

# Evidence of the effectiveness of a digital tool to promote health service literacy among young university students

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**Abstract.** University students face for their first time the necessity to find and access health services on their own. Information on health services is easily available online, but young people have difficulties with evaluating its trustworthiness and navigating multiple choices. We produced a digital information tool in the form of an interactive map displaying 88 preselected youth-friendly health services in the Bordeaux area (France). The tool was tested by 319 students who answered a first questionnaire on their knowledge of local youth-friendly health services. Among them, 73 students answered an additional satisfaction questionnaire: 85 percent declared having obtained clear information through this tool, and 100 percent felt reassured by the fact that information was advised by experts. Findings suggest that trustworthy institutional digital information tools can contribute to increase students' health service literacy, thus enhancing their access to care.

**Keywords:** Health information seeking, health service literacy, digital information tool.

## 1 Introduction

Most of university students are away from home in a new town and face the challenges of the transition from family dependence to adult autonomy [1]. Despite a well-accepted view that university students are generally in good health [2], routine medical check-ups are recommended at this age (18-24 years), and single health problems, from mild to severe, may raise the need among this specific population to access health care. In an unfamiliar place, finding a health service such as a doctor, a dentist or a gynecologist can be difficult for young people who are breaking from parental guidance. Indeed, burgeoning evidence demonstrates that lack of knowledge about where to get treatment is among the main barriers to receiving appropriate and timely health care [3-5].

In an era of easy access to information provided by new developments in web

infrastructures and information and communication technologies [6], this lack of knowledge in a highly connected generation is remarkable. Students have grown comfortable using the Internet to access information even on complex and sensitive issues such as health care [7]. However, they seem to feel lost in the online information overload [8], and ask to be guided in the identification of reliable information concerning health services [9]. Results of a survey by the Council of Europe on the information needs of young people show that new generations know how to functionally locate and acquire information from the web [10]. However, they do not have the necessary instruments and abilities to interpret and evaluate such information [11], especially concerning health topics. The next step should be to help students to obtain, use and develop these instruments and abilities in order to become “health literate” as soon as possible. Following the definition provided by Sørensen and colleagues [12], a “health literate” person has the capacity to seek and understand “health information” in order to make appropriate health decisions, including receiving health care. The term “health information” is vague and covers a wide range of information and opinions about health and illnesses, both at the individual and societal levels, including information in relation to a health service [13]. Adapting the definition by Sørensen and colleagues [12], in this paper we use the concept of “health service literacy” described as the capacity to seek and understand information specifically about health services (for instance opening time, staff, service offer, and costs) in order to access them. A “health service literate” person is then expected to be able to obtain, evaluate and finally use information on health services. In other words, “health service literacy” is not the sole knowledge of available health services, but also implies the concrete application of such knowledge to access care.

Previous research showed that young people struggle to navigate autonomously the health care system, and need support with evaluating the reliability of consulted sources [14-16]. As a result, low levels of health service literacy in this population can hamper access to health care contributing to increase morbidity and mortality in young and late adulthood [17].

## **2 Background to Research**

In most of university campuses around the world, students can freely access health services exclusively addressed to them. These health services are on-campus wellness clinics and health promotion centers, whose offer can vary from one country to another. In France, the Ministry of Higher Education and Research established in the year 2007 the creation of campus services of preventive medicine and health promotion called SUMPSS (*Services Universitaires de Médecine Préventive et de Promotion de la Santé*). Each French university is obliged to create a SUMPSS where students can obtain treatment and care for free or with a substantial reimbursement by the French students’ health insurance. With a limited staff compared to the large number of students registered at the university, these structures are not able to meet the demand of students who are compelled to seek for health care elsewhere. SUMPSS are additional to all other local health services students can access as any insured French citizen.

