Bridging Between Jewish Ultra-Orthodox and the Start-up Nation: A Case Study

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Abstract. The paper describes an innovative undergraduate program aiming to be sensitive to the increasing demand for higher education by the multi-cultural population in north-eastern part of Israel. The program interweaves societal, economical, informational, and technological facets of businesses, organizations, and communities in order to prepare students to successful Information Systems careers. The paper's focus is on a group of ultra-Orthodox students who graduated in 2017, including the unique case of an elderly caregiver who became a startupist. In light of recent calls for increasing the low employment rate of Israeli ultra-Orthodox Jews and for enabling their employment in fields that offer higher-paying jobs, such program might suggest a fruitful path.

Keywords: Community Information Systems · Entrepreneurship · ICT4D · PBL

1 Introduction

In the last three decades we have witnessed an invasion of homes, workplaces, public spaces, and both local and global organizations by information technology tools and systems. The advents of the World Wide Web, wireless communications, and miniaturized computing technology have expanded this invasion into mobile devices and remote communities. The widespread everyday use of mobile devices, computers, and information systems reflects a shift in conceptualizing the technology as more social than it was perceived before. More recently, over the last several years, social information systems have gained significant popularity. Social networking sites, social sharing and tagging systems and social media attract several million users a day all over the globe. These kinds of information systems provide their individual users with increased social presence, much broader access to information and knowledge, and powerful means of communication [1]. At the same time, social information systems emerge as an empowering force for both local and global communities, organizations, and businesses.

Following these changes [2], a new interdisciplinary area of study has evolved, arguing that the social and the technological mutually shape each other. Studies in this area touch several different fields, including computer science, information systems, information science, and some social sciences [3]. By examining the social aspects of computing, the fields of Social Informatics and Community Informatics aim to ensure that technical research agendas and information systems designs are relevant to the

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lives of people and organizations. Community Informatics aims further at empowering communities through the use of technology, especially those groups who are excluded from the mainstream communication systems [4].

The increasing interest among different communities of practice in integrating human and social considerations into traditional Information Systems (IS) curricula has led to the development of new academic programs around the globe. These are aimed at establishing a framework within which students develop analytical skills to identify and evaluate the social consequences of ICT-based systems and gain experience in the socio-technical process of designing information systems in business, libraries, health, government, education and beyond. While IS curricula have been traditionally targeted to business schools, the latest model curricula for undergraduate degrees in Information Systems [5] recommended reaching beyond the schools of management and business, stating that the discipline provides expertise that is critically important for an increasing number of other domains. In Israel, however, most undergraduate Information Systems programs operate either as part of the faculty of engineering or within the context of the business environment and related activities.

The undergraduate program in Community Information Systems (CIS) has been developed at a college situated in the north-eastern part of Israel in light of the global trends discussed above and, in addition, as a response to the educational gap identified between various population sectors in Israel. The program seeks to prepare and grow local Information Systems workforce by advancing understanding of computing, design, human-computer interaction, digital culture, entrepreneurship and other subjects regarded as critical to developing the needed workforce for the 21st century [6]. The curriculum combines theory and practice while emphasizing subjects that are relevant to the workforce and the organizations surrounding the college, thus creating 'practice of relevance' [7] for its students.

2 The CIS Program Structure

The undergraduate program in Community Information Systems (CIS) has been approved by the national council for higher education at the end of 2010 and the first students started their course of study in the fall term of 2011. The program's main assumption is that the revolutionary development of information technologies in general and of information systems in particular, changes organizational structure and organizational practices. Therefore, the workforce as a whole will benefit from acquiring basic academic knowledge in information systems, not only the engineers or those in managerial positions [8]. The notion of "community" in Community Information Systems is broad, including business communities as well as non-profit organizations, global or local organizations, public communities, cultural communities, and rural communities [3, 4, 9].

