Social Representations of ICT in High School Students in Niger

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ABSTRACT

This article examines social representations of information and communications technologies (ICT) in high school students in Niamey, Niger, and explores whether these representations are determined by training in and regular use of ICT. A sample of 50 students attending two *lycées* (an academically oriented high school) was studied. Only one *lycée* offered computer courses. The results of semi-directed interviews show that, whether or not they took computer courses, the students developed social representations of ICT. These representations were associated with favourable attitudes toward computer and Internet use at school. The chi-square test hypothesis shows that students' social representations of ICT were not determined by training in ICT.

Indexing terms/Keywords

Social representations; ICT; high school students; Niger

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INTRODUCTION

In cybercafés, homes, and sometimes the schools of Niamey, Niger, more and more students are using computers to learn, communicate, and amuse themselves. Far more than a fad, information and communications technologies (ICT) are used every day to find, via online computers, a variety of teaching and learning solutions. UNESCO (2004) defines ICT as *"The combination of informatics technology with other, related technologies, specifically communication technology"* (p. 13). ICT pool information processing and transmission methods used in computer science, the Internet, and telecommunications.

The schools are also on board, as they embrace computer courses and outfit computer labs for students to use. However, the success of various ICT integration programs in high schools remains dependent on the social dynamic as well as issues concerning both students and computers. An examination of social representations can provide a deeper understanding of how students use ICT to interpret their daily reality and how they can be encouraged to use these technologies for learning.

This study is therefore guided by the opinions, judgments, and attitudes of high school students about ICT, with a focus on their social representations. From these representations, we identify the students' positions on ICT as well as the role of training in and regular use of ICT in developing these positions. We conclude by highlighting the importance of considering social representations when implementing projects to pedagogically integrate ICT.

ICT IN DEVELOPING COUNTRIES: THE CASE OF NIGER

The developing countries have particular socioeconomic realities. For example, out of 186 countries, Niger is classified last according to the human development index (UNDP, 2013), whereas certain South American countries such as Chili, in fortieth place, are making a better showing. In the education sector, Niger faces many problems. The most urgent is the rapid growth of its student population. In fact, insofar as the importance placed on ICT and ICT usage rates in a society are determined by that society's level of infrastructure and economic development (Chinn and Failie, 2007; Hanafizadeh, Saghaei and Hanafizadeh, 2009), Niger has barely begun to integrate ICT into its education system. However, ICT integration constitutes an option that the education authorities have envisaged in order to improve the quality of education in Niger. Thus, the National Information and Communication Infrastructure (NICI) plan (2004) includes a number of actions and objectives concerning ICT use for education and training. Moreover, the country hopes to provide the infrastructure required to integrate ICT into education (Karsenti and Tchameni Ngamo, 2008), which would be expected to improve teaching and training in Niger.

In this perspective, this study aims to contribute to the integration of ICT in the Nigerien education system by providing a deeper understanding of students' representations of ICT. Such representations constitute a significant factor for effective pedagogical integration of ICT, as we will see below.

OVERVIEW OF THE LITERATURE ON STUDENTS' SOCIAL REPRESENTATIONS OF ICT

In this section, we present the social representation theories that inspired the present study, followed by an accounting of the students' representations of ICT.

Social representations

Social representations comprise a "universe of opinions" (Moscovici, 1976). They enable us to apprehend our social environment. They also come into play in interactions between groups relating to social objects. For Moliner, Rateau, and Cohen-Scali (2002, p. 11):

> They clarify that which permanently relates us to the world and to each other. They inform us on how this connection is made. In this sense, we may envisage a global theory of the social subject and the possibility of integrating the various streams of social psychology. [free translation]

Considered as a way of being aware of reality, social representations are the outcome of mental activity. They allow presenting to the mind an object or event that is not actually present, or of which knowledge or control is only partial. Social representations provide criteria for evaluating the environment, and they make it possible to justify or legitimize certain behaviours (Moliner, Rateau & Cohen-Scali, 2002).

