Agency and identity of female Arab students entering a technological university

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This report studies the progression of cultural and mathematical identities of female Arab students during their first semester of engineering studies in a technological university in Israel. The report focuses on the cases of two students, Mira and Lena, who demonstrated remarkably different trajectories of identity development. Data was analyzed by closely examining narratives in students' Space of Authorship related to gender and ethnicity. Findings show that Mira's Space of Authorship included multiple narratives relating to ethnic and religious conflicts, upon which Mira enacted agency by debating and choosing specific courses of action both in social life and in mathematics learning. In contrast, Lena's Space of Authorship drew upon psychological discourse to explain her difficulties in ways that did not afford her agency to act back on the challenges she was facing.

Keywords: Agency, identity, gender, Arab students, undergraduate education

Introduction and theoretical framework

The Arab minority in Israel is an involuntary minority (dependent on their collective identities in relation to the dominant group) (Flum & Kaplan, 2016) which consist of 20.5% of the general population. There are long standing tensions between the Jewish majority and the Arab minority in Israel, which have encouraged geographical, political and social separation between them (Flum & Kaplan, 2016; Kaplan, Abu-Sa'ad, & Yonah, 2001). This separation also exists in the education system, where the K-12 education systems of the two populations are completely separated. Thus, universities are usually the first multicultural encounter between Arab and Jewish students. University courses are taught in Hebrew, while in school Arab students study mostly in Arabic. In addition, Arab students have multiple challenges connected with their minority status and the political and ethnic conflicts it entails. For female students, these are compounded by difficulties relating to changing gender roles in this relatively traditional society (Arar & Masry-Herzalah, 2014). As female students enter the predominantly Jewish university, they are exposed to social narratives that question their ability to succeed (similar to Jewish female students). Yet, for Arab females, university studies are often the first occasion to leave their home-village and be exposed to Western, secular culture. This is a transition that often causes "culture shock" (Arar & Haj-Yahia, 2016).

The report is a part of a large study whose goal was to explore the process that Arab female students' identities undergo through their entry into a predominantly Jewish university, both in relation to these students' academic and mathematical learning, and in relation to their sense of ethnic and cultural belonging. Data shows high rates of failure of this particular minority on entry-level mathematics courses at the Technion. We employ a socio-cultural lens on the activity of mathematics learning to study the relation between cultural transitions and the development of a student's mathematical and learning identity (Sfard & Prusak, 2005; Wenger, 1998). In particular, we rely on a sociocultural view of learning as becoming a participant in a certain community (Lave & Wenger, 1991; Sfard & Prusak, 2005). Communities are characterized by shared values, forms of action and interpretative schemes.

These have been defined by Holland, Lachicotte, Skinner, and Cane (1998) as "figured worlds", where a figured world is defined as "a socially and culturally constructed realm of interpretation in which particular characters and actors are recognized, significance is assigned to certain acts, and particular outcomes are valued by others" (p. 52). In the case of Arab students, the home, family and village figured world is extremely different from the predominantly Jewish, technological and western figured world of the university.

In our work, we rely on Holland and colleagues' (1998) concept of "space of authorship", which links between figured worlds and the identity participants author for themselves within these figured worlds. Holland et al. point out that the space of authoring, in which people figure their identity, is always a contested space. We link these ideas with Sfard & Prusak's (2005) definition of identity as a set of reifying, significant and endorsable narratives about a person. Space of authorship, for us, is the realm of narratives from which identity narratives are picked up, contested against and negotiated. Agency, defined by Holland and colleagues (1998) as "the realized capacity of people to act upon their world" (p. 42), is enacted through the orchestration "arranging the identifiable social discourses/practices that are one's resources" and form his/her space of authorship (p. 272). Thus, the question of this study is: How do cultural and mathematical identities of female Arab students develop during the initial phase of their college level mathematics studies and in what ways do these students enact agency in relation to the narratives regarding ethnicity and gender in their space of authorship?

