Promoting a Culture of Learning based on Internal Values in Large Undergraduate Courses: The added Value of Technology

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Abstract

In recent years there is a growing concern regarding the quality of learning in undergraduate level education. In this study we synthesize various views about the notion of "learning culture" into one generic framework in which we describe a continuum ranging from learning driven by external values (e.g., passing a test) to internal values (e.g., the urge to learn). We use this framework to explore the effect of an intervention in three levels, which utilizes technology to gradually employ higher levels of internal values of teaching in a large-scale undergraduate Biology course. A web-based tutorial was used to enable students to study basic contents on their own, and private Wiki spaces were used to enables teams to collaboratively construct knowledge. Seventeen hundred utterances from 76 student interviews were analyzed phenomenographically. Findings indicate that: (a) the common assumption that undergraduate students typically hold external values of learning was refuted; (b) it is possible, using technology, to affect students' learning culture towards a more internal value based culture. The framework proved as productive in exploring relationships between learning and teaching not only in the class, but also in a wider context—the culture of the institution, faculty, and individual student.

Rationale

In recent years a growing concern is expressed in the media regarding the quality of learning and teaching in formal education at schools and universities (Brown, Collins, & Duguid, 1989; Scardamalia & Bereiter, 2006). Arum and Roska (2011), following their recent large scale longitudinal study, indicate that most students who enroll to college are typically interested in socializing, and less so in learning. They describe a culture of learning in which students expect undemanding fun activities, but also high grades and credential.

This issue, which we refer to as "learning culture" is echoed in a wide range of research fields such as educational psychology, curriculum design, assessment, and even business and administration studies. Each of these research fields provides a unique view of what the general notion of "learning culture" entails. In this paper we suggest to synthesize these views into one generic framework which we call the "Cultures of Learning and Teaching Continuum (CLTC). We claim that the merging of various points of view in this framework has the potential to provide deeper and more multi-faceted explanations for learning and teaching processes, and for the relationships between "teaching culture" and "learning culture" in various contexts.

The current research describes a first attempt to use the CLTC framework to explain the effect of a technology-enhanced intervention that we have designed and implemented in a large-scale undergraduate level Biology course in order to promote a more productive culture of learning.

The Cultures of Learning and Teaching Continuum

There are several definitions to the term "culture", among which are Kluckholn's (1954) definition -"The collection of beliefs, values, behaviors, customs, and attitudes that distinguish the people of one society from those of another", and Hofstede's (1991) definition -"The collective programming of the mind that distinguishes the members of one human group from those of another". Based on these definitions we define the terms "learning culture" and "teaching culture" as *the beliefs, values and behaviors a person or a group of people have with regards to their own "learning" or "teaching" in specific contexts*. We describe learning culture using a continuum ranging from learning which is driven by *external* motives and values (e.g. passing a test) to learning that is driven by internal values (e.g. the urge to learn). Similarly, we describe teaching culture as one that encourages learning with a parallel range of values.

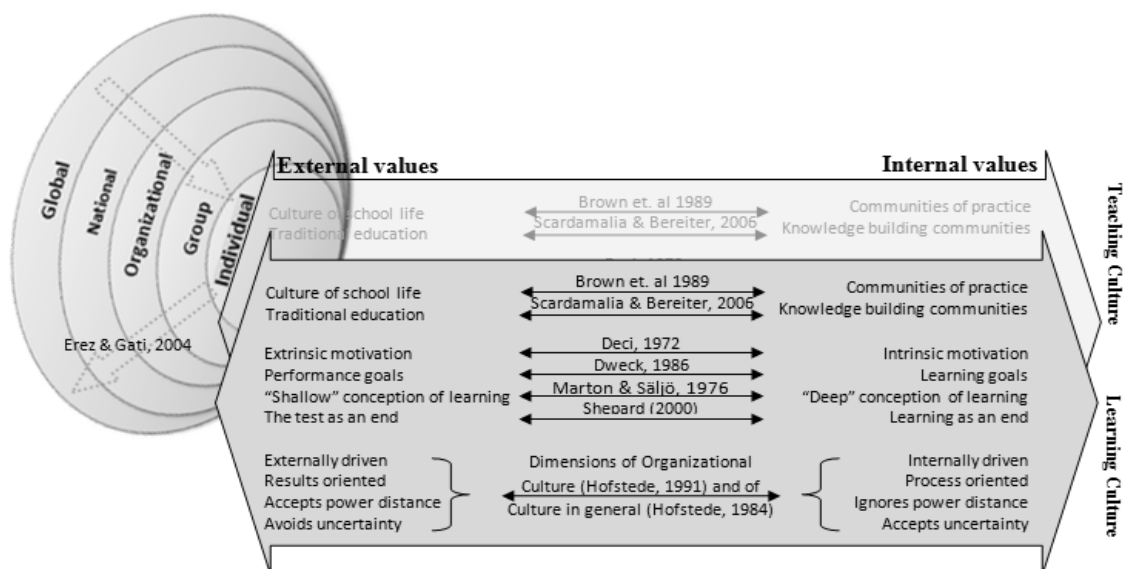The CLTC framework synthesizes ideas from several research fields, as summarized in Fig. 1:

**Figure 1: The Cultures of Learning and Teaching Continuum (CLTC):
From external (left) to internal (right) values**

Context: The Design of the Intervention

The relationship between learning and teaching cultures was studied in this research in the context of an introductory semester long Biology course with about 350 biology undergraduate students each semester. Prior to our intervention, this course was taught via traditional lectures. We deliberately chose this context to examine whether internal values of learning can be reached even in such an extreme condition which typically fosters external values. We developed three levels of an intervention model, each designed to promote more internal values of learning (and thus, representing a teaching culture with more internal values). The intervention took place in three consecutive years between the years 2008 to 2010.

All three levels of intervention were based on the use of an online tutorial that we developed (see figure 2) which included videos of all course lectures, interactive visualizations and self-feedback questions.
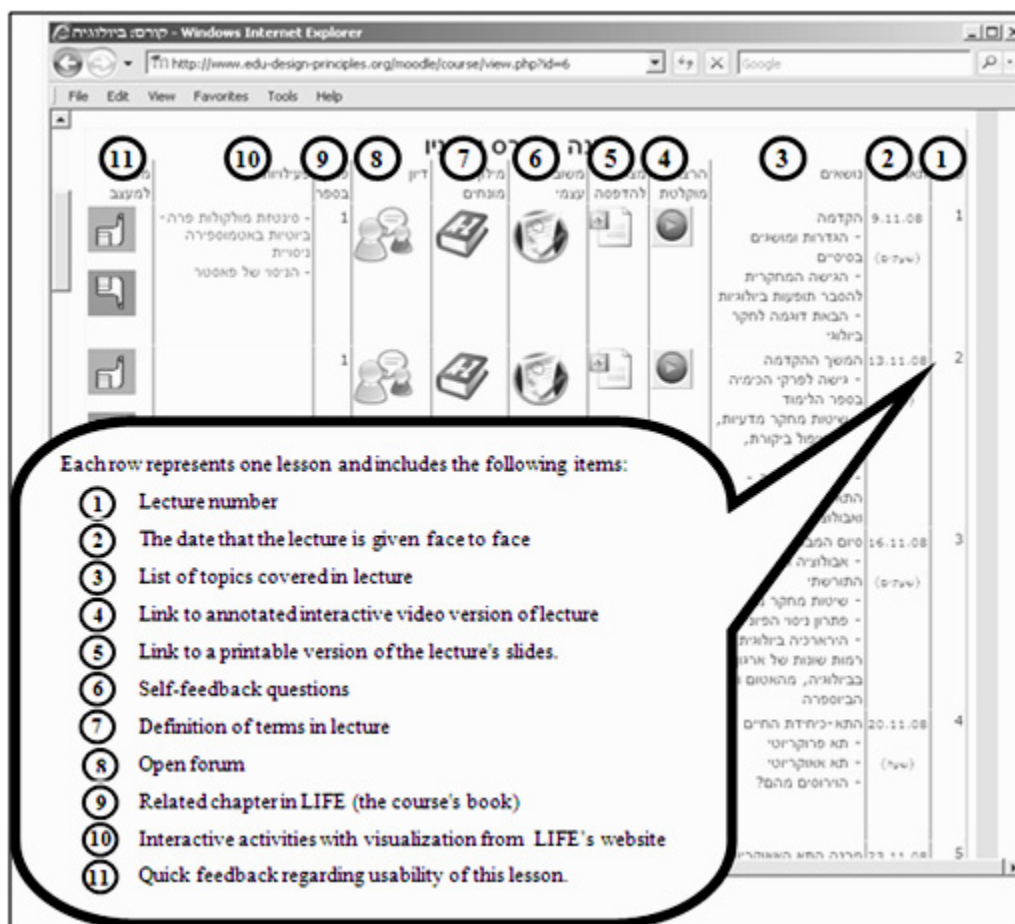

