ABSTRACT
The conference theme - "Leveraging Computing to Change Education" - focuses on the influence of computing on the way we educate at all levels. In this paper we highlight the conference theme from the perspective of computer science (CS) teacher preparation and describe the Views program, launched at the Technion – Israel Institute of Technology, two years ago. Views invites Technion graduates back to the Technion to study toward an additional bachelor's degree in the Department of Education in Science and Technology. The degree they earn includes a high school teaching certificate in one of eight tracks: math, physics, biology, chemistry, CS, environmental sciences, electrical engineering, and mechanical engineering. Views students receive full study scholarships and are not required to commit to work in the education system after graduation. In the paper, we (a) present the Views program; (b) analyze factors that motivate and demotivate CS graduates to enroll in the program; (c) describe the characteristics of students in the program and their contribution to the learning environments and (d) address hopes with respect to the expected future impact of the Views program on the education system in Israel in general and on CS education in particular.

Categories and Subject Descriptors
K.3.2 [Computers and Education]: Computer and Information Science Education – Computer science education, Curriculum.

General Terms
Economics, Human Factors, Standardization.

Keywords
CS teacher preparation, CS education and the job market, CS teachers, CS teaching as a second career, STEM education.

1. INTRODUCTION
Many countries experience difficulties in attracting excellent STEM (science, technology, engineering and mathematics) teachers, especially on the high school level. This shortage is partially explained by the fact that qualified young people, who excel in STEM, prefer to study one of the STEM subjects and do not commit to work in the education system. This phenomenon, in turn, is partially explained by the social norms accepted in these countries.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

Conference '14, Month 5–8, 2014, Atlanta, GA, USA.
Copyright 2010 ACM 1-58113-000-0/00/0010 …$15.00.

In response to this shortage, the Technion – Israel Institute of Technology launched several education initiatives, one of which – the Views1 program – is described and analyzed in this paper from the perspective of CS education. The objective of Views is to help alleviate the STEM teachers' shortage in Israel by providing Technion graduates with an additional profession – high school STEM teachers – that they will be able to use if, when and where they choose to switch to education.

As it turns out, many Technion graduates, from all scientific and engineering disciplines, ages and professional backgrounds, find the Views program attractive. In this paper, we focus on those Technion graduates who chose to study in the CS education track of Views and we address questions such as: What motivates CS graduates to enroll in the program and what demotivates them? What characterizes them? And, how are these characteristics expressed in courses taught in the Technion's CS teacher preparation program? We suggest that the discussion presented in this paper highlights a new perspective on high school CS teacher preparation programs.

We first describe the general background of Views and of its CS education track in particular. Then, based on the analysis of data collected from several resources, we describe some observations with respect to students’ decisions to choose (or not choose) this track and try to explain them, answer the questions presented above, and propose directions for future research.

2. THE STUDY ENVIRONMENT
2.1 Technion – Israel Institute of Technology
The Technion – Israel Institute of Technology2 is the major supplier of scientists and engineers to the Israeli industry. Its graduates constitute over 70 percent of the country’s founders and managers of hi-tech companies. Due to the ingenuity of Technion alumni, Israel is now home to the largest concentration of technology start-up companies outside of Silicon Valley, and 80 percent of Israeli NASDAQ companies are led by Technion graduates. The Technion recently won, together with Cornell University, a competition to establish an applied sciences graduate school on Roosevelt Island off Manhattan (see The Jacobs Technion-Cornell Innovation Institute - JTCI3)

1 The name of the Views program in Hebrew is Mabatim (= Views in English), which is the Hebrew acronym for Engineers/Scientists in Science and Technology Education.
2 Technion's website: http://www1.technion.ac.il/en
3 See: http://tech.cornell.edu/experience/jtci/
2.2 Department of Education in Science and Technology

The Technion's Department of Education in Science and Technology (the department) is one of the Technion's 18 academic units. The department's teaching, research and development activities are varied and focus on learning sciences, educational technologies, and education in a variety of subjects and learning environments. The department offers eight undergraduate study tracks and a comprehensive graduate program. The undergraduate program covers the full range of high school STEM education disciplines and it includes a high school teaching certificate for STEM subjects in one of eight fields: math, physics, biology, chemistry, CS, environmental sciences, electrical engineering, and mechanical engineering.