Method

The cases of Mira and Lena were taken from a larger study in which we followed 13 female Israeli Arab undergraduate students during their first semester at the Technion, a technological university in Israel. All of the participants were studying in either the Computer Science faculty or the Electrical Engineering faculty, where 40-50% of the courses taken in the first semester are mathematics courses (usually Calculus I and Algebra I), both of which are among the most coveted faculties in this institute and have very high entrance qualifications. The students' ages ranged between 18 and 19.5 years. They were recruited voluntarily, during the first week of the semester, through an institutional mentoring project for Arab students in which senior students mentor the incoming students. Students were promised complete confidentiality and signed informed consent forms. The study was approved by the Institutional Review Board of the Technion.

All the students were interviewed at the beginning and at the end of their first semester. Interviews were semi-structured and conducted by the first author in Arabic. They lasted between 30 and 90 minutes. Students also completed two midterm diaries, which included answers to questions sent to them by email. The final interview consisted of questions eliciting reflections about the past semester. In addition, students were requested to reflect upon and answer some of the questions from their final calculus exam. Data was analyzed using a combination of inductive and deductive codes (Saldana, 2016). Inductive coding searched for recurring themes in students' interviews. For example, a common conflict described by the students regarded social encounters, whether to "hang out" with certain people and with whom to study. Deductive codes were based on the theoretical orientation of figured worlds. In particular, we searched in the interviews' transcripts for valued actions, valued outcomes, significant actors and roles in the home vs. Technion figured worlds. The main themes

arising in all the interviews in relation to conflicts between the home figured world and the Technion figured world related to narratives about ethnicity and gender. In relation to these conflicts, we searched for indications of agency both in the actions described by participants (e.g., "I try to study hard"), or lack thereof ("I feel I am not focused" – with no mention of possible action to become focus). We also searched for agency in the manner in which interviewees spoke about the conflicts – as a given situation or as something that can be acted upon.

Findings

Mira and Lena were chosen for this report since they exemplified very different trajectories of acclimation to the figured world of the Technion. While Mira ended the first semester with passing grades and relative success, Lena failed several courses and was quite discontented with herself at the end of the semester. The different trajectories afforded opportunities to view and contrast different processes of change in identity narratives and the ways in which these changes drew upon certain spaces of authorship. We first explore the figured world of Mira and Lena, as seen through the collective narratives told by them. We pay attention here to what they say about gender/ethnicity and their positioning with relation to the conflicts they talk about.

Mira's stories about her family and village drew a figured world that is mono-ethnic and mono-religious. She reported in her first interview that she was having trouble living in a multi-cultural environment. She also identified herself as a "non-social person by nature", perhaps to minimize the potential conflicts that could arise as result of the multi-cultural environment at the Technion. Mira also reported being the first in her family to attend university and that she felt pressure from her family to succeed:

> I'm the first one [from my family] to ever attend a high academic institution. Everyone at home has expectations (from me) and that's a bit stressful. (Mira, 1st interview)

Positioning her academic skills in relation to her family seemed to be important to her:

> I have four older brothers and they were not strong at school, and a sister (who is) a year older than me. I'm better than her academically. She has not yet begun her academic studies. (Mira, 1st interview)

Although Mira authored herself as "strong" academically, she confessed in her first interview that mathematics was not a subject she preferred: "to tell (you) the truth, I do not like mathematics". Her goal was to study computer science and mathematics was seen only as a means towards that cause.