Imagining information system as a junction connecting (i) human users, (ii) supporting technologies, and (iii) organizational environment, the curriculum includes (i) psychological and sociological aspects, (ii) information technologies and systems, and (iii) issues of organizational culture. This interdisciplinary approach can be seen also in Community Informatics undergraduate and graduate programs in Canada, USA,

Australia, Italy, South Africa, and other countries [10] as well as in the emerging field of ICT for Development – ICT4D [11, 12]. The interdisciplinary nature of these fields calls for creating interdisciplinary academic programs that will support educating "more capable learners, more innovative teachers, more creative thinkers, more effective leaders and more engaged global citizens" [13, p. 626]. Such programs enable students' specialization both in the technical and the social aspects of information systems. They also expose learners to the breadth of human arenas and communities supported by information systems like public health, economic development, education, and many more.

The three-years curriculum is structured around "Information Technologies and Systems" as a core area of study [14]. Required core courses provide 70 out of 120 credits, where one credit typically equals fifteen class hours. The core curriculum contains foundation courses in Mathematics and Statistics, Programming and Computer Science (CS) [15], and Information Systems (IS). Additional ten credits are offered through elective courses in the core area of study, such as cybersecurity [16], Big Data analytics [17], and Bioinformatics [18] (see details in Table 1).

Table 1. Distribution of courses in different areas of study

Area of study		Year 1	Year 2	Year 3	Sum of credits
Core: Information Technologies and Information Systems	Required credits	25	25	20	70
	Elective credits		6	4	10
Sum of core credits		25	31	24	80
Areas of specialization: (a) The Knowledge Society (b) Information in Organizations	Required credits in area (a)	8	6	4	18
	Required credits in area (b)	8	6	4	18
	Elective credits		2	2	4
Sum of credits in areas of specialization		16	14	10	40

The rest of the credits are equally divided between two supporting areas of study: (a) "The Knowledge Society" and (b) "Information in Organizations". Area (a) includes required courses like digital culture and new media [19], sociology of the internet, online learning strategies, and evaluating digital communities [20]. Area (b) includes required courses like knowledge management and organizational behaviour. The electives include project management, Enterprise Resource Planning (ERP) [21], and an innovative course named "Israel the Start-up Nation" [22] in which students are visiting high-tech companies and start-ups to experience first-hand the organizational culture of the industry they are about to join.

As part of the required core curriculum, 3rd year students are designing, developing, and presenting a real-life project thus combining the knowledge from previous years to construct a digital information system for an organization of their choice (see examples in Fig. 1). Project-Based Learning (PBL) plays an important role in this process. PBL is a powerful pedagogy, thought of as especially appropriate for ICT and business management courses [21, 23]. PBL provides students opportunities to practice cognitive and interpersonal skills, as they work in group projects, cope with complex, real world issues and practices and produce carefully designed products [24]. It is further justified by the CIS program's inherent diversity as well as the learning requirement from students to develop a broader and deeper understanding of how high-tech organizations and entrepreneurs work, and how they utilize technology to improve their products in particular and the society in general [8].

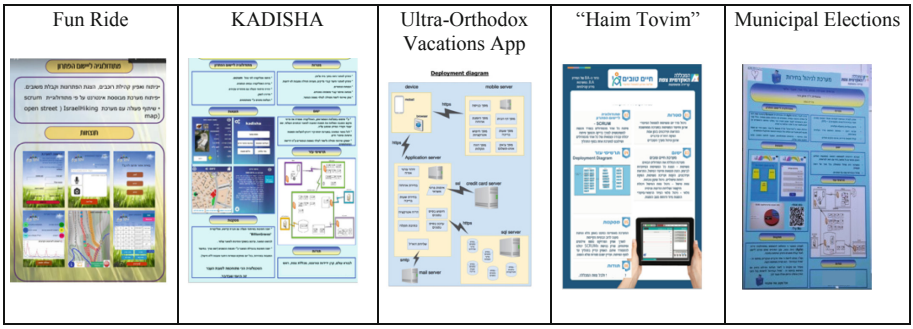

Fig. 1. Final projects designed by 2017 graduates of the ultra-Orthodox group

The structure of the Community Information Systems program separates the core of the curriculum from the electives with the intent of supporting the creation of a sound knowledge base of information systems, at a level appropriate for undergraduate students. At the same time, the courses in both areas of specializations mark the social, cultural, organizational, and human aspects as central to the knowledge base of information systems, thus can support the conceptual development of a multi-faceted body of knowledge. As can be seen in Table 1 above, students are exposed to the interdisciplinary nature of the program from Year 1. That way the program provides the multidisciplinary knowledge required for entry-level positions in a wide spectrum of organizations, as well as design experience of real-world information systems.