The department considers its contribution to the Israeli educational system to be not only in preparing prospective high school science and technology teachers, but also in encouraging its graduate students to contribute to Israel's higher education, the hi-tech industry, the Israel Defense Forces, and the third sector.

This is a fertile ground for the Views program which reflects the Technion sense of responsibility for improving STEM education in Israel also on the school level. As is described in the continuation of the paper, the Views program is one platform that enables the Technion to promote this agenda by training high school STEM teachers with broad world view and vast work experience in a variety of workplaces.

2.3 CS Teacher Preparation

A decrease in the number of students who choose CS undergraduate studies [1, 2, 8, 12] drew attention to CS teacher preparation programs. Surveys indicate the need to (a) update the high school curriculum in parallel to improving teacher preparation programs [5, 11, 13] and (b) to diversify the population of prospective CS teachers [2, 4].

The Technion's CS education track is one of the study tracks offered by the department. It is a high school CS teacher preparation program that illustrates the model, suggested in [6, 7], for the Israeli high school CS curriculum and it includes three main tiers: disciplinary studies, education and pedagogical studies, and pedagogical-disciplinary studies (for more details see [9, 10]).

3. THE VIEWS PROGRAM

As far as we know, the Views program proposes a new approach towards the profession of STEM teaching, as is reflected in the following description.

3.1 Program Description and Rationale

Views invites all Technion graduates back to the Technion's Department of Education in Science and Technology, to study toward an additional bachelor's degree in one of the eight study tracks mentioned above.

The rationale guiding the development of Views was to offer conditions that would enable Technion graduates to join the program. The Technion approached this challenge in a gradual and proactive manner. First, broad conceptual agreement was solicited among both academic and administrative entities, and later candidates for the program were approached from among Technion graduates (first) and current students (later).

Technion graduates who enroll in the Views program receive full study scholarships from the Technion for two years. Since the number of credits required to complete this degree is similar to that required for an MBA, the study program is organized similarly. The students attend classes one full day or two half-days a week for two years, and so they can continue working as scientists/engineers in the industry in parallel to their studies. Views students study alongside the Technion's regular undergraduate students, a fact that affects the regular courses studied in the program as is discussed later on in the paper. The framework established for the Views program is now open to all Technion undergraduate students who may begin studying in one of the department's disciplinary tracks in parallel to their B.Sc. studies in science and engineering, and join the Views program to complete their studies in STEM education after graduating in science or engineering.

Although the students enrolled in the Views program receive full study scholarships for two years, they are not required to commit to teaching in the education system. This decision was made for the following reasons: (1) Teaching should not be done only because one made a commitment to do so; (2) the knowledge that Views students gain in the program – mainly, learning and teaching processes – is useful also in the hi-tech industry when coping with new knowledge and technological developments. Thus, even if Views students decide not to switch to education, they will still use the knowledge they gained in their studies and contribute to Israel’s prosperity, but in a different way; (3) the exposure of Views students during their studies to schools, high school students, and to teaching and learning processes will continue to affect them throughout their entire life. Thus, even if they did not originally consider becoming STEM high school teachers, they may consider this option at some future time, either in parallel to their work in the industry or if they ever decide to switch careers to STEM teaching.

3.2 The Views Program Participants

Participant recruitment: Views is introduced and publicized through the Technion's alumni association mailing list, the Technion newsletter and the department's website. As it turns out, however, the current most popular channel of advertisement is by word of mouth through friends and acquaintances who are already enrolled in the program. Students who are currently studying at the Technion in one of its science and engineering faculties are invited to a meeting we organize each semester to introduce and promote Views.

Participants currently enrolled in Views: Since Views was launched two years ago, 146 Technion graduates enrolled in the program: 60 started the program in its first year, 2012, and have recently completed the two-year program; 90 started the program in its second year, 2013, and have just completed their first year of studies. Current enrollment in the coming Winter semester (2013-2014) is at about 50 graduates and we expect to have about 100 Views students each year for the next five to ten years. The department currently has about 300 undergraduate students – half of whom are Views students. Sixty percent of Views students are males and forty percent are females.