Unlike her academic identity, which included narratives of relative strength and did not include many conflicts in its space of authorship, regarding her ethnic identity as an Arab student Mira's space of authorship was much more conflictual. In the initial interview, Mira reported that she had not encountered people from other religions before she started studying at the Technion. Her first close encounter with someone of a different religion occurred when she entered the dorms:

> I live with a Christian student in the dorms; she is from a different religion. At first, I worried about the idea of living with her, because I am a Muslim and she is Christian. I was worried I would feel restricted and not able to behave freely. (Mira, 1st interview)

Mira's justification of her worries as based on the fact that the student was "Christian" while she was "a Muslim" indicated that, in her space of authorship, the mere religious identity of a person could cause problems while living together and "not behaving freely". Notably, the fact that the Christian student was also Arab was not mentioned but taken for granted, and the possibility of living with a Jewish student was not mentioned at all. Yet, like in many other instances, where Mira only reported about conflicts in retrospect, this encounter was already authored as resolved. She ended the story by:

> Later I discovered that if I give her the space to behave according to her beliefs and religion, she will give me back the same space I need. (Mira, 1st interview)

Her agency in relation to this conflict could be seen in the actions she described ("give her space") that resulted in what she needed ("the same space I need"). As the semester progressed, Mira repeatedly recounted encounters with students of other religions and gave them significance. Although Mira expressed an acceptance of students from different religions, her diary entries clarified that she was engaged with conflictual narratives around ethnicity and religion and that these were entering her space of authorship:

> Every day and all the time, I face differences. First, the atmosphere at the Technion is not like the atmosphere at home at all. Here everyone is independent and each person is responsible for himself and his own decisions. There are people from different places, different religion[s], different thoughts and different values and cultures. For example, I came from a village where everyone is Arab and we all belong to the same religion, whereas at the institute I meet people from all over the world and from different religions. I see people behaving in a way that goes against my values and that is a new atmosphere for me, I am constantly trying to stay on the side and not get involved with anyone. (Mira, 1st diary)

Several issues relating to this excerpt are worth mentioning. First, Mira is explicitly talking about "differences" between the "Technion" and "home". In other words, it is clear that she is constructing the two locations as different figured worlds. The differences mainly point to differences in relations between the individual and the social community ("here everyone is independent"), hinting that in her home figured world, people are interdependent and not responsible for their own decisions. The interdependence is linked in Mira's words to the Arab ethnicity and to the religious homogeneity of her home village. Thus, it is clear from Mira's words that she is able to locate the conflict, the values that are at stake, and her positionality with relation to this conflict. Notably, there are signs of agency in this story too. Mira writes about the conflict and immediately states her actions in relation to it ("I try to stay on the side and not get involved"). Later in the semester, this action of "staying on the side" seems to mature into a more nuanced positioning and identification of herself with relation to the "others":

> I came from a traditional and relatively conservative family, where I grew up with values that I believe are correct. However, at the Technion, I encounter many people who behave against my beliefs, and it makes me feel that I am an extreme person or something like that. Yet I continue to believe in my tradition as they continue to believe in theirs. (Mira, 2nd diary)

This excerpts hints at several processes that Mira underwent during the semester. First, there are beginnings of separation from "her beliefs". Whereas these beliefs were stated in the first diary as

simply "her values" ("I see people behave against *my* values"), here, these beliefs are located in time and space ("I came from a traditional … family", "I *grew up* with values"). Moreover, the statement about values "that I believe are correct" shows hints of voices that position these beliefs as "incorrect". These voices are later located in people "who behave against my beliefs" and that, whether directly or indirectly, make Mira feel she is "an extreme person". The taken-for-granted "beliefs" and "values" have thus been questioned and contested for Mira, and this has raised a conflict with regard to identity narratives concerning religion and ethnicity. In the face of these conflicts, Mira enacts agency in choosing to adhere to her home values.

With relation to her mathematical identity, Mira reported finding her mathematics studies to be surprisingly satisfying. In her first diary, she wrote:

> The most interesting lecture in my weekly schedule is a Calculus lecture, because I learn mathematics differently… I learn how to learn mathematics, how to think outside the box and how to find ideas or solutions for different mathematics problems. It is a hard course but the lecturer is a wonderful person and he makes it an enjoyable course. (Mira, 1st diary)

Her satisfaction with her mathematical studies continued throughout the semester despite hurdles and setbacks. In the last interview Mira reported failing in the first take of the calculus exam because of being "unprepared unlike I should have been", then studying better and passing the second take with a satisfying result.