One of the program's pillars is rooted in the disciplinary foundations of Computer Science (CS) and software development. The core Community Information Systems curriculum proposes a computing track tailored for non-computer-science majors in order to give them an understanding of the principles and practices of computing as well as its potential for transforming the world [25]. As a result of such integrated curriculum, the program envisions graduates which are both information-technology-oriented and social-oriented, and thus can empower the communities within they live and work. Five cohorts have graduated the program so far, and most graduates are now employed as knowledge workers in a wide array of organizations.

3 Opening the CIS Program for Ultra-Orthodox

In parallel to the process of designing and opening the unique B.A. program in Community Information Systems at the college, significant changes have been documented with regard to integrating ultra-Orthodox undergraduates in the Israeli higher education system in [26]. Recent reports expect that within the next decade, the ultra-Orthodox sector will reach 16% of the total population (now 12%), and that more than half of its population will be young (under 20). The Israeli higher education system has joined forces in an effort to prepare for these changes, while the number of ultra-Orthodox students in it has already grown from 1,000 in 2007 to more than 10,000 in 2017. Worth noticing is the fact that the breakdown of B.A. subjects taken by ultra-Orthodox students differs greatly from that among the general population, and that only 8% study engineering (including computer science), compared with 18% of the general population in Israel.

The number of ultra-Orthodox Israelis rose above one million for the first time in 2017, including a growth within the city where the college is located and the communities around it. As a college located at the heart of the ancient city, surrounded by all kinds of religious communities including the ultra-Orthodox, the college is sensitive for the needs as well as for the challenges in opening the college's doors to this population. After a successful initiative of offering an academic degree in social work for ultra-Orthodox women, the Community Information Systems department joined the endeavor in 2013 by tailoring the B.A. program to the needs of ultra-Orthodox men.

3.1 Bridging the Gaps

The ultra-Orthodox class of 15 men from the major cities and the surrounding communities of the eastern Gallilee, was constructed with the aid of external agencies and philanthropies that generously supported the students during four and a half years of study. This support enabled overcoming the income gap, which is only one of the barriers need to be considered. In special, the college needed to construct a program of study that will overcome the knowledge gap, including a lack of general studies and matriculation certificates, as the following quotation clarifies:

> "Most members of the ultra-Orthodox sector have never received a basic educational foundation. Ultra-Orthodox elementary schools for boys teach secular subjects for a limited number of hours and at a level that does not provide a suitable basis for the modern labor market. Most of the ultra-Orthodox (both men and women) do not obtain a matriculation certificate, and thus find it difficult to gain entry to regular institutions of higher education" [27, p. 85].

In order to meet the acceptance conditions for the Community Information Systems program, the ultra-Orthodox group began with a first-year general preparatory program emphasizing Mathematic, English, and computer literacy, equivalent to high school matriculation certificate. In the second year, the group was offered a structured program of studying towards the national psychometric exam, and in addition took courses like Academic Literacy and Introduction to Information and Communication Technologies. These credits were later qualified towards the 120 credits of the Community Information Systems program. Only after successfully passing the December 2013 national

psychometric exam with a sufficient score, the students could begin their course of study in the B.A. program. Their first semester of the program was the spring semester of 2014.