Table 1 presents the distribution of Views students among the different study tracks. As can be seen, while the CS Faculty is the
second largest faculty at the Technion (see data in Table 2), only 8% of all Views students selected CS education as their STEM education track, and only half of them are CS graduates. This observation led to the questions that we address in this paper.

Table 1. Distribution of Views students among the study tracks

<table>
<thead>
<tr>
<th>Education Track</th>
<th># of Views Students</th>
<th>% of Views Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>29</td>
<td>20%</td>
</tr>
<tr>
<td>Electrical engineering</td>
<td>26</td>
<td>18%</td>
</tr>
<tr>
<td>Biology</td>
<td>22</td>
<td>15%</td>
</tr>
<tr>
<td>Mechanical engineering</td>
<td>20</td>
<td>14%</td>
</tr>
<tr>
<td>Chemistry</td>
<td>19</td>
<td>13%</td>
</tr>
<tr>
<td>Physics</td>
<td>15</td>
<td>10%</td>
</tr>
<tr>
<td>Computer Science</td>
<td>12</td>
<td>8%</td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>146</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.3 The CS Education Track of Views

The CS education track of Views is open to students and graduates of the Technion’s faculties of CS, Industrial Engineering and Management (the Information Systems track only), and Electrical Engineering (the Computer Engineering track only). Students from other faculties are permitted to join this track, under special circumstances, provided they complete required prerequisites, either from the department’s designated courses for teachers (for example, Computational Models for CS teachers, Programming Paradigms) or from the courses offered the Faculty of CS.

The program consists of 36 credits as listed below:

- 8 credits of elective courses from the department (e.g., Methods courses of other STEM subjects).
- 6 credits of elective advanced courses from the faculty of CS (seminars, projects, and advanced studies).

4. THE STUDY

The Views program is accompanied by a comprehensive formative assessment as is customary with novel programs. This paper presents preliminary observations of the part of that assessment that focuses on the CS education track of Views.

4.1 Study Targets and Questions

The study aims to understand the factors influencing Technion CS graduates to explore the option of working as CS teachers as a second career (following or parallel to a career in industry) and to enroll in the Views program in preparation for this shift.

The research questions derived from this target were:

- What factors motivate Technion CS graduates to enroll in Views?
- What factors demotivate Technion CS graduates from enrolling in Views?
- Does the integration of Views students into the regular undergraduate study track influence it? If yes – how?

4.2 Population

We collected data from the Views students and from Technion alumni who expressed interest in the program. In addition, we analyzed data on the number of students and graduates from the five largest Technion faculties.

4.3 Data-Gathering Tools

Both quantitative and qualitative data were collected:
- Descriptive statistics: Number of current Technion students and graduates;
- Online surveys: Questionnaires enabled us to reach a wide population and to collect data either anonymously or not (according to each respondent’s choice). Most of the questions in the questionnaires were open questions since our study just began and we first wished to learn about research participants’ perspective before gathering data using closed questions.
- Interviews: In the questionnaires we also asked participants whether they would be willing to be interviewed and we subsequently interviewed three Technion alumni from the CS education track of Views and five CS alumni who expressed interest in the program but ultimately did not enroll.

In the online surveys and interviews we asked about the interviewees’ background, their perspectives on teaching high school CS as a second career, and their thoughts with respect to factors that motivate CS alumni to enroll in Views as opposed to factors that demotivate them.

5. DATA ANALYSES

5.1 The Distribution of Views Students

5.1.1 The small number of CS alumni enrolled in Views

To examine the low enrollment in the CS education track of Views, we took a broader perspective and looked at the number of students and alumni in the Technion’s five largest faculties, of which CS is second in size. For each faculty, we looked at four student groups (Table 2):

- Group A: Students who are currently studying at the faculty;
- Group B: Students who currently study at the Technion and who attended the meetings at which we explained how to start studying towards a second Bachelor’s degree in STEM education in order to join Views after graduation (Group B is a subset of Group A);
- Group C: Alumni who showed interest in studying in Views;
- Group D: Technion graduates who enrolled in Views (Group D is a subset of Group C).

Data description: Tables 1 and 2 and some additional data reflect the following facts:

a. Eight CS graduates are enrolled in the Views program: six in the CS education track, one in the electrical engineering education track and one in the math education track.

