This paper is about care-based teaching aided by technology. This is a case-study of the implementation of ELM, a software tool serving as a communication channel between teachers and each one of their students, on which the students report weekly on their learning situation and state of mind. The teachers can respond to emerging needs before they escalate into bigger problems and can modify their own teaching strategies based on the class’ averages. The paper highlights the features of the tool, demonstrates its pedagogic features and reports findings from a classroom of 32 student teachers. The reported results show individual intervention procedures used by the teachers and teaching strategies changes applied on the whole classroom, based on the weekly reports. Based on students’ comments reported and the reflective reports of the teachers (researchers), it is evident that the use of ELM supports the care-based teaching approach of the teachers, allowing them to keep a ‘finger on the pulse’ of every student, attend to their immediate needs and improve the classroom atmosphere by adapting the learning environment to the whole class’ needs.

**KEYWORDS:** educational innovation - ELM, teachers’ education, caring teaching, co-teaching
Introduction

New winds are beginning to blow in schools’ endless corridors. Some change is felt. Generation gap has never been more apparent, much of it is attributed to the digital divide.

The idea that children are spending so much time on the internet, often simultaneously using a number of media channels, communicating with real and virtual friends, adopting new forms of language, values and culture, new skills and new lifestyle is scary (Livingstone, Haddon & Gorzig, 2012; Lemish, Ribak & Aloni, 2009). It seems that school has been losing its relevance to children’s lives (Fullan, 2012). Educational beliefs are revisited (Wadmany, 2012). Abused and beaten terms like ‘Experiential Learning’; ‘Constructivism’; ‘Inquiry’; ‘Communication’, are reexamined in light of new technologies that can empower them more than ever before. Philosophical beliefs are reinterpreted and used to reevaluate common educational practices, while administrative system are pulling harder into learning standards and production models.

The divide between ‘people’ oriented philosophical vision and ‘content’ oriented perspectives seems to growing every day. Teachers education is getting more challenging, more demanding, while classroom reality remains the same (Wadmany, 2012). Through all this clouds of chaos, a young student-teacher is emerging, asking the question teachers have been asking since the beginning of public schools: what am I going to do tomorrow morning in my classroom?

The main issue addressed in this paper is teachers’ inability to ‘keep a finger on the pulse of each student’. Although many teachers would claim that they can, that they can identify every need of every child in their classroom, facts show differently.

A report for the Bill & Melinda Gates Foundation named ‘The Silent Epidemic’ (Bridgeland et al, 2006), states that “Each year, almost one third of all public high school students – and nearly one half of all blacks, Hispanics and Native Americans – fail to graduate from public high school with their class.”

The ‘Silent Epidemic’ report interviewed 467 high school dropouts in focus groups from 25 states (US). The results are summarized into the following two tables which were collected from the report:

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes were not interesting</td>
<td>47</td>
</tr>
<tr>
<td>Not motivated or inspired to work hard</td>
<td>69</td>
</tr>
<tr>
<td>Personal reasons</td>
<td>32</td>
</tr>
<tr>
<td>Failing in school</td>
<td>35</td>
</tr>
<tr>
<td>Started high school poorly prepared by their earlier schooling</td>
<td>45</td>
</tr>
<tr>
<td>Significant doubts that they could have met their high school’s requirements for graduation even if they had put in the necessary effort.</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 1. Students’ report the reasons for dropping out (Based upon Bridgeland et al, 2006)
What could be done?

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve teaching and curricula to make school more relevant and engaging and enhance the connection between school and work</td>
</tr>
<tr>
<td>Improve instruction, and access to supports, for struggling students</td>
</tr>
<tr>
<td>Build a school climate that fosters academics</td>
</tr>
<tr>
<td>Ensure that students have a strong relationship with at least one adult in the school</td>
</tr>
<tr>
<td>Improve the communication between parents and schools</td>
</tr>
</tbody>
</table>

**Table 2.** Dropout suggestions for improving chances of students to graduate (Based upon Bridgeland et al, 2006)

Genrealizing the reasons stated in table 1. We can safely assume that teachers’ cannot identify the early signs of students’ down hill journey leading to the inevitable outcome: dropping out.