Concerning the awareness of both local and campus health services, results from a survey carried out in the USA show that university students do not know where to seek for health care and are not familiar with campus health services [18]. In Australia, data from a similar survey reveal the same alarming findings: students have poor knowledge of available health services and consequently avoid access to health care [19]. In Europe, health service literacy has been less explored. An ongoing cohort study called *i-Share* (internet-based Students HeAlth Research Enterprise) is collecting data on the health status and habits of 30.000 university students across France [20]. Preliminary analyses were conducted in the fourth year of the cohort study (April 2017), on a total of 12.554 students, 9.421 of whom were females (75 percent). Results showed that 4.622 students (37 percent of the total sample) declared having refused to consult any general practitioner or specialist in the last 12 months. For 287 of them (6 percent), the reason was that they did not know where to find a general practitioner or specialist. Similarly, 1.959 students (16 percent) reported having refused to consult a dentist; for 239 of them (12 percent), the reason was the same: they did not know where to find a dentist. Finally, among all 9.421 female students, 4.737 (50 percent) declared not having consulted a gynecologist in the last 12 months. For 973 of them (21 percent), once again the reason was that they did not know where to find a gynecologist. Drawing on these findings from the *i-Share* survey, we were inspired to look further in the issue of health service literacy in university students.

Health care educators and professionals, as well as parents and professors, face several challenges in ensuring that university students are health service literate. One of the first challenges is to deliver information on health services which is appealing, readable and understandable to a young public. A second challenge is the mean to deliver such information. Today, the Internet and new technologies are the first source of information for young people [7], and digital tools lend themselves to providing, sharing and viewing information in an attractive manner. Digital tools represent then a good way to deliver health information to young adults. However, few are the studies on the effectiveness of these new tools. Finally, a though challenge is increasing students' interest to become health service literate. Face to their academic workload, their worries in their transition to adulthood, and the feeling that information on health services does not concern them because of their young age and good health, students do not express often the need to be informed on their own health or on health issues in general [21].

In an attempt to meet these three challenges, we conducted research with students from the University of Bordeaux, France, by producing an *ad hoc* digital information tool in the form of an interactive map displaying youth-friendly health services in the Bordeaux area.

### **3 Objective and research questions**

The primary objective of this research was to examine whether an *ad hoc* digital information tool providing trustworthy information on health services can be effective

in increasing students' health service literacy. The following questions were explored:

1. Can an *ad hoc* digital information tool increase students' knowledge of available health services?
2. Are *ad hoc* digital information tools a valid alternative to unguided Internet search of information on health services?
3. Can networks of support like university staff and health care professionals play a pivotal role in helping students in their uptake of online health information seeking?
4. Are the design and usability of *ad hoc* digital information tools determinant in facilitating the acquisition of information on health services?

## 4 Overview of Methodology

### 4.1 The servi-Share study

The present study, called *servi-Share* (services in the *i-Share* project) is nested in the above-mentioned French *i-Share* cohort study [19], whose principal investigators are based at the University of Bordeaux. Four researchers and three public health graduate students from the *i-Share* study, plus seven health care professionals and three industry web-developers constituted the *servi-Share* team for the conception and production of a digital information tool. The tool was an interactive mobile-friendly map displaying 88 preselected youth-friendly health services with detailed information on opening time, staff, service offer, and costs (Fig. 1). We defined as youth-friendly services low-cost or free health care outpatient services addressed, either exclusively or among other population groups, to young people aged 18-24 years. All health domains were taken into consideration, from general health to sexual health, gynecology, and dentistry. The rationale and development of this digital information tool are described elsewhere [20].