Figure 2: The online tutorial

In the 1st level of intervention (2008) the use of the online tutorial was optional, and complemented the regular lectures. In the 2nd level (2009) lessons still took place as lectures, but students were required to learn some of the informational contents via the online tutorial, so the instructor could delve deeper into abstract principles that cut across topics (e.g. the relation between structure and function). Since students were in charge of learning some of the content on their own, we view this as representing a more internal based culture of teaching; a culture that seeks to support students in gaining more ownership, or a "deep" conception of their own learning.

In the 3rd level (2010) students were required to learn most of the contents on their own using the online tutorial. In addition, each student was part of a small knowledge building team; from the beginning of the course the students were divided into groups of about 30 by choosing a specific topic (e.g. cell organelles) to focus on. Each group was further divided to smaller teams that chose to focus on a specific aspect within a given topic (e.g. one organelle). Each team (about 5 students) worked for about four weeks to study the contents and prepare a presentation about their aspect of the topic. To do so, each team was provided with a private, editable space on the course' website, using the sharing capabilities of Google Apps (see figure 3), in which extra materials, guided inquiry questions and step-by-step instructions were provided to them.

The teams could use their working area in different ways. They could either use it just as a set of instructions, or as *the* place for sharing information, and building together their knowledge.
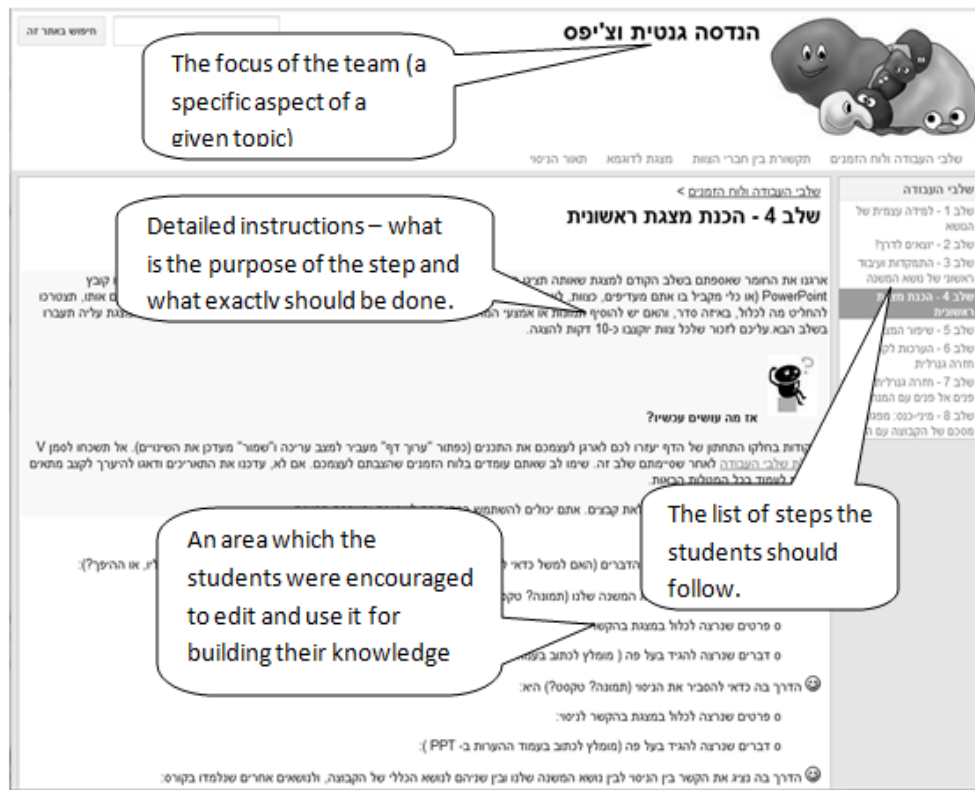

Figure 3: The working area of one of the teams

After four weeks the teams met together, and presented their work to the rest of the group in a special "mini-conference" meeting facilitated by the instructor. These meetings, each time with a different group, replaced the regular lectures, so that each student learned most of the topics from the online tutorial, and one topic via the collaborative learning and mini-conference format. We view this level as representing the highest level of an internal-value culture of teaching in the intervention.

