making choices and decisions regarding one's quality of life free from undue external influence or interference" (Wehmeyer, 1996, p. 22). Note that this notion is being promoted by some of the objectives of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD; United Nations, 2006).

The potential benefits of social networks for people with ID also come with certain risks. Due to their high levels of credulity (Greenspan, Loughlin, & Black, 2001), people with ID could be more easily deceived by untrustworthy users. Based on this assumption, there have been previous attempts to create safer online social networks for people with ID (Löfgren-Mårtenson, 2008). However, interview studies have revealed that users with ID do not favor such restricted social networking sites and prefer to participate in sites that are open to the general public (Holmes & O'Loughlin, 2014). Specifically, we focus on social question

and answer (SQA) forums, which are particularly popular online social networks used to search for and discuss information on virtually any topic, from dining out to science and mathematics (Jeon & Rieh, 2013; Zhang & Deng, 2013). Our main goal is to analyze whether people with ID can confront common information challenges of SQA forums aimed at the general public, specifically by exploring to what extent they evaluate recommendations in SQA.

In the next sections, we first describe important socio-cognitive characteristics of people with ID that may limit their evaluation and use of information from SQA. Then, we discuss the scientific literature about how typically developing users evaluate recommendations in SQA. Finally, we present a study in which we compared the pattern of responses of students with ID with that of chronological age-matched (CA) and verbal mental age-matched (VMA) control groups to understand if students with ID's behavior in SQA can be characterized as a delay in development or as an atypical development (Hodapp, Burack, & Zigler, 1995).

Socio-cognitive Characteristics of People with ID

People with ID have several characteristics that may limit their interaction with SQA and the Internet in general. There are different definitions of ID in the literature, but the most widespread definition state that people with ID are characterized by important limitations in both intellectual functioning and adaptive behaviors relevant to daily functioning (APA, 2013; Schalock et al., 2010). The intellectual functioning is usually assessed by intelligence tests that provide an intelligence coefficient (IQ) that can be used for comparisons with respect to the typically developing population.[1]

[1] Most of the studies of people with ID cited in this article established severity levels using the scale of the DSM-IV-TR (APA, 2000) or the ICD-10 (WHO, 1992), which coincide in

On the other hand, the adaptive behavior is assessed across three domains: conceptual (or academic), social, and practical life skills. A key factor within the domain of conceptual and academic skills is the development of reading. Students with ID typically present a level of reading comprehension that is several years below their chronological age. In a series of studies of students with ID engaged in vocational schools, Fajardo et al. (2013, 2014) found that students aged 18–20 with mild to borderline ID showed reading comprehension levels corresponding to 9–11 year olds. Although this characteristic may limit the comprehension of forum discussions for students with ID, such reading levels still enable access to online reading material written at the appropriate level of difficulty.

Within the social domain of adaptive behavior, a high percentage of people with ID are characterized in terms of ingenuity, credulity, and gullibility (Greenspan, Switzky, & Woods, 2011; Luckasson et al., 2002). As previously discussed, their high levels of credulity, defined as belief despite lack of evidence (Greenspan et al., 2001), may be problematic because Internet forums often contain misinformation and inadequate advice. In forums about sensitive subjects such as health and sexual behaviors, such misinformation could have potentially serious consequences (Versteeg, Knopf, Posluszny, Vockell, & Britto, 2009).

Leffert, Siperstein, and Widaman (2010) studied adaptive behavior of students with ID by presenting hypothetical problematic situations (presented via video-taped vignettes) that described social scenarios in which an actor showed explicit or implicit benign or hostile intentions. Children with ID were less accurate in interpreting others' intentions than children with typical development. This was particularly evident when the situation depicted a complex set of events, such as when a salient event clue (e.g., the child who experiences a

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approximately the following categories of ID: borderline (IQ 71-84), mild (IQ 50/55- 70), moderate (IQ 35-40 to 50-55), severe (IQ 20-25 to 35-40) and profound (IQ below 20 or 25).

negative event displays an emotional reaction in response, such as exclaiming, "My sandwich is soaked!" after another child knocks over a glass of water) was not aligned to the actor's benign but implicit intentions (e.g., knocking over a glass of water by accident because he was playing football).

Van Nieuwenhuijzen et al. (2004, 2009, 2011) also studied the social domain of children with ID from the framework of social information processing (Dodge, 1986). According to this theory, social behavior is preceded by several mental steps: encoding, interpretation, goal clarification, response generation, and response decision. Van Nieuwenhuijzen et al. (2011) presented to children with mild to borderline ID (see note 1) a set of vignettes representing problematic and regular social interactions, and the children answered a set of questions about the situation. For the present research, the most relevant findings of Van Nieuwenhuijzen et al. were at the encoding and response decision steps. At the encoding step, in response to the question, "What happened in this cartoon/card/video clip?", children with mild to borderline ID included in their descriptions a higher number of outside experiences and normative beliefs in their descriptions of the social vignettes than the typically developing control group. In addition, children with mild to borderline ID tended to ignore actual information from the situation. Also, children with ID included fewer descriptions of actual situational information than the control group. For example, students with ID made more remarks that were based on interpretations or they mentioned information that was not present in the vignette, without integrating these remarks with what was actually described in the vignette. As the authors concluded, this pattern suggests that students with ID "rely more on their former experiences than on the actual information presented in the vignette" (p. 364). At the response decision step, in response to the question, "If you were a character of the vignette, what would you do?", children with ID generated more submissive

and less assertive responses than the control group, especially in situations with more complex information.