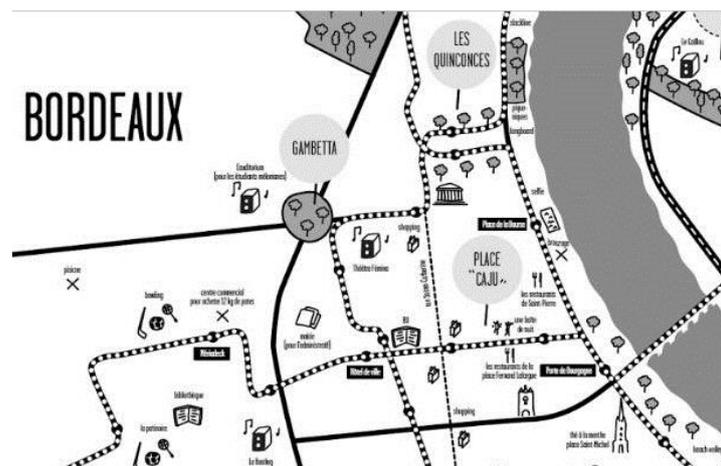


Fig. 1. Screenshot of the *servi-Share* digital information tool (Source: deux degrés)

The *servi-Share* digital information tool was tested and evaluated between September and December 2016 in a sub-sample of students belonging to the *i-Share* cohort study. We chose to contact by e-mail a convenience sub-sample of 1.300 students meeting the following criteria: being a student in one of the universities or post-secondary schools of the Bordeaux area, being aged 18-30 years, and having completed the *i-Share* baseline questionnaire. These 1.300 students were invited in September 2016 by e-mail to click on a link directing them to the *servi-Share* digital information tool. Students were informed that the tool was developed in the larger *i-Share* study, and reassured about the authority behind the information provided. For ethical reasons, participants' usage of the tool could not be registered and health care services that were searched could not be tracked.

The *servi-Share* study was conducted within the regulatory framework of the *i-Share* project by the Commission Nationale de l'Informatique et des Libertés (CNIL; National Commission of Informatics and Liberties; DR-2013-019).

#### **4.2 Questionnaire, Measures and Data Analysis**

Prior to the use of the *servi-Share* digital information tool, the sub-sample of 1.300 students was asked to answer an online 7-item questionnaire on knowledge of youth-friendly health services. Questions were embedded in the tool and concerned: (1) place of living (among 119 Bordeaux neighborhoods, 26 municipalities); (2) university location (among 11 different sites of higher education in Bordeaux); (3) how long the participant had been living in the Bordeaux area (from 1 to 24 years); (4) favorite mean of transport (bike, car, public transports, by walk); (5) which types of youth-friendly health services the participant was seeking information for (general health, infections, sexual health, nutrition, mental health, alcohol/tobacco/drugs, health administrative issues, dentist, other specialist, vaccine, radiography and complementary exams, emergencies); (6) the best criterion to choose a youth-friendly health service (low cost, geographical proximity, trustworthiness, short waiting time); and (7) knowledge of youth-friendly health services in Bordeaux.

After two months from the invitation to use the *servi-Share* digital information tool and answer its questionnaire, participants were asked in November 2016 to complete a supplementary online satisfaction questionnaire. A link was sent by e-mail to access a 10-item Google Form. Questions were: (1) "Have you encountered any difficulties in using this tool?"; (2) "Do you like the design?"; (3) "Have you discovered through this tool some youth-friendly health services you had never heard about before?"; (4) "Have you found in this tool some new youth-friendly health services you will access in the future?"; (5) "Will you use this tool in the future instead of other geolocalization search engines if you need to contact a youth-friendly health service?"; (6) "Where would you like to see this tool being promoted and diffused?"; (7) "Through which channels do you think that students should be informed of the existence of this tool?"; (8) "Will you recommend this tool to your friends?"; (9) "What would you like to add to this tool?"; and (10) "How would you rate this tool?". The two questionnaires allowed for comparison of respondents' knowledge of youth-friendly health services in the Bordeaux area before and after the use of the digital tool. The items were created *ad hoc*

in order to explore this new research field given that no validated scales to measure health service literacy exist yet.

Additional data on gender, age, field of study (Health Studies, Medicine, Literature and Social Sciences, Scientific Disciplines, Law and Economy, Other, and missing value), health status (very good, good, average, poor, very poor) and services utilization (at least one consultation in the last 12 months with a general practitioner, a dentist, an ophthalmologist, a gynecologist, or another specialist among dermatologist, neurologist, urologist, gastroenterologist, otorhinolaryngologist, psychologist/psychiatrist) were retrieved from the *i-Share* database.