These writers strongly believe that the method and technology present in this paper named ELM, can challenge each of the above reasons, provide means to implement the actions suggested in table 2. and improve significantly teachers’ ability to attend to the individual and shared needs of their students.

This paper is about one bridge between classroom reality and educational vision as portrait in the following: ‘I am a humanist, I want to be the best teacher I can, I want to reach every child, I want to help him/her grow I want to be a caring teacher for my students! – how do I do that with forty kids in my classroom?’

Research shows that intrinsically motivated teachers, energized by inner needs and internal wishes will prefer to identify the motivating sources of their students. They prefer as well to involve their students in developing curriculum materials and learning initiatives when compared with teachers that are extrinsically motivated, focused on external needs, rewards and punishments.

Teachers that follow the affective teaching approach tend to reject learning systems in which the objectives where all previously defined, while students are expected to perform the other’s objectives. Affective teachers are more flexible in choosing content and teaching methods, listen more to their students and care more for the needs and interests of each of their students (Noddings, 2005; Smith, 2004).

Noddings (1992) claims that all teachers training programs have to focus on the developing of caring centered beliefs and pedagogic activities. She suggests that we need to train caring teachers and adds that teachers trainers need to be primarily concerned with their students’ needs and reject traditional, outdated programs (Huber, 2010).

The research literature indicates that attentive, caring teachers contributes both to the content acquisition and to the development of their self-image (Isenbarger & Zembylas, 2006). Research show also that caring teachers play role models for students and influence their caring behavior in their classes (Lake, Jones & Dagli, 2004; Noddings, 1992, 2005).
Faculties of education consistently make claims about the importance of sustained interaction and meaningful collaboration in the building of teachers’ professional development (Wadmany & Levin, 2009). However, research suggests without an intentional structure in place, the benefits of these claims are typically not realized (Darling-Hammond & Bransford, 2005). Further, claims have been made about the role information communication technology (ICT) can play to enable reflective practice, interaction and collaboration (Crichton & Kopp, 2009). Solomon and Schrum (2007) suggest that ICT can play a role in creating and sustaining professional learning communities, creating an environment of trust through productive dialogue and constructive feedback and support (Bonk, Wisher, & Lee, 2004).

The research presented in this paper explores one such learning environment – ELM.

Facing this challenge, Yaniv (2008) had developed a new communication channel between teachers and every one of their students called ‘ELM’ – Eye Light Monitor. ELM is a web-based mentoring software tool.

In order to understand ELM’s potential in supporting students and teachers, the authors had conducted the study of ELM in an M.Ed. program in Educational Technology reported in this paper.

ELM can provide teachers with a continuous flow of information about each student, become a means of student’s and teacher’s self-awareness, create a human link between the student and teacher, and provide a teacher with an indication of developing trends within a class. ELM provides the teacher with a dynamic picture of individual student’s state-of-mind levels, focusing on issues like stress, misunderstanding, confusion and lack of engagement.

Further, this paper illustrates the importance of rigorous collaboration and social interaction among educators, and researchers in the development, implementation and modification of innovation for teaching and learning. While many educators are still wrestling with ways of integrating ICT into their teaching contexts, some actually take the bold step of designing software solutions to address perennial problems.

1. Methodology

This is a single case study methodology, focusing on the dynamics between the mentor and the students. The dynamics between the teachers and the students were expected to be triggered by the use of a web-based software tool named ELM (Eye-Light Monitor).

It is anticipated that the findings of this case-study will inform on a specific role of technology as a communication channel between one and many. Probing into the dynamics elicited by this communication channel, it is anticipated that this research will provide understanding of the role of ELM in empowering teachers with a real-time monitor of each of their students’ well-being in large classrooms,
while providing a summarized image of their own teaching practice.

This case study embodies the essential characteristics of a qualitative research project as summarized by Merriam (1999, p. 11):

1. The goal of eliciting understanding and establishing the meaning of the case.
2. The researchers as primary of data collection.
3. The inductive orientation of data analysis.