Leffert et al. (2010) proposed that credulity in people with ID—specifically, their difficulties in integrating different dimensions of a situation—could have a cognitive root. This may cause their interpretations of others' intentions to be biased on more salient aspects (in the above example, a strong emotional reaction in response to the negative event, e.g., exclaiming "My sandwich is soaked!" after another child knocks over a glass of water) and not necessarily more informative aspects of the social situation (e.g., child knocks over a glass of water by accident because he was playing football). To overcome this limitation, they may rely on their previous experiences—ignoring most the actual information presented in that situation—to complete their encoding of complex social situations (Van Nieuwenhuijzen et al., 2011). Note that in this case, the use of prior knowledge to comprehend a situation does not correspond to what is usually observed in typically developing people. In such cases, readers link important information from the situation being described to their existing knowledge on the topic in order to establish a more elaborated mental representation of the situation (e.g., McNamara & Magliano, 2009). In the case of people with ID, they may replace a representation of what is being described with a representation mostly based on their prior knowledge of similar situations. This may be problematic if the representation based on their knowledge does not incorporate all the important information from the situation being described.

In sum, according to the rather scarce research available, we can conclude that in social situations people with ID present difficulties on: interpreting others' intentions (Leffert et al., 2010), integrating different dimensions of the situation (Leffert et al., 2010), and relying too heavily on their prior knowledge (and ignoring important aspects of the situation

itself) (Van Nieuwenhuijzen et al., 2011). We will reconsider those aspects in an attempt to understand the evaluation of source information in SQA by people with ID.

Next, we revise the findings regarding how typically developing adults evaluate recommendations in SQA, to establish a baseline of what can be expected –and what not- from a competent reader.

Evaluation of Recommendations in SQA Forums

Participation in SQA forums is usually unrestricted. Thus, answers in SQA are authored by users with different levels of competence in the topics being discussed, which may provide more or less elaborated recommendations. The question arises as to how students evaluate recommendations in SQA, and how the ability to identify source credibility cues (e.g., authorship, message quality) and use them to set a critical stance on the forum discussion (e.g., recommending an answer from the SQA, following a recommendation) develops across schools years.

The literature on the topic is still scarce, and it has mostly focused on adults (usually undergraduate students). Prior research suggests that adult users of Web forums tend to favor messages authored by self-declared experts over novice or anonymous authors. In a field study with users of travel forums, Casaló, Flavián, and Guinalíu (2011) reported that perceived competence of the forum community was positively correlated with users' intentions to follow particular advice. In a study with undergraduate students, Winter and Krämer (2012) found that participants rated as more credible more often reread messages posted on a science blog by authors that self-reported being experts on the topic field than those written by novices. However, this effect was not replicated by Hu and Sundar (2010), who found that undergraduate students reported similar credibility perceptions and behavioral intentions after reading a health Web forum including a single message from either an expert (e.g., Chris Park, MD) or a novice (e.g., "Chris Park" only, without using the "MD"). These

results suggest that source information must be salient enough to produce an impact on users' evaluation.

Users' evaluation of SQA messages may not just be linked to author credentials, but also to the quality of the message content (Jeon & Rieh, 2013). Salmerón, Macedo-Rouet, and Rouet (2015) have argued that author credentials interact with message content, specifically the evidence provided to support a claim in order to influence students' evaluation of recommendations in SQA. In a study of SQA, the authors found that undergraduate students tend to recommend more often advice from self-reported experts than competing recommendations by users under pseudonyms only when the self-reported expert claims were supported by a documentary source (e.g., biology handbook, Web page from a hospital), but not when they were based on personal experience. Evaluating recommendations by combining different source reliability cues, such as author credentials and evidence to support a claim, may allow proficient students to filter out messages of low quality.

In sum, existing research suggest that adults (and more specifically undergraduate students) are competent in evaluating sources in SQA, or at least that they employ certain heuristics to assess and use reliable information online (Metzger, Flanagin, & Medders, 2010). Note that these results differ from students' behavior in more demanding tasks, such as the reading of multiple documents or science inquiry tasks. Although in such situations undergraduate students may evaluate sources to some extent, quite often they do not use sources to critically interpret information (e.g., Bråten, Britt, Strømsø, & Rouet, 2011).

How do typically developing young students become competent evaluators of recommendations in SQA? Macedo-Rouet et al. (2013) conducted one of the few studies that explored children's abilities to evaluate sources in printed texts. Specifically, they found that fourth and fifth grade students were able to identify expert sources in short texts when they were requested to do so. However, their explanations for why the author was an expert were

based on superficial or irrelevant cues. In the study by Salmerón et al. (2015) discussed above, students from primary (fifth and sixth grade) and secondary (eighth and ninth grade) education recommended more often the SQA messages authored by self-reported experts than competing recommendations by users under pseudonym. Contrary to what was found with undergraduate students, this effect did not vary as a function of the type of evidence included to support the message claim (e.g., documentary source or personal experience). In addition, students from primary education recommended to a higher extent messages from self-reported experts if they included a personal experience to support their claim than when the same self-reported experts used a documentary source in their recommendations. Students from secondary education did not vary their recommendation of the self-reported expert as a function of the type of evidence included. In conclusion, these results suggest that from primary to undergraduate education there is change in regard to what is considered good evidence to support a recommendation in SQA between personal experience and documentary sources.