Another gap needed bridging has been more cultural. The male students in the ultra-Orthodox group were relatively older than the regular college student population and were already fathers in large families. They often were the first in their families to reach the academic world and were not used and sometimes reluctant to study and work in a mixed-gender and multi-cultural environment. It is worth noticing however that the ultra-Orthodox society is changing in this respect as well. For example, a survey from 2013 shows that a growing percentage of the ultra-Orthodox parents support academic studies for their children [28].

The college therefore supported constructing a special learning environment for the Community Information Systems' ultra-Orthodox group, using the college's facilities in less crowded evening hours, leaving Fridays off (unlike the regular program), and offering additional summer semesters. As Table 2 shows, the complete program included 8 semesters over three years, while regular B.A. studies usually spread over 6 semesters with long summer vacation between the first and the second year and then again between the second and the third year. The Community Information Systems' ultra-Orthodox students therefore took part in a challenging non-stop learning journey towards becoming part of the high-tech community and the professional workforce of what is termed "The Startup Nation" [22].

Table 2. Timeline of the ultra-Orthodox CIS program

Part of the program		Dates
Preparatory program		October 2012–August 2013
National psychometric exam		December 2013
B.A. Year 1	1st semester	Spring 2014
	2nd semester	Summer 2014
	3rd semester	Fall-Winter 2014
B.A. Year 2	4th semester	Spring 2015
	5th semester	Summer 2015
	6th semester	Fall-Winter 2015
B.A. Year 3	7th semester	Spring 2016
	8th semester	Summer 2016
Final projects presentation (see examples in Fig. 1)		January 2017
Graduation ceremony		June 2017

3.2 The Case of M.M.

A few days after the holiday of Sukkot in October 2017, only four months after graduating the CIS program and receiving his B.A. diploma, stepped M.M. on to the

stage of the college's auditorium to make a pitch presenting his innovative social-technological idea. The presentation was a part of the Demo Day of the newly established center of innovation and entrepreneurship at the college. Following a summer full of design activities and preparations for this ground-breaking event, happening for the first time at the northern periphery of Israel, seven pioneering teams presented their inventive ideas and technological initiatives in front of key figures of the Start-up Nation and potential investors from all around the country (Fig. 2).

Fig. 2. Invitation for the demo day of the 1st cycle of Zefat's entrepreneurship center

Among the teams chosen to participate in the pioneering cycle based on the authenticity and maturity of their initiatives, was M.M. and his classmate from the ultra-Orthodox group. The couple collaborated with an academic advisor who is a user-experience (UX) professional, and also a lecturer teaching in the Community Information Systems program, to design what they termed "Haim Tovim", translated into "Good Life". The initiative grew out in the third year of studying in the program, while the students needed to find an idea for developing an information system that meets a real-life need, and to design a prototype as a final project using what they had learned and experienced throughout the Community Information Systems program. In addition to his academic studies, M.M. was also working part time as a caregiver for Haim, an elderly person with ALS in a complex nursing state. His idea was to develop a comprehensive information system for monitoring the treatment of the nursing patient outside the hospital (at home or protected housing), that will enable the caregiver as well as the patient and the family to make sure that the required treatment has indeed been done. Describing how the idea emerged, M.M. wrote (E-mail communication, September 2017)[1]:

> "My personal encounter with the giving to others while studying Information Systems gave birth to the idea for the project (which is titled 'Haim Tovim' in honor of my patient). I truly hope that the idea will progress from being a prototype in the academy to a real-world application helping so many people who desperately need it!"

Indeed, during their last two semesters (in the summer and fall of 2016) M.M. and his colleague further developed the idea and the prototype of the system and presented the final project in an exciting event in front of the Community Information Systems

[1] Although M.M. gave his full consent to publish any detail concerning his project, the paper uses a pseudo name.

department' students and teachers in January 2017. Shortly thereafter, the project got to the finals in a national ultra-Orthodox startups competition. Following the acceptance of the bachelor's degree in June 2017, M.M. received a technological job offer and retired from his work as a caregiver. However, the original idea to develop an information system for caregivers was not abandoned and in July 2017 the "Haim Tovim" project was accepted to the pioneering cycle of the center of innovation and entrepreneurship. As part of participating in the center's activities during the summer of 2017, the team further developed the project and designed a "one pager" briefly describing the aims, the market, and the needs (Fig. 3).