1. The fundamental basis of this case study was to understand the impact of real-time, self-reported, student data on two major layers of student-teacher interactions: The individual student layer and the whole classroom layer. At the individual student layer, this study is aimed to examine the teacher’s ability to:

   a) Identify trends leading to potential learning problems a student might be developing.
   b) Identify shifts in student’s attitude.
   c) Identify developing stress situations in individual students.

At the whole classroom layer, this study relies on another important function of ELM: to provide the teacher with a summarized, averaged data of all students. At this layer this study examines the teacher’s ability to:

   a) Reflect on his/her own impact on classroom performance.
   b) Identify real-time impact of pedagogical strategies and classroom tactics.
   c) Reflect on his/her own self-image as an effective teacher.

2. Merriam considers the researcher as the primary instrument of data collection and promotes the use of fieldwork. This study was conducted by the researchers while co-delivering a graduate course in a teachers college. ELM has been used by the researchers and their students throughout the semester. The impact of this usage is examined here.

3. Inductive orientation to data analysis is an inherent process of using ELM. Each week the data were examined at both the individual student layer and the whole classroom layer and pedagogical and personal intervention decisions are made based on its interpretation. It is the impact of these interpretations that are studied in this study.

1.1 Research Questions

Will the use of ELM help the teachers?

1. Identify trends leading to potential learning problems a student might be developing that will illicit teacher’s intervention?
2. Identify shifts in student’s attitude that will elicit teacher’s intervention.
3. Identify developing stress situations in individual students that will elicit teacher’s intervention.
4. Reflect on his/her own impact on classroom performance, reflection that will result in taking action.
5. Identify real-time impact of pedagogical strategies and classroom tactics.
6. Reflect on his/her own self-image as an effective teacher.

1.2 Procedure

ELM has been introduced in a graduate level course named ‘Learning a Change in Education’, at a large teachers college in Israel in 2011. Thirty two students, all teachers with at least 3 years of teaching experience and 2 instructors participated in this study. The students were asked to use the ELM tool every week. They were instructed to relate to five criteria, record any change they sense and annotate it.

The instructor, while receiving the students’ graphs, quickly scanned the profile to identify needs for intervention, consulted with his co-teacher and responded accordingly.

There is no attempt to generalize the findings of this experience. This study adds to a battery of studies conducted on ELM and serve to better understand the ELM method.

1.3 Rational for the selection of this case

Because of this unique co-teaching situation, the instructor’s (the developer of ELM) perspective as a researcher/teacher can be balanced by the co-teacher presence and experience. This study might shed more light on the use of ELM than previous ‘single teacher’ studies (Yaniv, 2008; Crichton and Yaniv, 2011).

2. ELM – The Tool

2.1 Description

ELM is a web-based tool, developed by Hanan Yaniv for rapid and efficient communication between teachers and students, mentors and mentees. Through a set of “sliders”, each representing a criterion for the users’ ‘state of mind’, the teacher/mentor can monitor individual and group dynamics and attend to potential problems as they begin to emerge. ELM offers the means of presetting the criteria for each group of students (class). The criteria used in this study were:

Each week, the students were asked to login into their ELM account and feel out the weekly report. They were asked to move each criterion’s slider to the level they feel represents their status and annotate the reason with a short statement explaining that level. The annotations are needed if they feel there has been a change since last week’s report.
ELM offers a graph that shows all previous levels:

![Graph showing previous levels](image)

**Figure 1.** ELM – Student’s weekly report

*Involvement:* How involved have you been through the session

*Interest:* What was the level of interest you’ve felt during the last class?

*Learning:* How much do you feel you’ve learnt in the last class?

*Anxiety:* What was your frustration level during the last class?

*Relevancy:* How much of the last class you feel is relevant to your own needs?

The instructor can communicate short messages to the student entering text under each of the bars, usually in response to student’s annotations.

Besides the individual student’s report, the instructor can get the whole class averages presented on a bar graph (Image 3).
2.2 Data Collection

The tools that were selected triangulate information from various resources to increase the validity and reliability of the results:

1. ELM individual students data
2. ELM whole group averages
3. The instructor’s interventions reports
4. The instructor and the co-teacher discussions of the data and intervention strategies
5. The instructor’s reflections as co-instructor
6. The co-teacher’s reflections as co-instructor
7. The co-teacher’s semi-structured interviews of 9 individual students.