The principle of social representation refers to a set of processes that proceed from individuals to the group, arising out of ideological conditions. Collectively generated by the members of a group, social representations reveal some of the specific features of that group. These representations may differ from those of another group. Through its social representations, each group conveys standards, codes, and behaviours. Reality is therefore perceived by individuals and groups through the social representations they have constructed together.

Two factors determine social representations. The first is content. According to Jodelet (2005), a social representation is defined by its content, which may include information, images, opinions, and attitudes. Furthermore, this content relates to an object. The second is the connection between the content and the subject, because a social representation is always that of an individual—then that individual's family, social group, class, and so on—who is in a relationship with another subject. By "social group," we mean a group of individuals who act and interact and are placed in a common position vis-à-vis a social object.

To examine social representations, we must examine the relationships between a numbers of elements: a social group or category of individuals, the individual, and the social object. The researcher can explore social representations at the society level. In practice, this requires examining very different individuals who share some things in common. Social representations may also be examined at the group level, or among several groups. This approach requires exploring the positions of the group vis-à-vis the object. With respect to an object, different groups will represent the object according to their respective criteria. How do ICT fit into this scheme?

Students' social representations of ICT

Like other social groups that use computers, students develop social representations of ICT according to how they are presented, the various uses made of them, and emerging issues. Media have gone a long way to inform students about ICT. Far-reaching media campaigns that teach the importance of ICT have influenced the social representations that groups have constructed (Ratinaud, 2003). ICT have therefore entered the lives of children, engendering new social values. They are objects of judgment, opinions, and attitudes (Komis, 1994). Students construct their social representations through a series of negotiations between their own acquired experience and all the representations mediated through the family, the school, and the media (Giannoula & Baron, 2002).

In a study on elementary students' representations of the computer, Giannoula (2000) showed that children view the computer primarily as a gaming tool. Next come text-related activities, information search, Internet access, and finally, schoolwork. These results indicate that, in their social representations of ICT, students do not consider the computer primarily as a learning tool, but more as a device that allows them to enter a world of play. Komis (1994) notes a change in students' representations as they move up the grade levels. Older children have more abstract representations of the informational and logical uses of ICT. Younger children have more graphic representations that concern the physical aspects of ICT, oriented more toward gaming. In short, gaming is a more predominant concern in younger students.

In the social representations of university students, Wagner and Clemence (1999) found some negative perceptions of the computer. Students viewed the computer unfavourably from a societal perspective. They associated the computer with global conformity and weakened social bonds, and they felt that it stifled the imagination. Trabal (1996) observed students for whom the computer was a source of problems, headaches, and hassles (p. 72).

What is the role of training in young people's representations of ICT? In their study in a Malaysian university, Hong, Ridzuan, and Kuek (2003) found that students at Malaysia Sarawak University generally had positive attitudes toward Internet-supported learning, regardless of race or sex. Nor was this attitude associated with academic proficiency. The researchers concluded that students with better basic Internet skills generally have more positive attitudes concerning how they might use the Internet to improve their schoolwork.

Research questions

Taken together, the literature shows that in order to integrate ICT into education, it is not enough to consider technical aspects. It is also important to consider the contribution of ICT as tools that mediate the knowledge transfer between teacher and students. According to Giannoula (2000), introducing computers into schools is one thing, and ensuring that students become interested in them and are motivated to use them is another. Educators must adopt a reflective approach to developing and implementing computer-assisted instruction. Moreover, this reflective process should account for social representations. Accordingly, this study attempts to respond to two research questions based on a review of the literature on representations. First, what is the content of these social representations? Second, is the content of these social representations determined by training in and regular use of ICT? In this study, the term ICT refers to computers and the Internet only, these being the most commonly used technologies in Niger's education system.

METHOD

In this section, we present the methodology used to investigate our two research questions.