Fig. 3. The top part of the project's one pager (in Hebrew)

In an email correspondence during the preparations for the Demo Day, M.M. provided a few words on himself and the unique and personal path he had been through prior to starting the academic studies. M.M. was severely hurt twice in his left hand, both times in terror attacks, and had to go through complex medical and psychological treatments that disrupted his normal life (September 2017):

> "…We moved to the city of Zefat. After a long time of ups and downs, treatments and personal work, an opportunity arrived for me at the college. In a quick decision that I thank God for, I enrolled in the CIS program. I now realize how much this move improved my life and stabilized them".

A few weeks later, in his Demo Day pitch, M.M. started with this personal story and directed the audience towards realizing the potential contribution of the suggested information system. As a result of the successful presentation, M.M. was invited to present the project in additional professional events, and a window of opportunity was opened for future business development. Currently, the project is being developed by M.M. in collaboration with another graduate of the ultra-Orthodox group and the support of a senior lecturer in the Community Information Systems program. All the three live and work in the high-tech sector at the eastern Galilee, thus serving as a physical bridge between the ultra-Orthodox and the Start-up Nation. In a recent email communication M.M. reflected on their progress stating that "we constantly work on promoting the project, (but) as it often happens, behind each wall there is another one…" (E-mail communication, June 2018). The project's team grows its organizational network hoping to run experimental trials of the information system and attract more investors and supporters.

4 Summary

Accompanying and guiding the ultra-Orthodox group of students throughout their years of studying in the Community Information Systems program has been a unique and rare opportunity for the program's academic staff to assist in closing some of the abovementioned gaps, as well as to open new horizons for future professional success in the knowledge age of the 21st century [29]. This goes hand in hand with the main goal of the national plan to integrate ultra-Orthodox Israelis into higher-quality segments of the labor market [27] or, as the title of this paper suggests, with bridging between the ultra-Orthodox communities and the Startup Nation.

Despite the efforts to keep technology such as computers and televisions out of ultra-Orthodox schools and homes, the mobile revolution of the last decade makes it almost impossible [30, 31]. Since the Community Information Systems program deals with issues connecting social and communal understanding with advanced technological skills, the ultra-Orthodox who have graduated the program might be better able to serve their communities with regard to understanding of both current mobile revolution and future technological developments.

In addition, in light of current trends that call for programming for all and regard coding as the literacy of the 21st century, the Community Information Systems program holds potential to give students majoring in non-Computer-Science fields an understanding of the principles of computing and knowledge about the practices of computing professionals. Although the ultra-Orthodox graduates are not expected to become professional programmers, their exposure to these basic features of software engineering makes them more able to talk to computer scientists, understand these professionals' concerns, collaborate with them in developing and maintaining organizational and communal IT projects, and at the same time to develop their own interdisciplinary career on a proper foundation.

As is hinted in M.M.'s story briefly brought above, the students in the ultra-Orthodox group faced numerous challenges, including a lack of general studies (in special, Mathematics and English); the need to support their large families while studying; the absence of 'role models' – people from their familiar communities who have experienced academic studies in technological fields; resistance to change and to modernity within their close cycle of family, friends, and religious leaders; to name just a few. A recent study of the phenomenon of ultra-Orthodox women who join high-tech organizations raises similar challenges, but also points to the broader change underway in employment patterns [32].

Working at the mixed-gendered, multi-cultural environment of a general academic college, the lecturers, the managers, and the administrative staff needed also to adjust procedures and behaviors to the specific needs of this unique group of learners.

In spite of those and additional challenges not detailed here, the experience has been successful for both the college and the ultra-Orthodox group who graduated in June 2017. In light of recent calls for increasing the low employment rate of Israeli ultra-Orthodox Jews in general and for enabling their employment in fields that offer higher-paying jobs in particular, the Community Information Systems program might suggest a fruitful path.

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