Rationale for the Present Study

An open question is to what extent students with ID may evaluate recommendations in SQA by identify and using source credibility cues, such as author credentials and evidence to support the recommendation claims. Given their socio-cognitive limitations described in a previous section, a less competent behavior is expected when compared with typically developing readers. Specifically, given their limitations in terms of ingenuity, credulity, and gullibility (Greenspan et al., 2011; Luckasson et al., 2002), we expect that students with ID would agree with the recommendations in forums independently of the author, contrary to what is found with typically developing students (Salmerón et al., 2015). Similarly, students with ID would include fewer citations of expert sources in their explanations to support a particular piece of advice, as compared to those of undergraduate students.

In addition, given the limitations of students with ID in integrating different dimensions of complex social situations (Leffert et al., 2010; Van Nieuwenhuijzen et al., 2011), we expect that their explanations to support advice, as compared to those of typically developing students, will be less elaborated (in terms of integration of advice and prior knowledge, inclusion of relevant information from the advice, etc.)

More importantly, we aim to explore whether these expected deficits may be linked to a delay in the development or to an atypical development. To respond to this question, we will use the factorial matching design commonly used to study behavioral deficits in individuals with developmental disorders, such as people with ID. The method consists of comparing their performance with two control groups (see Thomas et al., 2009 for a discussion). Specifically, the disorder group is matched with two different typically developing groups—one matched on chronological age (CA) and another matched on mental age (VMA) based on the scores from a standardized test. If the disorder group shows poorer performance compared with the CA group but not with the MA group, it can be concluded that individuals with the disorder present a developmental delay on this ability. If, by contrast, the disorder group shows poorer performance compared with both control groups, it can be concluded that the disorder group exhibits developmental deviance or atypicality.

Following the factorial matching design, we ran an experiment that compared the evaluation of recommendations in SQA that varied according to the authorship of the message (i.e., authors were either self-proclaimed experts or users under pseudonyms) and on the evidence given to support the advice (i.e., either a documentary source or personal experience). The pattern of evaluations of students with ID ($N = 44$) was compared to that of two control groups, which were matched by either age (CA) or mental age as measured by standardized vocabulary test (VMA). In a systematic review of research papers on the use of technology by people with ID, Stendal (2012) found that out of 54 research papers, only one

used an experimental methodology. Thus, our study constitutes a unique effort to experimentally assess how people with ID interact with technology.

Methodology

Participants

Group of students with ID. Forty-four students with mild ID participated in the study. The final sample (see inclusion criterion below) included 40 students (47.5% female, average age 19 years (*SD* = 1.81, ranging from 17 to 23)). Participants were students from a vocational training center for people with special needs from a mid-size city in Spain. Access to the center is restricted to young people who have an official diagnosis and certificate of disability, have completed the mandatory 10 years of schooling in Spain, and have enough personal and social autonomy to follow different job training modules. Students with ID were recruited to participate after consultation with the pedagogical team of the center that supported the present study as a scholarship activity aimed to provide pedagogical recommendations for training in the use of digital media in classrooms.

Most participants used the Internet on a daily basis outside school, either with computers or smartphones. They used the Internet mostly to participate in social networks (e.g., Facebook), to watch multimedia content, and to use Web searches engines (e.g., Google). The criterion for including participants in this group was significantly below the average IQ. To determine students' verbal and non-verbal intelligence, we administered individually the Kaufman Brief Intelligence Test (KBIT) (Kaufman & Kaufman, 1997) in a single session that lasted 20–30 minutes. The IQ composite (a combination of verbal and non-verbal subscales scores) is highly reliable (internal consistency of .98 for all ages). The verbal subscale of the K-BIT comprises an Expressive Vocabulary task requiring the participant to name pictures and a Definitions task that requires the participant to provide a word that best fits the verbal clues that are provided. The non-verbal subscale is composed of

the matrices test, which evaluates the ability to complete visual analogies. The participants are presented with visual patterns and asked to complete the picture by pointing to the correct choice. For the analyses, we only included participants with IQ composite scores between 40 and 85, which correspond to moderate, mild, and borderline intellectual functioning (according to the categories in the DSM-IV-TR, American Psychiatric Association, 2000). The average IQ composite score of the final sample (N = 40) was 61.55 (SD = 11.87, ranging from 40 to 85). The average raw score for the expressive vocabulary subtask of KBIT, which was used to determine the verbal-mental-age (VMA) matching control group, was 38.80 (SD = 6.19, ranging from 16 to 55). Given that verbal ability is more relevant to reading skills than either nonverbal ability or overall IQ, verbal mental age (VMA) scores were used to match participants for data analysis (see Channel et al. (2013) for a similar design rationale).