Participants

We conducted semi-directed interviews with 50 high school students attending two lycées in the Niamey metropolitan area. We used a non-probabilistic sampling method to build our study sample. We solicited volunteers from the two schools and retained 25 from each school (five per class), for a total of 50 students. They were enrolled in second-year literature, first-year literature, first-year science, final-year literature, and final-year science classes. Note that in the first school, where 25 subjects were selected from all streams, the students received two hours of computer training per week, which was not the case at the second school. These circumstances allowed us to explore potential associations between social representations of ICT in education and training in ICT.

The sociodemographic characteristics of the sample were as follows: of the 50 students, 34 were male (68%) and 16 were female (32%); five were aged from 21 to 23 years; 32 from 18 to 20 years; and 13 from 15 to 17 years. This uneven age distribution can be explained by the fact that many students begin school at age eight years. Ten years later, they should be in the second year of the *lycée*, but some have repeated a year in the process.

Measurement and procedure

Data were collected from the students at the two schools using an interview guide. The guide was developed in several steps. First, the question categories were decided. From the literature on ICT and social representations, we identified

several themes in social representations of ICT in education: knowledge of ICT; ICT integration for learning; and computers and the Internet. We drew up 20 questions addressing these themes. Following an initial validation in 15 volunteer students, we fine-tuned the guide by eliminating questions that appeared to be difficult to understand or redundant. We retained five questions for the interview guide, which we again ratified in 10 more volunteer students.

Analysis method and results

To grasp the content of the social representations, the interview data were subjected to a content analysis using a closed procedure (Ghiglione & Matalon, 1985; Moliner, Rateau & Cohen-Scali, 2002). In practice, after gathering the data, we retranscribed and then coded them. Two main categories emerged from the coding: social representations of ICT and social representations of ICT-assisted learning. The codes were then quantified to establish the frequencies of certain coded segments, expressed in percentage.

To respond to the second research question, we used the chi-square test hypothesis with nominal variables to determine the association between social representations and training in ICT.

RESULTS

Recall that our research aims were to better understand the content of students' social representations of ICT in education and their potential association with training in and regular use of ICT. In the next sections, we present the results on the content of the social representations. We then present the associations between the content and training in and regular use of ICT.

We begin by specifying that 27 students (54%) of the sample had taken computer courses and 23 (46%) had not. In addition, 43 students (86%) had regular access to a computer. Four students had only occasional access to a computer, and three had no access to a computer. Computers were accessed at a cybercafé (28 students), at home (10 students), at home and at a cybercafé (7 students), and at a parent's workplace (3 students).

The content of students' social representations of ICT

Students' social representations of ICT

The social representations of ICT that were generated evidence the students' loose knowledge of the term. For one student, *"It's the new media, computerized, that lets you communicate"* (EI_F_10). For another, ICT enabled *"finding information so you can develop a better intellectual vision and contact people from all over the world"* (EI_F_16). While admitting a lack of information about the term, one student said that, *"I know that it lets us know what's happening around the world"* (EI_NF_12). For another, *"They* [ICT] *are used to train journalists, camera technicians, directors, script writers, and so on"* (EI_F_21). Some students knew what the acronym ICT stands for, but could not formulate an accurate definition of the term. *"ICT, it's technology. It's used for radio, for television"* (EI_F_16). Similarly, one student stated that, *"ICT are used to give information and to take pictures"* (EI_F_17). In their comments, the word "media" appeared frequently. Perhaps it was associated with the "communications" aspect of ICT.

The students viewed ICT as the most powerful tool of the century. This vision was justified by the fact that, *"ICT are very important because everything is computerized today. Just to get a job, you have to know how to use technologies"* (EI_NF_5) ICT were also viewed as a symbol of a changing era. They enable people to live differently from before, in the time of their grandparents. Here we may infer the symbol of a new generation. This belief was shared by many of the students. For instance, one said that, *"ICT, it's a new method that makes our work easier than it was for our grandparents"* (EI_NF_2). *"I know that we're in the 21st century and technologies are going to allow us to make progress like crazy,"* (E_NF_20) pronounced another student. Finally, one student claimed to know nothing at all about ICT, even though it was *"one of the most important factors for progress in the world today"* (EI_F_6).