To summarize, Mira retold her identity at the end of the semester as stronger in mathematics than at the beginning, despite recounting many stories of conflicts with relation to her ethnic and religious identity in a foreign figured world. With relation to almost all the descriptions of conflict, Mira's talk was full of agency, whether it was related to decisions she made to adhere to her religious values, or with regard to changing her methods of study. Along with that, some changes in the space of authorship of her ethnic and religious identity occurred. These could be detected mainly in how she narrated her "values" and "beliefs" – from being inherently "hers" to being a result of her "upbringing" and her home figured world. In addition, the space of authorship came to include also third person narratives about her being identified as an "extreme" person by others, something which forced Mira to reexamine her beliefs and values and to make choices regarding them.

Unlike Mira, who was hesitant about her connection with mathematics in the first interview, Lena's first person mathematical identity was authored in the interview as highly successful. To signify her success, she narrated the following story:

> I don't know if you know the Elkasmi competitions? (Interviewer nods.) I participated in this competition from fourth till ninth grade, almost I won the first place, once I won second place and once third place… that means it (mathematics) was for me. (Lena, 1st interview)

Elkasmi is a competition for gifted students in mathematics in the Arab community. Lena was signifying her strength in mathematics by drawing on the significance that participating and winning these competitions has in her community, a significance she made sure was shared by her interviewer.

Apart of the Elkasmi story, Lena relied, similarly to Mira, on her family's narratives when authoring her first person academic and mathematical identity. She reported that her family thought of her as a

strong student, who could achieve anything she wanted. These expectations were talked about both as a reassuring element and as a stress factor:

> They (parents and family) always remind you that you have potential. So I somehow try to turn this potential (to reality) ... So that's my parents' expectations in particular, and my sisters think that I'm 'Rambo'. That I could do anything and get along. Most people expect so. (Lena, 1st interview)

Unlike Mira, Lena was not a first generation university student in her family. Her parents both had academic degrees. Yet similarly to Mira, she also reported feeling stress from her family's high expectations. Again, it was clear from her talk that she was highly accountable to her family and community with relation to her academic choices and achievements. Yet unlike Mira, Lena's talk about her studies was mostly devoid of agency. Her authoring of herself as successful was based on the diagnosis that "math is for me", justified by her winning math competitions during her childhood. Also in revoicing the voices of parents and significant narrators ("they always remind you"), these voices narrated her as "having potential" and "turning this potential into reality". This diagnostical discourse was most noticeable in the main conflict Lena talked about from her first interview – that relating to her gender:

> I will not begin now by saying that boys are smarter than girls, but I believe that boys have more self-confidence in the science field than girls. They (boys) always think that the science field is for them, and girls think that they are less … that is what I read and see around me. Here I see the difference between boys and girls, but that does not mean anything about the final results because sometimes the way the girl thinks help her beat all her competitors. (Lena, 1st interview)

Notably, already at this initial phase of her studies, Lena was contesting voices that were saying "boys are smarter than girls". She was negating them, yet endorsing the narrative that "boys have more self-confidence than girls", which she justified based on what she "read and saw around her". Again, there were no signs of agency in Lena's talk. Her talk was diagnostic ("here I see the difference between boys and girls"), but there was no mention of her own actions in relation to this conflict.