We performed descriptive statistical analyses on data from three databases (*i-Share study* baseline questionnaire, first *servi-Share* questionnaire and second *servi-Share* satisfaction questionnaire) using SAS (V.9.3; SAS Institute Inc., Cary, North Carolina, USA).

## 5 Results and Discussion

According to the general response rate of *i-Share* participants to other ongoing sub-studies (approximately 20percent), we expected at least 300 students to use the *servi-Share* digital information tool and answer the first 7-item questionnaire. Of the 1.300 invited students, a final sample of 319 students (24 percent response rate) tested the *servi-Share* digital information tool (N=253 female students, 79 percent). The invitation to answer the second *servi-Share* satisfaction questionnaire was then sent to all 319 student testers. In total, 73 of 319 students (23 percent response rate) completed this second questionnaire (N= 58 female students, 79 percent). Table 1 illustrates the socio-demographic characteristics of the respondents to the first and the second *servi-Share* questionnaires. When comparing these characteristics between the two samples, no differences were found.

**Table 1.** The socio-demographic characteristics of the respondents to the first *servi-Share* questionnaire (N=319) and its satisfaction questionnaire (N=73).

Socio-demographic variables	First questionnaire <i>servi-Share</i>	Satisfaction questionnaire <i>servi-Share</i>
<b>Age*</b>	21.7 (2.2)	21.3 (1.7)
<b>Gender</b>		
Female	253 (79.3%)	58 (79.5%)
Male	66 (20.7%)	15 (20.5%)
<b>Field of study</b>		
Health Studies	89 (27.9%)	26 (35.6%)
Medicine	56 (17.6%)	11 (15.1%)
Literature and Social Sciences	86 (27.0%)	18 (24.7%)
Scientific Disciplines	28 (8.8%)	5 (6.8%)
Law and Economy	29 (9.1%)	6 (8.2%)
Other	21 (6.6%)	4 (5.5%)
Missing	10 (3.1%)	3 (4.1%)

<b>Health Status</b>		
Very good	72 (22.6%)	18 (24.7%)
Good	186 (58.3%)	45 (61.6%)
Average	56 (17.6%)	9 (12.3%)
Poor	5 (1.6%)	1 (1.4%)
Very poor	-	-
<b>Consultations with a health professional</b>		
General practitioner	278 (87.1%)	62 (84.9%)
Dentist	136 (42.6%)	34 (46.6%)
Ophthalmologist	120 (37.6%)	29 (39.7%)
Gynecologist	133 (41.7%)	28 (48.3%)
At least 1 other specialist	200 (62.7%)	47 (64.4%)
<b>Total</b>	<b>319 (100.0%)</b>	<b>73 (100.0%)</b>

\* Mean age (standard deviation)

We analyzed data in order to provide insight into the four posed research questions. Concerning the first research question (“Can an *ad hoc* digital information tool increase students’ knowledge of available health services?”), results from the first *servi-Share* questionnaire revealed that 187 students (60 percent) had no knowledge of youth-friendly health services in Bordeaux before using the tool. The majority of them reported avoidance and delay of health care partially due to lack of information on local youth-friendly health services (N=187, 59 percent, 4 missing values). Students were mostly interested in obtaining information on the three following types of youth-friendly health services: general practitioner (N=258, 81 percent), gynecologist (N=194, 77 percent among female students), and dentist (N= 191, 60 percent). Results from the satisfaction questionnaire indicated that the *servi-Share* digital information tool provided its users with clear information on either new services or services they partially knew (N=62, 85 percent). Furthermore, almost the same number of students declared that they would access some displayed youth-friendly health services in the future (N=61, 84 percent), suggesting that they were keen to apply received information in order to access health care. When specifically looking at data from students having answered the *servi-Share* satisfaction questionnaire (N=73), we were able to compare the knowledge of youth-friendly health services before and after the use of the *servi-Share* digital information tool. Before the use of our tool, less than half of the sample (N=33, 46 percent, 2 missing values) had declared knowing at least one youth-friendly health service. After the use of our tool, more than two thirds of students (N=60, 85 percent, no missing values) declared having acquired new knowledge on youth-friendly health services. Regardless of the knowledge of any youth-friendly health service before the use of the *servi-Share* digital information tool, the proportion of students declaring having obtained new information on youth-friendly health services thanks to our tool was high (84 percent).