With respect to knowledge of how ICT are used, the students' comments reveal that with ICT, they could get "ahead" of others, who learned everything they knew from television. On this subject, one student said that, *"With ICT, the world opens up, and it's vast. For example, the information that we get on television, we can get that faster"* (EI_F_10).

ICT were also perceived as technologies that could enable *"cultures to get to know each other"* (EI_NF_11). This same student felt that the Internet made it possible to *"compare our culture with European culture."* He concluded by saying that, *"With the Internet, you can see what's going on in the world through the computer."*

Aspects related to sharing with others are revealed in the students' comments. *"The Internet, it's for communicating, for sharing our ideas with other people, with the outside"* (EI_F_6). Note that the word "outside" is mentioned repeatedly. For the students, it was important to connect with people from outside their country, or with people who were studying abroad. Email is a relationship tool. *"As for the Internet, it lets me stay in touch with people I know,"* said one student (EI_F_18). Another said that, *"Personally, I have a PC that I use for a lot of things. I write papers, and with the Internet, I've been able to start a blog, and I use it to correspond with my friends"* (EI_F_17). For this student, *"It* [the Internet] *makes it easy to communicate, and it eliminates distance"* (EI_NF_11).

Recreation is another aspect of ICT that emerges from the students' comments. Listening to music, playing games, or watching films gives the students a chance to take a break, to enter another world. *"It* [the computer] *brings me to another world, lets me forget about all the problems in my life"* (EI_F_2) said one student. *"Playing on the computer lets me put everything aside"* said the same student. Another student suggested that chatting was a way of escaping. The computer,

whether connected or not, was therefore perceived as a tool for recreation, escape, and distraction. Thus, games, chatting, and downloading music were just some of the ways that the students used ICT.

In sum, even though the term ICT itself was not always clearly understood, the technologies were put to many uses. They enabled the students to evolve, to find out what was happening in the wider world, to do research, to relax, and to compare their culture with others.

Social representations of ICT-assisted learning

The most prominent theme that emerges is that ICT support learning. This sentiment was repeated by 90% of the students. The computer and the Internet were perceived as tools that promoted learning. Many of the students found that using a computer helped them learn. One student said that it was a pedagogical tool, because, *"You can find descriptions, films, videos, and everything that you can find in a book. So it's the most powerful tool for intellectual development and for teaching"* (EI_NF_11).

For one student, "You can get ahead of other students when you use a computer. It has programs, like math programs, that help a lot. So I can learn at home what I have to learn at school the next day" (EI_F_3). Here, the computer is thought to make students more competitive, because a student with a computer can get the jump on other students.

On the other hand, some students were less positive: *"You can learn, but not much. The computer gives you information, but no explanations"* (EI_F_11). Similarly, another student said that although the computer provided information, it did not explain anything that the student could not understand. He stated further that, *"It* [the computer] *gives us a lot of information, but on the other hand it doesn't give any explanations when we don't understand"* (EI_F_17).

A further representation is that ICT are powerful tools that promote learning. This confirms the students' vision of how ICT can be used at school: tomorrow's schools will be Internet-connected. And, with the exception of a few dissenting opinions, the overwhelming perception is that ICT should not be used for purposes other than teaching.

With respect to distance learning versus face-to-face learning, our results show a predominant preference for face-to-face learning. This is the second most common theme in the social representations of the students. Thus, 72% of the students felt that face-to-face courses were more sociable and welcoming than online courses. For one student, the classroom *"is not just for learning. We learn more as a group. So if it's online, you are alone, you are at home, you receive your courses. There's no discussion with your friends"* (EI_NF_19). Another student emphasized that the presence of the teacher in the class was reassuring. Habitual use of a computer and the Internet seemed to be a hindrance for one student: *"I wonder, how would a student that doesn't know how to navigate well learn on the Net?"* (EI_NF_13).