The design of the intervention was conducted by a collaborative multi-expertise design team. According to Erez and Gati's dynamic multi-level model of culture (2004), the individual cultures of each of these researchers is influenced by the various cultures of communities they are part of, such as their research community, the academic department they belong to, and the institution they are part of (see circles in figure 1). The design of the intervention resulted from intense negotiation between team participants, and thus, the design decisions eventually made, represent a process of balancing between ideas and values of the various cultures (Kali, Markauskaite, Goodyear & Ward, 2011). The main purpose of the design was targeted towards the third level of the intervention. The other two levels were designed to enable the institution to gradually adapt to the innovation. Thus, the design decisions made for the development of the intervention are a result of taking into account the culture of the institution.

Research Purpose

This research extends findings from our previous work in this project and frames them within a more generalized context of the CLTC framework. Previous findings indicated that: (a)Student's

final exam scores (multiple choice questions) remained similar following the different levels of intervention (Sagy et al., 2010). (b)The online tutorial was extensively used in all levels of the intervention, no significant differences were found between the levels (Sagy, et al., 2010). (c)Students' performance on higher order cognitive tasks (as expressed in the open-ended question that was added to the test) was significantly higher in the 3rd level of intervention (Tsaushu   et al., 2011). The purpose of the current study was to examine the effect of the gradual change in the course design from another aspect – its influence on the students' learning culture. In other words, our aim was ***to explore how the teaching culture affected the learning culture***.

Methods

Towards the end of each intervention we interviewed 15-40 random students who studied in the course. A total of 76 students were thus interviewed. The interviews, which lasted about 40 minutes each, were semi-structured and focused on students' views about the course and the way they experienced it. Each interview was audio-taped, transcribed verbatim and analyzed. Our focus in the analysis was not on how students described their actions for learning, but rather, on what they thought about these actions –the values through which they viewed their learning. Marton (1981) describes such a perspective as a second order perspective, which he suggests to analyze phenomenographically.

On the whole, 1703 utterances were analyzed, with an average of 12 references that indicated values per interview. About 80% percent of the coded utterances referred to course features and another 20% were general ones. These latter utterances enabled us to differentiate between students with a general internal or external learning culture. Finally, the findings from the phenomenographic analysis were quantified based on Chi's (1997) notion of quantification of qualitative data, in order to examine the effect of the gradual design of the course on student's learning culture.

Table 1 presents the learning culture rubric that was developed and used in this process. Since the process was grounded, the categories are emergent and not realted one-to-one with the theoretical frameworks presented above. The categories do have, though, a good relations with these frameworks as specified by notes [1]-[5] at the bottom of table 1.

Findings
Students' general learning culture rubric
The distribution of students' general learning culture showed no significant difference between the three years of the intervention. This enabled us to combine the data collected through the three years of the intervention. Figure 4 shows the distribution of this categorization. It can be seen that although many students were characterized as having an external based culture of learning, still, a substantial portion of the students were characterized as having an internal or mixed learning culture.

Table 1: Learning culture rubric

Aspect	Learning culture based on internal values	Learning culture based on external values
Goal orientation[1]	• Seeking deep understanding, profundity, interest, expanding intellectual horizons, or personal growth. • Viewing the formative role of evaluation. • Showing internal motivation and expressing satisfaction or a feeling of achievement when referring to studying	• Seeking sufficient grade, fulfilling academic requirements • Viewing only the summative role of assessment • Showing external motivation by either comparing one's work to that of others or to an external standard (e.g. exam grade)
Willingness to invest an effort [2]	• Investing extra efforts in order to maximize the opportunities to learn	• Putting minimal efforts, looks for shortcuts
Attitude toward authority [3]	• Seeking help wherever possible, not only from "authoritative" sources. • Accepting new knowledge critically even when it comes from an "authoritative" source.	• Seeking authority, attempting to please the instructor, the institution's regulation, etc • Accepting knowledge coming from an "authoritative" source without contestation
Attitude toward uncertainty [3]	• Tendency to accept uncertainty and viewing it as an opportunity for self-growth.	• Intimidation by uncertainty, attempting to avoid it and viewing it as an obstacle to the learning process.
Ownership of the learning process [4]	• Accepting and even seeking ownership of one's learning process	• Attempting to avoid ownership, and insisting on the instructor's ownership
Conception of learning [5]	• Deep learning: reference to the deep meanings of the subject matters, making connections, and building on previous knowledge.	• Shallow learning: reference to the "face value" of the content, memorization.