As the semester progressed, the gender related narratives turned into first person identity narratives. In her first diary, she wrote:

> Despite all the faith I have in myself, I feel that I'm not confident enough, in comparison with boys, at least with a boy who I study with. I think it comes from old stereotypes about the composition of the boy's brain versus the girl's brain. Sometimes I fear that these stereotypes are true and that my mental ability is not enough. (Lena, 1st diary)

Again, Lena's authoring of the narratives about gender and mathematics/technological studies was solely diagnostic and devoid of agentic descriptions. She was examining her "beliefs in herself" and her "self-confidence" against "old stereotypes", indicating at least a partial endorsement ("sometimes I fear these stereotypes are true") of these narratives about "the composition of the boy's brain versus the girl's brain". Importantly, these "stereotypes" were about "brains" of males and females, something that was clearly beyond Lena's agency to change. Lena was examining and identifying herself within this figured world of fixed-ability gender-related narratives, without any indication that

she had a choice to accept or reject them. The gender-related narratives evolved in the second diary into a mini-theory of the relation between her "self-confidence" and her actions:

> When a person is less confident, I don't know how (to explain this) … But sometimes you do not believe in yourself, sometimes you do not want to meet anyone. That (decision), not wanting to meet anyone, is not the best decision in the world. You have to be with people who you see every day and share with them what you solved, and what you did not (solve). So that it helps you keep going. Sometimes it made me stop or slow down. (Lena, 2nd diary)

This quote exemplifies well the psychological discourse that Lena drew upon to explain her perceived failure during the first semester. Explanations about her failure (which is not mentioned here explicitly, only hinted at) use psychological keywords ("self-confidence", "belief in oneself") to justify her decision "not to meet anyone". The self-diagnostic statements are written about as pre-given and beyond Lena's control. Further, these psychological states have led Lena, according to her narrative, to certain decisions that she regrets ("you have to be with people"), yet there is no indication that Lena had a choice regarding these decisions. They were a direct result of her low "self-confidence". In the final interview at the end of the semester, Lena's discourse was full of such regrets:

> I started the semester as a little girl, I was not focused … I was very nervous about people around me so I did not study in the library and stayed at the dorms. Everyone asks you 'what's going on?', 'Did you solve the homework?' Why should they ask me? I felt pressure. (Lena, 2nd interview)

Again, this quote is full of psychological terms relating to maturity, cognitive and emotional functioning ("a little girl", "not focused", "very nervous"). As was common in all her interviews and diary entries, there is no mention of any difficulties relating to her ethnic or cultural status.

The final interview also had indications that Lena was re-authoring her identity as a high-school student (at least to the audience of the interviewer). She said: "I have never been in a place like this, even in high school there were difficulties but it isn't like here." This narrative was different than those authored in the first interview, where Lena talked about herself as successful and being "made for" mathematics. She now talked about her high-school career as containing difficulties too, yet not as extreme as in the Technion. The lack of agency with relation to these difficulties was consistent. Lena talked about wrong decisions that she made during the semester (such as not asking for help) but always in retrospect, and always with relation to how these decisions were unhelpful.

Summary and Discussion

Multiple studies have discussed the relationship between being part of a minority group and success in school or academic studies (Arar & Haj-Yahia, 2016; Flum & Kaplan, 2016; Nasir & Saxe, 2003). According to these studies, higher education allows minority students to move from the margins of society closer to its centers of power. Yet, at the same time, institutions of higher education pose significant barriers and conflicts for minority students. In the case of the Arab minority in Israel, and in particular, female students, these barriers are only starting to be understood. In this study, we shed light on two contrasting cases of first semester acclimation. These two cases hint that agency may be a crucial aspect of such acclimation, in the face of complex social and political conflicts. Mira's story

demonstrates a case of high agency, along with very explicit positioning of herself in relation to ethnic and religious conflicts. This agency seems to have helped her overcome difficulties in the social, as well as the academic and mathematical aspects of the Technion's figured world. In contrast, Lena's story demonstrates a case of very little agency, along with a total neglect of her positionality with regard to ethnic and religious conflicts. Paradoxically, although Lena seemed to start the semester as better acclimated to the figured world of the Technion, her lack of awareness of the constraints imposed on her by her minority status may have led to lack of agency. The significance of our study lies in turning attention to the importance of Arab female students' awareness of the social and ethnic conflicts they face upon entering a foreign figured world. This awareness may cultivate choice, which is the necessary condition for these students' agency to cope with challenges.

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