Verbal mental age-matched control group (VMA). Fifty-nine fifth-grade students from a regular school in the region of Valencia participated in the study. Students from the fifth grade were recruited to participate after consultation and approval of principals and regional educational authorities. From this sample, we selected 40 students (52.5% female, with an average age of 11 years (SD = 0.26, ranging from 11 to 12)) who matched on verbal mental age with the group of students with ID, as indicated by the expressive vocabulary task of KBIT. Specifically, the average raw score was 42.26 (SD = 2.42, ranging from 35 to 45), which did not differ from that of the group of students with ID, $t(40.33) = -1.32$, $p = .19$.

Chronological age-matched control group (CA). Forty-four undergraduate students from the Education School of the University of Valencia participated in the study. Undergraduate students volunteered for class credit. For the analyses, we selected 40 students (80% female, average age of 19 years (SD = 0.40, ranging from 19 to 21) similar to that of the group of students with ID. On average, chronological age did not differ between these two groups, $t(38.14) = 1.13$, $p = .27$. Vocabulary and IQ of undergraduate students were

assumed to be at the above-average level. Thus, baseline measurements were not taken for this group.

Materials and Measures

SQA forums. We adapted four SQA forums that are publicly available on the Internet, mainly addressed to young people. Specifically, we copied the messages of existing discussions and edited them for language correctness and to ensure a similar length between forums. Any private information that could identify the original sources was deleted. The forums dealt with daily life topics that were expected to be familiar to children and adolescents in the region. Teachers at the center for students with ID participating in the study ensured that all participants were familiar with the topics used. Readability indices indicated that texts were appropriate for fifth graders. Table 1 summarizes the main characteristics of the forums used, including the forum topics and the recommendations used. The forums opened with a user request for advice on a particular problem. In the request, the user proposed a specific solution for his/her problem and asked the audience to give an opinion. Then, a different user proposed an alternative solution (see Figure 1 for an example). Forums varied in two aspects: authorship of the responding user and evidence to support the claim. On the one hand, authorship had two levels: self-reported expert, defined as a professional working on a field related to the forum discussion; and user under pseudonym (see Table 1, columns 3-4). Authorship was displayed below a neutral picture of the user, close to the advice reported (see Figure 1). On the other hand, evidence to support authors' claims had two levels: a documentary source mentioned in support of a claim, e.g., "I recommend you follow the advice of the General Hospital website: breathe slowly and deeply before speaking," or a personal experience, e.g., "When I was a student, I also had to cope with these fears. I advise you to do what I used to do: take something in your hand while you speak."

- Insert Figure 1 about here-

-Insert Table 1 about here-

Reading prompt. To ensure that students would read the entire forum before evaluating the recommendation, we asked them to answer the following question: "Which of the following statements corresponds to [name of the author]'s advice?" Students could revisit the forum while answering the question.

Recommendation task. In this task, participants answered the question, "Do you think [the user] should follow the recommendation from the forum?" on a four-point Likert scale, from "I really think he/she should not follow it" to "I really think he/she should follow it." The scale also included smiley faces with each label (Figure 2). The use of such visual representation is advised for users with intellectual disabilities because it facilitates communication and reduces acquiescence effects (Kroese, Gillott, & Atkinson, 1998).

-Insert Figure 2 about here-

Explanation for the recommendation task. In this task, students provided reasons for why they gave a particular recommendation to the user. Specifically, the instructions read, "Write a short message to [the user] to explain your reasons why she should or should not follow the recommendation from the forum."

Procedure

The study took place in the center's computer lab during a session that lasted approximately 35–50 minutes. First, students practiced in a forum that had the same structure as the experimental ones. They performed the same tasks as those that would be required in the experiment. In the practice forum, the research assistants responded to questions regarding the procedure until students felt confident with the task. For the group of students with ID, the researchers encouraged them to proceed whenever they were hesitant, and the

researchers recalled the procedure whenever the participants expressed doubts about what to do next. Students worked individually in each of the four experimental forums. They answered the reading prompts, performed the recommendation task, and then wrote an explanation for their recommendation.

Design

We used a 2 x 2 repeated measures design, with two independent variables: authorship (self-reported expert or user under pseudonym) and evidence (documentary source or personal experience). Advice was counterbalanced across conditions to avoid potential confounding between actual content and experimental manipulations.

As main dependent variable we used the responses in the recommendation task, as a ranked ordered variable (0 = He/she should really not follow the recommendation; 1= He/she should not follow the recommendation; 2= He/she should follow the recommendation; 3= He/she should really follow the recommendation). We also used as dependent variable several indices related to the level of elaboration of the explanations for the recommendation task (see coding section below).

Coding of Explanations for the Recommendation Task

We classified students' explanations for the recommendation task according to their level of elaboration. Specifically, we used the following rubric (see Table 2 for examples): a) "paraphrase" – the response only explicitly mentions or paraphrases the advice from the forum, without adding additional information; b) "elaboration" – the response explicitly mentions or paraphrases the advice from the forum and also integrates it with information from other sources or background knowledge, usually by means of comparison or coordination of two recommendations; or c) "opinion" – the response does not include an explicit mention or a paraphrase of any of the recommendations in the forum, but it contains other recommendations not discussed in the forum, without any attempt to reconcile the new

recommendation with the actual discussion in the forum (cf. Van Nieuwenhuijzen et al., 2011). In addition, we coded for source citations of experts either within the forum (internal expert sources) of from elsewhere (external expert sources) (see Table 2 for example). We included as source citations any reference to an expert mentioned either to support a claim ("You should follow the advice because she is an expert doctor.") or as part of a claim ("You must ask for help to your teacher.").