Concerning the second research question (“Are *ad hoc* digital information tools a valid alternative to unguided Internet search of information on health services?”), results from the satisfaction questionnaire indicated that the majority of students (N=50, 68 percent) would use the *servi-Share* digital information tool instead of other existing search engines. Students considered then this tool as a valid alternative to unguided Internet search of health information.

Concerning the third research question (“Can networks of support like university staff and health care professionals play a pivotal role in helping students in their uptake of online health information seeking?”), almost all students answering the satisfaction questionnaire (N=70, 96 percent) reported that promoting the *servi-Share* digital information tool through the official website and social network pages of their university was important to increase its credibility. Students felt reassured by the fact that the information on displayed health services was selected by a pool of public health researchers and health care professionals. This suggests that networks of support like health care experts can help students in navigating online health information. Finally, concerning the fourth research question (“Are the design and usability of *ad hoc* digital information tools determinant in facilitating the acquisition of information on health services?”), the majority of students from the satisfaction questionnaire did not find any difficulties in using the *servi-Share* digital information tool (N=67, 92 percent), and liked its design (N=55, 75 percent). Usability and design of *ad hoc* digital information tools may then be determinant in facilitating the acquisition of information on health services. Students appreciated that information was concise and clear, and that plain language was used instead of medical jargon.

## **6 Limitations and Future Studies**

First, the main limitations of this study include the fact that the survey was based on self-evaluation and that only one fifth of the respondents to the first questionnaire completed the second satisfaction questionnaire. As already experienced in other studies within the larger *i-Share* cohort, retaining young university students is an especially difficult task. Young people are involved in a variety of competing activities and bombarded with various marketing messages and appeals for information from a variety of sources. Lack of time and heavy workload are the main reasons why they often refuse to respond to surveys [22]. To achieve success in future longitudinal studies, personalized communications, multimodal contact strategies, thoughtful use of communication technologies, and adherence to customer service principles would be critical [23]. Second, the question of how to assess the effectiveness of digital tools concerning health information is now engendering significant debate in the scientific information, communication and public health community [24]. Future studies are needed to take action in providing evidence of effective methods for monitoring and evaluation of digital tools for health-related information. Third, the small sample of our study and the *servi-Share* tool concerned only university students from the Bordeaux area. However, while generalizability of our findings is limited, the use of short and simple digital information tools to increase health service literacy in students worldwide is recommended and should be consistently studied in future research. The *servi-Share* tool will be available to all students registered to the *i-Share* website, as it will be displayed on their personal account page in early 2018. For future versions of this tool concerning the Bordeaux area, and for any possible similar tool, the use of a design thinking approach is recommended.

## 8. Concluding Remarks

In order to increase health service literacy in students, strategies can be adopted to make information appealing, useful and readable to them. Today, new technologies and the Internet are the best means to deliver information on health services to this highly-connected population. However, students feel the need to be reassured on the quality of information found and instructed to evaluate it. Digital information tools can be a valid support to guide young people's online health information-seeking, especially if they are conceived and constructed by experts [25]. The data collected in this study suggest that students' health service literacy is low, but digital information tools have the potential to improve it, provided that the information is trustworthy.

We contributed then to the design of digital information tools with a practical view on how to make it easier for young people to find information about health services in their living area. This specific study on French students provided insights for digital information tools on health services information to be adapted, produced and disseminated in other countries.

Building capacity of any students worldwide to seek information on health services can contribute to their health service literacy, thus promoting their access to care [26] by reducing the risk of making health decisions on the basis of non-credible information [9].

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