3. Results

3.1 At the individual student layer

The following table (1) shows the instructor’s interventions in 3 levels:

1. Respond to a student’s annotation to a specific criteria
2. Initiate a response based on student’s data (no student’s annotation)
3. Invite the student to a face to face meeting
Examples of the instructor’s Interventions:

1. Respond to a student’s annotation to a specific criteria

   Trigger: Hi ‘Anxiety’ level (4 out of 5), comment: ‘It so different in the field’.  
   Response: ‘What’s different?’  
   Student response: ‘technology is so scarce in kindergarten’  
   Intervention: encouraged the student to raise up the issue in class.

2. Initiate a response based on student’s data (no student’s annotation)

   Trigger: Very low ‘Involvement’ level (2 out of 5).  
   Response: ‘What’s going on?’  
   Student response ‘My involvement has been internal – I didn’t speak’

3. Invite the student to a face to face meeting

   Trigger: Student reports are below class’s averages 3 weeks in a row. No annotations.  
   Intervention: Because there are no annotations accompanying such low settings, meeting with the student with an attempt to understand his attitude.

3.2 At the whole class level

ELM provides a weekly average bar diagram of all criteria (Image 3). That option provides the instructor with a probe into class atmosphere, alerting about potential problems that might be developing.

Here is an example of the weekly averages that required intervention (Image 4):

<table>
<thead>
<tr>
<th>Respond</th>
<th>Initiate</th>
<th>Invite</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 1. Frequencies of the instructor’s Interventions
From previous experience, these averages are way below normal functioning of the class. It was clear to the instructors that a change in strategy is required. A meeting between the instructor and the co-teacher, had resulted in changing the time the students are assigned for their team presentations (they were presenting an article every week in teams of four students per team).

The following week’s graph (image 5) is showing a much better image:

During the 14 weeks of the last semester (Feb. – June 2011), there were 3 instances of instructional strategy changes that were triggered by the weekly averages graphs:
Table 2. Instructional strategy changes evoked by ELM’s whole class weekly averages

<table>
<thead>
<tr>
<th>Week</th>
<th>Strategy Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Limit students’ presentations time to leave more time for class’ discussions</td>
</tr>
<tr>
<td>7</td>
<td>Redefine class assignments and marking criteria</td>
</tr>
<tr>
<td>10</td>
<td>Redefine ‘Learning’ and encourage students’ own reflection at ‘what have I learnt so far’</td>
</tr>
</tbody>
</table>

4. Students semi-structured interviews aimed to explore their experience of using ELM

The students' reports were very favorable. Content analysis of the interviews shows that their responses were suggesting 6 categories:

- Personal communication between the student and the teacher
- Feedback to the teacher on his recent lesson
- Immediate identification of emerging problems
- Identification of comprehension problems and other learning difficulties
- Projection of student’s feelings and state-of-mind
- An opportunity for special needs students and other learning disabilities to express themselves.

Here are some examples of students’ comments:

- (The software presents) “immediate, accurate, direct personal feedback”
- (The software presents) “Learning satisfaction, ‘red lights’ (alarms), teachers can adapt their activities to better suit students’ difficulties.”
- The teacher can understand the lessons’ problems. It’s a non-threatening reflection, easy to report (no writing needed).

4.1 Through the Instructor’s Eyes

Understanding ELM student data requires an instructor to ethically and thoughtfully probe into her/his personal philosophy of education, the ongoing atmosphere of a specific course, the way ELM is introduced and integrated into the course design, and the link between ELM and assessment and grading criteria and the impact both have on the chemistry between students and their teacher. In this case of co-teaching, we needed to be aware of our personal differences in the way we interpret our role as teachers and students’ role as learners. Because of many years of working together and sharing a similar vision of education, we have the fundamental trust and respect needed to coordinate such a delicate teaching environment, in which we are both facing real-time feedback from our students. It is this harmony between us that made it possible to reflect together and modify our strategies, resulting with amazing changes in students’ self-reported revelations about themselves and their role as teachers.