Two raters coded the responses from a subsample of 18 students and obtained good inter-rater agreement (Cohen's kappa = 0.85 for the degree of elaboration of explanations; 0.90 for the inclusion of sources). After resolving any disagreements, the remaining data were coded by one of the raters.

- Insert table 2 about here-

Results

Assessment of Forum Recommendations

We expected that students with ID would agree with the recommendations in forums independently of the author and evidence included in the message, as indicated by their ratings in the recommendation task and their citations to sources in their justifications. As can be seen in Table 3, most participants for all groups across all four conditions responded that the fictitious user requesting advice should "follow" (*M* = 42.5%) or "really follow" (*M*= 43.3%) the forum recommendation. Negative responses were not so frequent ("not follow": 13.75%; "really not follow": 1.87%), which suggested that advice in the forum was generally perceived as useful. However, as the following analyses revealed, there were some differences on the degree to which participants recommended advice.

We specified two planned contrasts to analyze forum recommendations to test a) the extent to which students agreed to recommendations as a function of authorship (self-reported expert versus users under pseudonym, by type of evidence included in the message) and b)

the extent to which agreement with expert advice depended on the evidence used to support the claim (self-reported expert who included as evidence documentary sources versus self-reported expert who reported personal experience) (see Salmerón et al., 2015). Friedman tests were conducted to analyze the rank ordered data for each group of participants, with one-tailed alpha levels for the planned contrasts and two-tailed alpha levels for the other analyses.

First, regarding the planned contrasts on the effect of authorship, we first compared ratings for messages from self-reported experts using documentary sources in their recommendations to those from users under a pseudonym using documentary sources. The difference was not significant for students with ID, $\chi^2(1) = 1$, $p = .16$, or VMA, $\chi^2(1) = 2.28$, $p = .07$; but it was for the CA group, $\chi^2(1) = 2.70$, $p = .05$. Undergraduate students (CA group) recommended to a higher degree messages from self-reported experts than from users under pseudonyms when those authors included documentary sources as evidence for their claims (cf. Casaló et al., 2011; Salmerón et al., 2015; Winter & Krämer, 2012). We then compared ratings for messages from self-reported experts using personal experience to those from users under pseudonym using personal experience. The difference was not significant for any of the groups of participants: students with ID, $\chi^2(1) = 0$; VMA, $\chi^2(1) = .39$, $p = .26$; CA, $\chi^2(1) = .93$, $p = .17$.

Second, regarding the planned contrast on the type of evidence used by self-reported experts, we compared ratings for messages from self-reported experts including documentary sources to those from self-reported experts using personal experience. While the difference was not significant for the group of students with ID, $\chi^2(1) = .60$, $p = .22$, it was so for the other two groups, VMA, $\chi^2(1) = 3.00$, $p = .04$; CA, $\chi^2(1) = 3.24$, $p = .03$. Undergraduate students (CA group) recommended to a higher extent advice from self-reported experts when they included a documentary source, as compared to when they included their personal

experience, while fifth grade students (VMA group) showed the opposite pattern (Salmerón et al., 2015).

Finally, we examined source citations in students' explanations for their ratings. On average, source citations were low across the four conditions, whether expert sources were present in the forum (3.96% of explanations, *SD* = 16.75, max = 6.67, min = 0) or not (4.58%, *SD* = 19.66, max = 7.5, min = .08). For this reason, we refrained from performing analyses across conditions or significance tests. As an exploratory analysis, we counted how many students from each group of participants cited expert sources who were present in the forum (see Table 1, column "self-reported expert") at least in one of the four explanations and how many participants cited external sources (e.g., friends, family, teacher) at least in one explanation. The data revealed that 5% of students with ID cited expert sources that were present in the forum, compared to 7.5% of fifth grade students (VMA group) and 27.5% of undergraduate students (CA group). In contrast, 30% of students with ID cited expert sources whom were not mentioned in the forum in at least one the explanations, as compared to 12.5% of fifth-grade students (VMA group) and 10% of undergraduate students (CA group).

In sum, as expected students with ID did not vary their degree of recommendation of forum advice as a function of authorship or type of evidence used to support the advice. Students with ID tended to encourage the fictitious user to follow the particular advice provided in the forum, regardless of authorship and evidence included in the message. This pattern contrasted to what was observed with both VMA and CA groups, which more often recommended expert sources when they included in their messages personal experiences (VMA) or documentary sources (CA). In addition, an exploratory analysis of source citations in participants' justifications supported our expectation that students with ID would not recommend to a higher extent advice from expert sources than that of users under

pseudonyms. Instead, they seemed to value other sources not mentioned in the forums, such as teachers or parents. Finally, the pattern of results of the students with ID differed from both control groups. Therefore, data suggested that the group of students with ID may exhibit developmental deviance or atypicality rather than a developmental delay in the acquisition of sourcing skills on online social networks.