---

5 These data do not include students who will begin their studies in Views in the Winter semester of the 2013-2014 academic year.
b. As can be seen from the sizes of Groups C and D, between one fourth and one third of alumni who expressed interest in Views eventually enrolled in the program; c. Alumni who enrolled in Views did not necessarily select the Views track that corresponds to the Technion faculty they graduated from. However, since such cases were relatively few, we did not incorporate them into our analysis as a separate category but rather included them in Group D;

Table 2. Interest in the Views program

<table>
<thead>
<tr>
<th>Faculty</th>
<th>A: Current students</th>
<th>B: Current students who participated in explanation meetings</th>
<th>C: Alumni who expressed interest after graduation$^6$</th>
<th>D: Alumni enrolled in Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering</td>
<td>1294</td>
<td>24</td>
<td>97</td>
<td>32</td>
</tr>
<tr>
<td>Computer Science</td>
<td>1118</td>
<td>26</td>
<td>36</td>
<td>8</td>
</tr>
<tr>
<td>Civil &amp; Environment Engineering</td>
<td>1052</td>
<td>22</td>
<td>36</td>
<td>10</td>
</tr>
<tr>
<td>Industrial &amp; Management Eng.</td>
<td>814</td>
<td>22</td>
<td>54</td>
<td>16</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>800</td>
<td>23</td>
<td>46</td>
<td>11</td>
</tr>
<tr>
<td>Total for above five faculties</td>
<td>5078</td>
<td>117</td>
<td>269</td>
<td>77</td>
</tr>
<tr>
<td>Total for all 18 Technion faculties</td>
<td>8571</td>
<td>194</td>
<td>532</td>
<td>146</td>
</tr>
</tbody>
</table>

d. In most cases, the relative size of the Technion faculty (Group A) corresponds both to the relative number of students who participated in explanation meetings (Group B), to the number of alumni who expressed interest in the program after graduation (Group C), and to the number of graduates studying in the corresponding Views track (Group D). This, however, is not the case for the CS and EE (electrical engineering) education tracks. First, the CS education track is the smallest track in Views, whereas the Faculty of CS is the second biggest after EE in terms of the number of students (1118 students, about one-eighth of the total number of Technion undergraduate students per year and 1294 undergraduate students, respectively). Second, the number of EE alumni in Groups C and D is substantially higher than from any of the other four largest Technion faculties.

Since a relative large number of the CS and EE Technion graduates work in the same hi-tech companies, in many cases in the same working environment and under similar working conditions, several questions arise: Why do the numbers of interested CS Technion students (Group B) and alumni (Group C) decrease when it comes to actual enrollment in the CS education track of Views (Group D)? And, why is the situation reversed when it comes to EE graduates? We attempt to answer these questions in the next section.

5.1.2 Engineering versus Science

In this section we focus on the four groups, A-D, of the faculties of CS and EE, which are similar in terms of their number of students and their very high admission criteria. The sizes of these groups raise the question: Why are the sizes of these faculties' respective Groups C and D different, while the sizes of their respective Groups A and B are so similar?

We first speculated that the answer to this question lies in the difference between (computer) science and (electrical) engineering and that the mere, original selection of EE over CS, that is, an engineering profession as opposed to a scientific profession, indicates that EE graduates have an a-priori tendency towards the profession of teaching. This is because engineering professions require skills like teamwork and collaboration with different stakeholders, which are beneficial also in teaching processes. And so we rephrased the questions: Can the differences in the sizes of Groups C-D of CS and EE be explained by the differences between science and engineering? We realized that the answer to this is No, due to three reasons.

First, the sizes of Group B of all five largest faculties are similar; Second, four out of the five largest faculties are engineering faculties while the CS faculty is the only scientific faculty among the top five. However, in terms of Group D, CS is more similar (yet smaller) to the other three engineering faculties than to EE; Third, as it turns out, many CS graduates work as software engineers after graduation, even though they do not have an engineering education.$^7$

Therefore, we asked: Since, in practice, both EE and CS graduates work as engineers, is there a difference between these two engineering fields and the kind of work that these graduates do after graduation in the Israeli hi-tech industry? The answer we suggest is based on the following preliminary data we have at this stage.