The students who felt that online courses were more interesting than classroom courses presented arguments for the emotional benefits and the power of machines. Concerning the emotional benefits, one student reported that, *"On the Internet, it's fun, it's technical, it's better than in class. In class, we're too shy to ask questions. But when you're alone at the computer, you can work by yourself, and it's private"* (EI_NF_19). This hesitancy to ask questions in class was repeatedly put forth as an argument in favour of the Internet. As stated by one student, *"The Internet is interesting, it's intimate, you're not ashamed in front of the screen"* (EI_NF_9).

The students' representations of the course delivery modes show that they are not yet ready to let go of traditional classrooms and embrace exclusive online learning. It is alright to use ICT in the classroom, but not without teachers, and not totally at a distance.

The teacher's role in a technological world is an important issue. The students produced many social representations that centered on this issue. For example, 64% were not in favour of replacing the teacher with a computer in the classroom. For most students, a machine could not replace a human being, because a machine does not have human capacities: it is a robot. One student said that, *"It can't replace the teacher, because even though the computer is an intelligent machine, it doesn't think, but the teacher is aware, and can only tell the truth"* (EI_F_21). Human relations with the teacher were also compared to interactions with the computer. The students reported that their teacher had given them confidence, and knew how to listen to them and encourage them, unlike the machine. In the words of one student, *"The teachers are there. You can see them, and ask them all kinds of questions"* (EI_F_19). For another, *"The teachers are there to serve us. They give us information and explain the reasons"* (EI_NF_11).

Even though not all schools have computers, and even though the students are convinced that tomorrow's schools will be online, they have developed favourable social representations of the teacher's role in the classroom. The computer can only complement teachers, not replace them.

The association between training in ICT and social representations

The second research question concerns the association between social representations of ICT in education and training in and regular use (or not) of ICT. To respond to this question, we performed the chi-square test. Let us recall that 55% of the students had received some computer training, and half the students (50%) had taken their training at an experimental school. The other 5% got their training on their own.

Figure 1 shows the difference in the social representations of knowledge of ICT between students who were trained and not trained in ICT. Note that more of the untrained students (68%) had a satisfactory social representation (SR) of ICT.

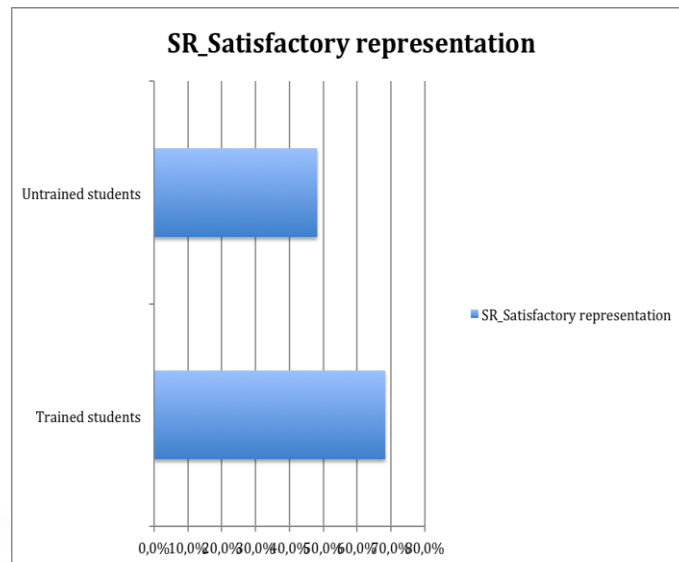[Below: Trained students; Untrained students; Satisfactory SR]

Fig 1: Frequency of social representations of knowledge of ICT in trained and untrained students

To determine whether there is an association between ICT training and social representations, we used the chi-square assumption.

Table 1. Cross-tabulation of social representations of ICT and students' training in ICT

			Students' training		Total
			Trained students	Untrained students	
Social representations of knowledge of ICT	Satisfactory	No. of students	12	17	29
		Theoretical No. of students	14.5	14.5	29
	Unsatisfactory	No. of students	13	8	21
		Theoretical No. of students	10.5	10.5	21
Total		No. of students	25	25	50
		Theoretical No. of students	25	25	50

No relationship was found between the variables *Students's training* and *Social representations of knowledge of ICT*. This indicates that training in ICT did not influence the emerge of social representations: χ^2 (1, N = 50) = 2.053, p = .125.