-Insert Table 3 about here-

Explanations for Users' Recommendations

We expected that students with ID will write less-elaborate explanations to support advice than typically developing students, in terms of integration of advice and prior knowledge and inclusion of relevant information from the advice.

To test this issue, we analyzed participants' explanations for their ratings to gain insights on how students with ID evaluated information from SQA. As described above, explanations were coded as paraphrases of a forum recommendation, as elaborations, or as opinions. Because we did not have expectations regarding a potential moderating effect of condition, analyses were conducted using Friedman tests for each group of participants on the average scores across the four conditions (see Table 4 for complete descriptive data for each group and condition).

Results showed significant differences for the three groups of participants: students with ID, $\chi^2(2) = 26.00$, $p < .01$; VMA group, $\chi^2(2) = 6.84$, $p = .03$; and CA group, $\chi^2(2) = 44.05$, $p < .01$. Students with ID wrote paraphrases and opinions more often than elaborations. Undergraduate students (CA group) wrote more elaborations than the other two types of explanations. Finally, fifth-grade students (VMA group) wrote more paraphrases than the other types of explanations.

-Insert Table 4 about here-

Discussion

In this experiment, we have assessed how students with ID evaluate recommendations in SQA forums, as compared to students matched on age (CA group) and verbal mental age (VMA). Our results reveal that people with ID differed from the control groups in the extent to which they use source information to qualify their recommendations to follow or not particular advice in SQA.

Regardless of authorship and evidence in the message, students with ID tend to encourage the fictitious forum users to follow the advice posted in the forum. In addition, in their justifications for those recommendations they scarcely refer to the expert sources in the forum. Instead, they refer more often to other sources not mentioned in the forums, such as teachers or parents. In addition, in their explanations for their recommendations they tend to add additional information without linking it to the actual discussion in the forum. By contrast, control groups recommend more often advice from expert authors than from users under pseudonyms, and they explain their recommendations by referring to the actual discussion in the forum. This pattern of results suggests that people with ID do not necessarily present a delay in the development of source evaluation skills, but rather present an atypical development. In the following sections, we discuss these results, identify issues for future research, and address the limitations of our study. Based on our results, we propose potential interventions to teach digital literacy to students with ID.

How Students with ID Evaluate Sources in SQA

In our experiment, participants evaluated to what extent a fictitious user should follow a particular recommendation given in a forum. In a majority of cases, participants with ID encouraged a fictitious user to “follow” or “really follow” the recommendation from the forum. They did so to a similar extent regardless of the author of the message (self-reported

expert or user under pseudonym) or the type of evidence included in the message to support the claim (documentary source or personal experience). Thus, students with ID were not sensitive to source credibility cues present in the SQA forums, which contrasted to what was found in both control groups. Undergraduate students (CA group) recommended to a higher extent advice authored by self-reported experts than by users under pseudonyms when the authors included documentary sources in their messages, but not when they used their personal experience to evidence their claims (Casaló et al., 2011; Salmerón et al., 2015; Winter & Krämer, 2012). In addition, both CA and VMA groups differed on their ratings to messages authored by self-reported experts, as a function of the type of evidence included. While the CA group rates higher self-reported expert messages that included a documentary source than when they included a personal experience, the reversed pattern was observed in the VMA group (Salmerón et al., 2015). In sum, undergraduate students tended to combine different credibility cues from sources in SQA to critically judge the extent to which they recommend particular advice, while younger students were more influenced by less sophisticated cues (i.e., personal experience) (cf. Macedo-Rouet et al., 2013).

In summary, data from this experiment indicated that, at least in the kind of forum examined in this experiment, students with ID were not critical when evaluating recommendations in SQA forums. Rather, in most cases they encouraged a fictitious user to "really follow" the recommendation in the forum. The pattern of results of students with ID differed from both control groups, which suggested that they hold an atypical development regarding their evaluation of recommendations, and not just a delay in its development. Given that this is the first study to explore these issues, this conclusion needs to be considered with caution. From our results, we can only speculate about the causes of such development. Students with ID could have difficulties identifying information sources in texts (cf. Macedo-Rouet et al., 2013) or understanding the importance of robust evidence to

support claims. Their high degree of acquiescence could also be influenced by their limitations in adaptive behavior, specifically their tendency to accept unsupported claims (cf. Greenspan et al., 2011; Luckasson et al., 2002). Those aspects should be explored in future research.

How Students with ID Interpret Recommendations in SQA

After evaluating the recommendations in each forum, participants provided written explanations about their evaluations by writing a message to a fictitious user who had requested help. In approximately 50% of the explanations, students with ID included in their explanations just opinions and information sources not present in the forum discussion, without any attempt to integrate this information into the ongoing discussion in the forum. Students from the control groups, on the contrary, elaborated their explanations by integrating prior knowledge with references to the recommendations in the forum (CA group) or paraphrased the recommendations in the forum (VMA group). This pattern suggests that students with ID relied mostly on their prior knowledge, instead of integrating their knowledge with the new information provided in the forums, which may reflect their difficulties in integrating different dimensions of the situations described (Van Nieuwenhuijzen et al., 2011). This is certainly problematic, particularly when the new information is credible and therefore should not be ignored.