[1] Based on the following theoretical frames: Goal orientation (Dweck, 1986), motivation (Deci, 1972), the role of assessment (Shepard, 2000) and Hofstede's (1991) "internally vs. externally driven" organizational cultural dimension.
[2] Based on Hofstede's (1991) "Process vs. Results orientation" organizational cultural dimension.
[3] Based on Hofstede's (1984) "Power distance" and "Uncertainty avoidance" cultural dimensions.
[4] Based on conceptions of learning (Prosser, Trigwell and Taylor, 1994)
[5] Based on Säljö's (1979) five levels of conceptions of learning: 1) a quantitative increase in knowledge, 2) memorizing, 3) Acquiring facts, skills and methods, 4) Making sense or abstracting meaning, 5) Understanding reality in a different way, that were divided to shallow conceptions of learning (levels 1-3) and deep conceptions of learning (levels 4-5).
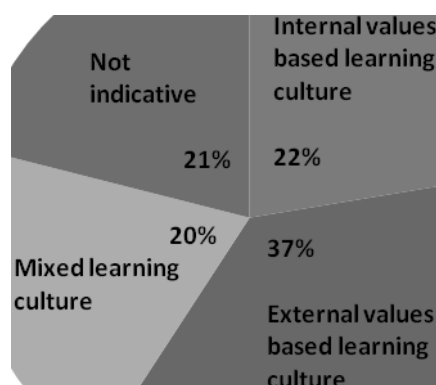

Figure 4: Distribution of students from the three level of intervention (n=76) into learning cultures

Students' values as reflected by reference to course features
Figure 5 shows the type of values used by students when referring to features in the intervention. The figure shows that in the 1st level of intervention only 36% of the references to course features were through internal values while 64% implied external values (e.g. "*The midterm exam forced us to learn*"). In the 2nd level, in which there was a noticeable change in the course design about 43% of references were related to internal values. The major difference was in the 3rd level of intervention – about 80% of the references to different course features were through internal values (e.g,: "*when I answer the test, I hope that I don't just rote and*

recite things, I want to get to a deep level of understanding", or – when referring to the team learning: "*it is important because you may think of something but then another student would say 'no, listen, it is not like that', he can point out 'there is this problem in your theory' and this way we could eliminate all the irrelevant theories"*).
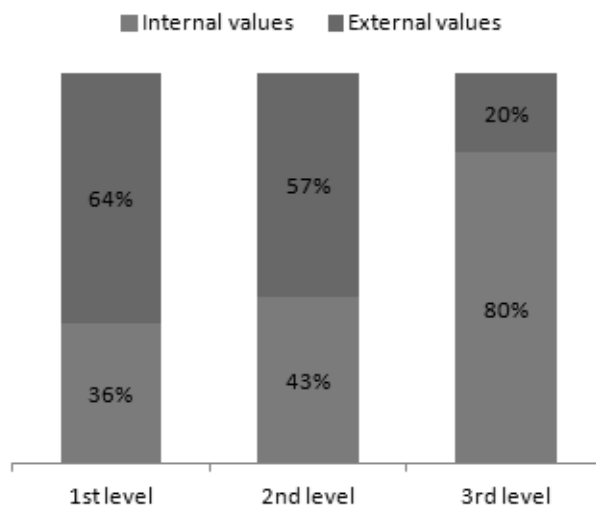

Figure 5: Types of values used when referring to features in the intervention

Discussion and Implications

The findings of the current research are encouraging. First, the assumption that the typical undergraduate student represents a learning culture based on external values (as implied by Arum and Roska 2010) was found not to be true in this study. A substantial portion of the students were found to represent an internal or a mixed culture of learning.

The second encouraging finding is the effect we found, of the teaching culture (as represented in the design of the intervention) on students' learning culture, as shown in figure 5. The higher levels of internal values found in students' utterances in interventions designed with higher levels of internal values of teaching, have an important implication. These finding mean that technology, when appropriately designed, can affect students' learning culture by employing a culture of teaching that is based on internal values. Specifically, we believe that two main aspects of our use of the technology were crucial in supporting the cultural change; First, the online tutorial platform, enabled students to study most of the basic contents on their own, and freed the instructors to work more closely with students in the mini-conference sessions. Second, the use of the Wiki spaces, with the structured instructions enabled small teams to collaboratively build their knowledge before sharing, and negotiating it with the larger group.

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