One of our interviewees, a Technion EE alumnus who graduated from the joint CS/EE track (computer engineering) and is currently enrolled in the CS education track of Views, reported having the following work experience: Management of the development of real-time software in [names of three companies] and several start-ups. In the last several years, I focused on product and application development, including hardware, chips, and quality assurance.

In his interview, we asked this student: How would you explain the low number of CS graduates who have joined Views? to which he answered: In CS, they concentrate on their profession, to develop... In EE, there is more openness. We [EE engineers] work with customers, educate and teach a variety of customers. In software there is an API, you define and then you must develop according to that definition, solve problems. In EE there is a need to struggle with service; sometimes an electrical engineer must stay on the customer's site for several days. In other cases, when electrical engineers design an electronic board, it requires a lot of interaction with customers from all over the world. In EE there is more guidance, teaching.

---

$^6$ Numbers for Groups C were retrieved on June 16, 2013 for the preparation of this paper. We counted only those who contacted the department head (the first author of this paper) by email. In addition, many Technion alumni asked questions by contacting the department secretary or calling the department head, but such inquiries were not recorded.

$^7$ Denning and Riehl [3] claim that “many of our software developers have been raised in a research tradition, not an engineering tradition.”
In another interview, it was suggested that EE graduates are promoted to managerial roles quicker than are CS graduates and therefore they gradually lose their flexibility and ability to adjust to new market demands as they approach the age of 30 or 40. Since, as mentioned above, electrical engineers usually gain some teaching experience during their professional development, those who enjoyed that aspect of their job, may consider joining the Views program. At the same time, CS graduates tend to stay in software development positions longer, first, enabling them to keep adjusting to new market demands; and second, preventing or at least minimizing their relative exposure to guidance and teaching situations.

To validate this observation, we examined the characterization of the CS alumni who expressed interest in Views and analyzed the profile of the 14 (out of 36) Technion CS graduates from Group C who answered our online questionnaire. Indeed, we found that their current work places were:

- **Hi-tech**: 9 (64%)
- **Traditional industry**: 2 (14%)
- **Education**: 0 (0%)
- **Public sector (not education)**: 1 (7%)
- **Other**: 2 (14%)

and their current positions were (they could chose more than one answer):

- **Research**: 0 (0%)
- **Software development**: 10 (63%)
- **Management**: 4 (25%)
- **Teaching**: 1 (6%)
- **Other**: 1 (6%)

Therefore, we speculate that since the actual work of electrical engineers requires listening, teaching, and education skills, the ability to experience processes in which these skills are expressed may help them discern whether or not they are attracted to the field of education; if they are, we believe they will tend to choose programs such as Views. At the same time, we suggest, the work of most CS graduates, though it may include such elements, does not expose them to such processes at the same level of intensity. This explanation clearly warrants further investigation.

Additional explanations for the difference in the number of EE and CS graduates in Views, that further support the above explanation, were suggested in interviews with CS alumni who expressed interest in Views but who did not ultimately enroll. As can be seen, these explanations are all related to differences between the two professions:

a. Salary level: The difference between a teacher’s salary, which is fixed regardless of the discipline taught, and salaries in CS is significantly greater than in the case of EE. The low status of the profession of teaching was also mentioned;

b. Intellectual curiosity: The field of CS provides more opportunities for new technological and intellectual development than does the field of EE. Consequently, CS graduates are less attracted to further studies in general and to programs such as Views in particular;

c. Kind of work: CS projects tend to be longer-term than do EE projects and so CS employees are more exposed to new developments and academic learning on the job than are their EE counterparts. CS employees may therefore fulfill their desire for learning in other venues than in Views;

d. Job security: CS employees are more secure in their jobs than are EE employees. This may be explained by the relative flexibility CS employees exhibit in adjusting to new market demands as mentioned above. Electrical engineers, therefore, tend to be on the lookout for an alternative profession in case it be needed.

### 5.2 The CS Views Students Motivational Factors

In Section 5.1 we explained the low number of CS alumni in the Views program and elaborated on some demotivating factors that prevent students from joining the program. Nevertheless, we were also interested in looking into the motivation of those who did enroll in the Views program.