In addition, students with ID included new arguments and additional information sources which, although not part of the forum itself, were nevertheless congruent with its main topic. Indeed, in the specific forum situations investigated in the present study, source credibility may be questionable, since they were online sources and, in the expert condition, their expertise was only self-reported. In such contexts, one could argue that relying on external sources, whose credibility is likely to be higher or at least more certain (such as in the case of teachers and psychologists), was in fact a good strategy. But if this behavior was

strategic, and not just a consequence of students with ID's limitations to integrate different information, they may have challenged the credibility of the online sources from the forums. However, such comments against online sources were rare in their explanations. Future research should further investigate the extent to which students with ID's inclusion of sources in their explanations reflect their processing limitations or a strategic behavior.

Implications for the ICT Literacy of Students with ID

Overall, these results suggest that students with ID need specific support to critically evaluate different source credibility cues present in SQA. Nevertheless, we would like to challenge the pessimistic views of the abilities of students with ID that have driven protectionist measures in the past, such as the creation of exclusive social networks for people with ID (Löfgren-Mårtenson, 2008), which, paradoxically, could lead to their exclusion from other social networks. On the contrary, it is important to improve the abilities of people with ID without constraining their possibilities to grow. As previous small-scale interventions show, students with ID could be educated to participate in sites that are open to the general public (Holmes & O'Loughlin, 2014) in order to promote their self-determination, that is, their ability to make choices and decisions regarding one's quality of life (Wehmeyer, 1996).

Promoting the use of social networks could be combined with specific training to improve the limitations of students with ID to interpret complex text discussions. In this line, Lundberg and Reichenberg (2013) have proposed and tested two programs based on reciprocal teaching and inference training to enhance the ability of people with ID to integrate complex texts. Stadtler, Scharrer, Macedo-Rouet, Rouet, and Bromme (this issue) have tested a program to train vocational students with low reading comprehension abilities in using sourcing skills. In four modules, the program raised students' awareness of the importance of attending to sources, addressed the question of how people acquire expertise, and promoted

the use of sources to assess the validity of a competing claim. These results constitute a prelude to less protectionist literacy interventions for students with ID.

Furthermore, the use of social networks could be supported by specific training of self-determination in ICT. Such training could involve different components such as giving students with ID the opportunity to set educational goals or to develop action plans (Palmer, Wehmeyer, Gipson, & Agran, 2004; Wehmeyer, 2014). Palmer et al. (2004) proposed that such training could improve student performance in other areas of the curriculum as well. Future research should address these options.

Limitations and Future Research

Our research has various limitations. We restricted the number of manipulations in our study to authorship and evidence in order to avoid an overly complex design. For this reason, we used recommendations that were useful and plausible to solve the problems raised in the forum. In other words, there was no recommendation that could be considered better than the other. While this could have increased the level of agreement with the recommendations in the results, it should be noted that with this method we were able to find differences between conditions for the two control groups (see also Salmerón et al., 2015). Future research should explore to what extent students with ID may be able to critically evaluate recommendations that also vary in terms of quality (such as comparing situations with more and less useful recommendations, or with more or less benevolent advice). Limitations in the adaptive behavior of students with ID, such as gullibility (Greenspan et al., 2011; Luckasson et al., 2002) or difficulties in interpreting others' intentions (Leffert et al., 2010), may lead them to accept as valid, or even follow, non-benevolent or non-useful recommendations in SQA. A failure to identify such situations could be particularly problematic when students use SQA forums to get information on sensitive subjects such as health or sexual behavior (Versteeg et al., 2009).

Another critical point is the method we used to gain insights from students' evaluation of recommendations in SQA. After reading the forum, they had to rate to what extent they would recommend or not particular advice to the fictitious user posting the question, using a scale that included smiley faces with each label to increase comprehensibility, as has been proposed in the literature assessing students with ID (Kroese et al., 1998). Afterwards, they had to write a response justifying their decision. One could argue that this task does not provide a direct measure of source evaluation, but rather an indirect measure of it. We refrained from using other common tasks employed in the literature for this purpose, such as requiring participants to evaluate the credibility of a source because, in a debriefing with teachers of the students with ID participating in the study, the teachers reported that their students would have difficulties understanding such abstract requests. On the other hand, the use of our method resembles the common task of voting up or down on recommendations in SQA, which may have increased the external validity of the measure. In addition, students with ID had no problem understanding the demands of this task.

The task of explaining the justification resembled the act of writing a response in a forum, and it demanded a relatively low amount of writing from the students. However, it was probably challenging for some students with ID. As mentioned previously, some of these participants required support during the whole session in order to follow the instructions. For example, they were systematically encouraged to provide explanations for the recommendation task because in some cases they will try to skip the writing task (to prevent this, the computer program that runs the study did not allow participants to precede until they had provided a response of at least five words). Future research may explore other less-demanding tasks for students with ID, such as allowing participants to provide an oral response.

Our results constitute a first step in trying to understand how students with ID judge information sources in social networks. Overall, these results call for further interventions on information-communication technology literacy for students with ID.