In the years I’ve been using ELM, I have found that the biggest challenge I face is
detaching assessment anxiety from ELM data entries. In the competition charged environment of post secondary education, if the students feel that ELM might influence their grade – there is no hope for honest reporting. Further, the instructional strategy the instructor adopts influences ELM student data. Loyalty to Rogers’ statements mentioned is critical. Specifically:

- “I have come to feel that the only learning which significantly influence behavior is self-discovered, self-appropriated learning.
- Such self-discovered learning, truth that has been personally appropriated and assimilated in experience, cannot be directly communicated to another” (1952, p. 227).

I always tell my students during my introduction of ELM that I will provide feedback only on issues I feel require feedback. I tell them that I will contact them personally if I feel intervention is needed. The need for feedback on everything they do is very consistent in all groups of students I have met. I feel this dependency on feedback is a result of so many years of behavioral conditioning in conventional schooling. My feedback policy is an attempt to wean my students from some of their need for feedback and external validation while shifting some of the responsibility over their own learning back to them. In some classes, when I manage to establish trustful relationship with my students, the message is well received. In some of my classes there are always some students who resist my personal philosophy and it shows significantly in the ELM data - both at the personal level (their data entries; for example they might tend to score items consistently higher as they might not trust my motives, or lower to show me how infective my teaching methods are) or a professional level (for example in the college student evaluation of their instructors at the end of a semester).

4.2 Through the Co-Teacher’s Eyes

In many respects, social interaction and sharing should be an intuitive part of professional teaching development; in reality many educators find teaching to be a solitary profession in which one’s work is done behind a closed classroom door with little time for conversation with colleagues. In this case of co-teaching, the developer and me have had the opportunity and the possibility to reflect together, to plan together and modify our instructional strategies, resulting from ELM students’ data, their reactions and self-reported revelations about themselves.

The use of ELM requires a solid vision of educational philosophy. Both of us, we share the same educational vision and the same sense of mission. The use of ELM without this kind of harmony might result a tension between the instructors.

ELM also provides a general picture of the class’s atmosphere, recognizing that student’s reports of boredom, lack of engagement, frustration are actual reflection of my own effectiveness. Using the insights provided by ELM, we can then detect situations in which new energies or a shift of teaching strategies are needed to re-engage the class, or an individual student, before the class, as a whole, or students, individually and to encourage them.
5. Discussion and Future Development and Research

This paper presents a multi-perspective journey into the challenges of implementing a pedagogical innovation. The developer of ELM, has been using ELM throughout his academic career in the past seven years and can coordinate this paper’s findings with his previous work as a teacher and a researcher. The co-instructor and researcher, has been introduced to ELM for the first time and her reflection represents her role as a new user.

There are three major conclusions that can be drawn from this semester’s experience:

1. The need for a synchronized, harmonized educational vision between the two co-instructors.

The use of ELM requires a solid vision of educational philosophy. The tool doesn’t make much sense if the educational environment is not guided by a strong belief of Humanistic philosophy of any color. Both researchers share the same educational vision, the same sense of mission and the same passion. Any attempt to use ELM without this kind of harmony might result in increased tension between the instructors.

2. The crucial importance of a real time monitor at the individual student level and at the whole classroom level.

ELM can ‘save’ a student and can ‘save’ a course. Developing trends of low values with no annotations can point at attitude changes that can result in students’ drifting into a ‘transparency’. ELM provides a real-time probe into developing problems and trigger a timely intervention that can stop the decay.

3. The crucial impact of and real time monitoring of data-based intervention.

The impact of any form of intervention should be studied in real time. The direction of that impact (if any) should be monitored, as unexpected drafts of unexpected events can lead is astray. ELM’s real time monitoring of trends can show the impact of any intervention as soon as it can be noticeable and help the instructor steer it in the desired direction.

The issue of trustful atmosphere is critical as it affects the reliability of ELM. It appears that the less trustful the students were, the less they wanted to use ELM to share their difficulties, and therefore, the less feedback they will get, and the more frustrated they become.

The next phase in ELM development will focus on its reliability and validity with a large sample size. As well, research attention will be given to (1) development of training / support documents, and (2) the expectation of feedback / response in an online environment, probing the degree to which the use of social software (chat, email, Facebook, etc.) encourages immediate response and continuous interactions.
References