DISCUSSION

Using individual interviews, we posed questions to 50 students in order to identify their social representations of ICT and to determine whether these representations were determined by training in ICT and regular use of ICT. Our results show that, regardless of whether or not they received training in or regularly used ICT, the students developed social representations of ICT. We determined that the students constructed social representations that fell into two main categories: ICT and the use of ICT for learning at school.

In line with Giannoula (2000), our results indicate that the students view ICT as recreational devices, a way to escape and relax. However, this does not prevent them from viewing ICT as tools that enable intercultural exchanges as well as learning. Accordingly, the students perceive ICT as powerful tools that can help them learn. Moreover, their social representations reveal that ICT cannot replace the classroom teacher because the technologies lack human attributes.

As advocated by Karsenti and Tchameni Ngamo (2009), students must be encouraged to appropriate ICT by promoting computer use. This step, which precedes complete integration, is made possible through positive social representations of ICT that the students construct among themselves. The social representations of ICT revealed in this study show that students not only have satisfactory knowledge of ICT, they also know how to use them, and they have favourable attitudes toward both academic and communicational uses of ICT. Nevertheless, these attitudes need to be confirmed by hands-on use complemented by theoretical courses.

In Burkina Faso, which borders Niger, Tiemtoré (2008) found that students' social representations tended to view ICT as tools with the potential to improve the country's economic situation and education system and to help people battle poverty and catch up with the West (p. 125). The students in Niamey have similar representations with respect to better education and national development. This convergence implies that ICT have the potential to spur development. This positive vision of ICT is certainly a factor that could ease their integration into schools.

This study did not establish an association between the students' social representations of ICT and training in ICT. Still, even though computers are seldom used in African and Nigerien schools, it would be useful to distribute a maximum amount of information on ICT, and particularly to promote the use of cybercafés to do schoolwork.

Thanks to ICT, information has become more accessible in Niamey. Despite the lack of libraries and school books, students can visit websites to extend their classroom learning. And they are ready to do so. It remains to plan courses to teach students how to make the best use of ICT. Students would not be resistant to this kind of program, because their social representations of ICT are favourable toward integration into the education system. We may therefore conclude, in concert with Peyssonneaux (2001), that certain conditions are required before computers and the Internet can be used to further education.

CONCLUSION

This study aimed to shed light on high school students' social representations of ICT. High school students in Niamey indeed have social representations of ICT. Knowing the opinions and attitudes of students vis-à-vis ICT could facilitate the integration of ICT into education systems.

Our results show that the conditions are in place to allow social representations of ICT to emerge among the students in Niamey. We demonstrated that a group of students have constructed a set of common knowledge and beliefs about ICT. These students believe that becoming adept in these technologies will allow them to interact with other groups, including their teachers. We may therefore suggest that ICT constitute an object of social representation for the high school students in Niamey. The history of this object and the circumstances of the group indicate that the social representations are in the emerging phase.

Our results show that the students have taken a position on ICT. Even though the computer and the Internet are the tools of choice for learning, the students continue to prefer classroom lessons. The teacher's role is therefore paramount. As a multimedia tool, the Internet-connected computer is deemed primarily a device to use for schoolwork, by searching for information in order to prepare better assignments. Our results do not support an association between the students' social representations of ICT and training in ICT.

The outcomes of this study lead to the following suggestion. School administrations are advised to encourage teachers to use ICT in daily practice. Successful ICT integration requires both teachers and students to embrace innovation. We have shown that students have favourable attitudes toward ICT use, and that this position is not associated with either training in ICT or regular use of ICT. Therefore, by using these technologies, teachers could substantially improve their teaching in circumstances where teaching materials are lacking. This would require setting up training programs for teachers in the pedagogical uses of ICT.

In a future study, we plan to use the social representations identified here to construct and validate a scale to measure social representations and perceptions of ICT.

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