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Table 1. Characteristics of the Internet Forums Used in the Study.

Forum topic	Recommendation A (1)	Recommendation B	Self-reported expert	User under pseudonym	Words	Flesch-Kincaid readability index (2)
I can't speak in public, help	Carry something in your hands during the presentation.	Breathe deep and slowly during the presentation.	Doctor	Dixie_XV	160-161	86-87.5
Skiing in Andorra, which equipment?	For short trips rent the equipment.	Look for bargains to buy equipment at convenience stores.	Sky monitor	Shannen5	147-154	83.2-87.7
Replant a Christmas tree in my garden	Check the roots of the trees before buying them to ensure it can be replanted.	Christmas trees can't be replanted, recycle them.	Gardener	Virdo	131-135	89.6-89.8
I go on vacation. What should I do with my pet?	Leave the cat at a pet center.	Bring the cat with you.	Veterinarian	Naxian	125-128	74.4-74.8

Note 1. For each forum, in 50% of the cases recommendation A was attributed to the user requesting advice, while recommendation B was attributed to the respondent. In the other 50% of the cases, this alignment was reversed.

Note 2. We used the adaptation of the Flesch-Kincaid index to Spanish developed by Fernández Huerta (1954).

Table 2. Examples of the Coding of Explanations and Source citations for the Recommendation Task, from Students with ID (see Table 1 for complete description of the forums). These are literal translations from Spanish in which we tried to keep the original grammatical errors.

Source citation	Paraphrases	Elaboration	Opinion
Without source citation	[Forum 'Vacation'] "It is a good advice. Before travelling you have to vaccinate your cat"	[Forum 'Speak in public] "Andro88 you don't have to follow his advice, because you have to learn, before speaking in public for example if you have teddy bears use them as people this will help you"	[Forum 'Skiing'] "You should buy. This way you won't get cold once you are there [sky resort]"
With source citation (internal expert sources)	[Forum 'Speak in public'] "Don't get nervous, as the people from the hospital told you"	[Forum 'Christmas tree'] "This is a good advice, because he is an expert in gardening. But if you change your mind you can always buy a plastic one [Christmas tree]"	Not available
With source citation (external expert sources)	Not available	[Forum 'Speak in public'] "To cope with your fear you may request help to friends or family. And breathe slowly, this I agree. And think that	[Forum 'Vacation'] "You should leave your cat to a neighbor"

		speaking in public is nothing especial”	

Table 3. Recommendation Ratings by Groups and Conditions. Data represents percentage of participants for each group and condition.

	Self-reported expert								User under pseudonym							
	Uses external source				Uses personal experience				Uses external source				Uses personal experience			
	Really not follow	Not follow	Follow	Really follow	Really not follow	Not follow	Follow	Really follow	Really not follow	Not follow	Follow	Really follow	Really not follow	Not follow	Follow	Really follow
Students with ID	2.5	10	27.5	60	2.5	10	40	47.5	0	10	42.5	47.5	0	10	37.5	52.5
VMA	0	25	57.5	17.5	2.5	12.5	47.5	37.5	0	15	52.5	32.5	5	22.5	30	42.5
CA	0	17.5	37.5	45	5	15	55	25	5	15	47.5	32.5	17.5	17.5	45	37.5

Table 4. Percentage of Different Types of Justifications Included in Students' Responses (only opinion, paraphrase of content, or elaboration), as a Function of Condition and Group. Data represents percentage of responses for each group and condition.

	Self-reported expert						User under pseudonym					
	Uses external source			Uses personal experience			Uses external source			Uses personal experience		
	Opinion	Paraphrasing	Elaboration	Opinion	Paraphrasing	Elaboration	Opinion	Paraphrasing	Elaboration	Opinion	Paraphrasing	Elaboration
Students with ID	52.5	42.5	5	50	40	10	40	47.5	12.5	47.5	47.5	5
VMA	27.5	40	32.5	42.5	45	12.5	20	47.5	32.5	25	42.5	32.5
CA	5	35	60	5	25	70	5	27.5	67.5	17.5	20	62.5

Figure 1. Recreation of a SQA Forum Used in the Study, Translated from Spanish.

Youth forum

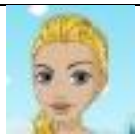
 Effie	**I go on vacation… what should I do with my pet?** Hello everybody, I hope somebody can help me out. I go for one month with my parents to visit my sister that lives in London, and I am worried about my little cat. She is 4 months old and I don't want to leave her alone. Do you think it is a good idea to leave her in a vet center so that they will take care of her? I am not really sure! Thanks in advance. Published: Fri 29 Oct 18:15
 Silvia García (Veterinarian)	Dear Effie. Veterinarians have studied this situation and they know that it is a difficult decision. You should check the different options you have. At the webpage 'Pets care' specialist veterinarians recommend to bring your pet with you abroad to prevent that she feels abandoned. You should be sure she has the necessary vaccines and all the required documents to travel. Source(s): "Webpage Pets care" Published: Fri 29 Oct 19:30

Figure 2. Likert Scale Used in the Recommendation Task.

			
I really think he/she should not follow it	I think he/she should not follow it	I think he/she should follow it.	I really think he/she should follow it.