We have elicited the following reasons for joining the program from interviews with CS alumni from Group D. These Views students said that they:

1. have always dreamt about going back to study in the academia and Views was an appropriate opportunity to realize that dream;
2. have dropped out of the race for promotion and now have the time to replenish the soul;
3. are considering a professional alternative with more conventional work hours;
4. wanted to take the opportunity since time has become available between projects;
5. are considering switching to teaching due to a desire to contribute to society and Views was deemed the best program for such a career move;
6. are engaged in instruction and thought that Views would contribute to their work.

As it turns out, these expectations are fulfilled. Among the different feelings these graduates expressed about their studies, they mentioned that they:

1. very much enjoy returning to academia, studying and connecting to current contents as well as to basic CS contents;
2. enjoy the encounter with younger students, despite conflicts that occasionally arise as to appropriate behavior in academia;
3. are challenged by the hands-on experience in the schools and in the mentorship activities despite the fact that they did not previously consider working in education. They now feel that they could contribute in either a formal or informal framework;
4. are happy and thankful for the opportunity that they have been given.

### 5.3 The Contribution of the Views Program to the Studies in the Department

Though we cannot currently predict the future contribution of Views students to the Israeli education system, we can learn about their current contribution to the study atmosphere at the department, in general, and the in courses they attend, in particular.

The increased number (from 150 in 2011 to 300 in 2013) of undergraduate students at the department is immediately reflected in the number of students in each course, which has increased significantly in that same time. Table 3 illustrates this by presenting the number of students enrolled in the two Methods of Teaching CS courses the last three times the courses were offered (every two years).

A reflective analysis of the second author of the paper, who teaches the Methods of Teaching CS courses, indicates that the mere increase in the number of students in the courses has several notable advantages:
- The more students in the class, the more meaningful and interaction-based the teaching may be;
- When group work is facilitated in the class, the size of the class enables its division into sub-groups of a reasonable size to foster a more meaningful learning process;
- The two populations – undergraduate students and Technion alumni – benefit from each other: The more mature students, i.e. the Technion alumni, bring their work experience into the class, while the undergraduate students help the older students relearn and refresh CS contents that they learned (sometimes many) years ago;
- The undergraduate students' self-esteem increases since they realize that they chose a profession that successful Technion CS graduates wish to study as a second career;
- The diversity inherent in this greater cohort of students further enhances the abovementioned phenomena.

Table 3: # of students enrolled in recent Methods of CS courses

<table>
<thead>
<tr>
<th>Course</th>
<th>2008/9</th>
<th>2010/11</th>
<th>2012/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods of Teaching CS I</td>
<td>5</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Methods of Teaching CS II</td>
<td>4</td>
<td>8</td>
<td>21</td>
</tr>
</tbody>
</table>

6. SUMMARY AND FUTURE RESEARCH

In this paper we presented our preliminary investigations of the Views program in general and its CS education track in particular. We learned that: (a) the profession of CS does not expose CS graduates to situations in which they can express teaching skills and therefore, even if they have a tendency towards education, they may not uncover it and consider education as a second career; (b) alumni students appreciate the personal contribution of Views; (c) alumni who enroll in Views have a significant impact on the department's studies.

In general, from the implementation of the program so far, and from the initial research findings presented here, we see in the program the potential of realizing the meaning of its name, Views. The program takes a positive view of the world of teaching, attracts high-quality teaching personnel who hold the future of education close to their heart, and it is evident that the participants in the program have a positive impact on the teacher preparation process.

Our hope is that Views will impact CS education on the high-school level as well. Since the accumulated knowledge gained in Israel on CS education in general and on CS teacher preparation in particular is already appreciated worldwide and since Israel is a relatively small country, it may, therefore, serve as a pilot case study for larger countries with respect to CS teaching as a second career.

In the future, we plan to:
- follow up on the integration of Views graduates into the education system;
- ask high school CS teachers for their perspective on the issues discussed in the paper;
- collect additional data using closed questionnaires when the number of students increases so as to obtain statistical results;
- expand the research to the perspective of the department's regular undergraduate CS students who studied both with and without Views students;
- broaden our research to include all students and all eight tracks offered by the Views program.

7. REFERENCES
