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*Corresponding author: Hava Greensfeld, Department of Education, Michlalah Jerusalem College, Bayit Vegan, P.O.B 16078, 29 Haari St, Jerusalem 92192, Israel
E-mail: greensfeld@gmail.com

Reviewing editor:
Sandro Serpa, University of the Azores, Portugal

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SOCIOLOGY | RESEARCH ARTICLE

To use or not to use, that is the question: On students' encounters with a library of examples

Hava Greensfeld^{1,2*} and Efrat Nevo¹

Abstract: Understanding learning processes in an example-based environment is of interest to scholars from various disciplines. This qualitative study presents the missing perspective: the emotional and motivational aspects that accompany learning in an example-based environment. The participants of our study were 70 students in four classes (2010–2013) of “The Learning Processes,” an academic course at a teacher-education college. Research tools were: An open questionnaire to expose the students' preconceptions regarding the use of a library of examples in learning processes, three reflective journals, observations, and a designated library of examples. In this study we adopted a unique pedagogical strategy, both in constructing the library of examples and in determining when the examples would be studied. Content analysis revealed two contrasting approaches: the “objecting” versus the “agreeing”; these led to identification of six academic emotional types (three “objecting” types and three “agreeing” types) of users of the example-based environment. The processes that caused each student to behave in a particular way were found to be complex, with external-behavioral expressions (actual use of examples), and internal expressions. These were related to each type's focused achievement goal, academic self-concept, and to social-academic emotions aroused in this

ABOUT THE AUTHORS

Hava Greensfeld is a Senior lecturer and researcher of science education, teaching thinking and curriculum planning at Michlalah Jerusalem College, where I serve as head of the research department; editorial board member of the academic journal *Dapim* (one of the central educational journal in Israel). This paper on learning through examples is linked to my research interest in meaningful teaching and learning.

Efrat Nevo is a Lecturer and researcher of teaching thinking at Michlalah Jerusalem College; teaches pedagogy and serves as mentor for research projects. This study of the role of examples in the learning process is connected to the core fields of my research concerning teaching and learning.

PUBLIC INTEREST STATEMENT

“Who needs examples?”

We began this study with the belief that students would welcome the opportunity to use examples in doing their assignments. That belief stemmed from our own experience as students. We had enjoyed using examples and felt that they had enhanced our motivation to learn. To our surprise, we found that some students feel quite negative toward using examples. You've probably been in a learning situation in which you were offered work done by students from previous years to help you on your assignments. How did you feel about using those examples made by others? We discovered that learning from examples is no trivial matter. Our study presents a new angle on the issue of learning in an example-rich environment. We mapped a mosaic of six types of learners, composed of emotional and motivational elements, each of them with unique characteristics and preferences about example-based learning. This study will interest students, lecturers, high school teachers and creators of example-rich learning environments.

environment. The present study broadens the implications of the theory of learning through examples, and emphasizes the widely varied preferences of learners in an example-rich environment.

Subjects: Development Studies, Environment, Social Work, Urban Studies; Social Sciences; Behavioral Sciences; Education; Educational Research; Education Studies; Higher Education; Curriculum Studies; Educational Psychology

Keywords: academic emotions; learning through example; achievement goals; academic self-concept; social-academic emotions

Four talked about the pine tree.

One defined it by genus, species, and variety.

One assessed its disadvantages for the lumber industry.

One quoted poems about pine trees in many languages.

One took root, stretched out branches, and rustled.

(“Conversation,” Dan Pagis, 1989; Trans. Stephen Mitchell, *The selected poetry of Dan Pagis*, p. 89)

1. Introduction

Learning in an example-based environment is common in various areas, whether by teachers and lecturers, who bring examples to illustrate their words, or by students, who wish to see examples of a given task. And indeed, a great deal of research has been done on the cognitive and the pedagogical aspects of this kind of learning (e.g. van Gog & Rummel, 2010; Kolodner, 1993/2014; Lawson, 2005; Yerushalmy & Elikan, 2010). However, motivational and emotional processes during example-based learning in educational context have been underexplored (Syring et al., 2015). Our study is thus unique in its analysis of academic emotions and motivational aspects that were exposed during an academic course set in a learning environment in which examples were integrated. In this age of accessible information, students and facilitators can easily use examples for their academic needs. Understanding what motivates people to use or not to use examples is thus highly important. This study expands the theoretical aspects of students’ preferences and emotions in the context of learning in an example-rich environment. The practical implications of our study will be of interest to both instructors and lecturers who are involved in development of learning environments through use of examples and learning from precedents.

In the literature review of example-based learning, we first consider four perspectives. Each of them exhibits unique characteristics: (1) the use of examples as a concept-teaching strategy; (2) the use of worked examples as a strategy for teaching mathematical problem-solving; (3) learning from observing the demonstration by an expert; (4) learning through case-based reasoning (CBR). Our literature review presents the cognitive and pedagogical aspects of example-based learning that are most prevalent in research on example-based learning, and situates the present study in relation to those perspectives. Then the role of emotions in learning processes is discussed as the basis for understanding students’ behaviors in an example-rich environment. That section relates both to academic emotions and to motivational aspects that accompany learning processes. For the purposes of this study, we constructed an example-rich environment that offers an example for educators from a variety of disciplines. This paper includes a detailed discussion of our considerations in constructing that unique environment and a pedagogical strategy of its utilization during the learning process that took place in an academic course in a college of education. To the best of our knowledge, no other study has yet been done on the emotional and motivational aspects of learning in an example-rich environment. Our findings demonstrate the complexity of learners’ preferences in an example-rich environment. Those preferences also include aspects of achievement goals, academic self-concept, and social-academic emotions.

2. Four perspectives on example-based learning for the construction of knowledge

In studies that dealt with concept-teaching strategies, researchers explored how example-based teaching assists students in efficiently integrating new knowledge with prior knowledge (Vinner, 1983). Two widespread pedagogical approaches to teaching concepts to children through examples were found (Klausmeier, 1976; Vinner, 2011). The first approach is definition-based, deductive instruction, which involves presenting the definition of a concept and describing its main characteristics. The students are then presented with examples, which they research in accordance with the given definition. The second approach is example-based, inductive instruction. In this approach, the students are presented with examples from which they are asked to extrapolate a principle and to determine the characteristics of the concept, from which to formulate a definition. The role of examples in concept acquisition remains a subject for research in cognitive psychology and science instruction, both concerning how learners construct knowledge strategies and regarding the search for optimal learning strategies such as constructivist teaching for conceptual change, dialogue, and mediation (Avrahami et al., 1997; Lawson, 2005; Sfard, 2005, 2007; Vygotsky, 1978; Zaslavsky & Zodik, 2014). In this paper, we will not focus on students' inductive or deductive mental process during example-based learning, but rather on student behaviors and the variety of emotional processes that students undergo while using examples.

The second perspective focuses on learning by means of worked examples in mathematical problem-solving. Carroll (1994) defined the worked examples concept as a stage-by-stage demonstration for solving a specific type of problem until the solution is reached. This type of learning strategy presents students with a recommended procedure in order to reach the resolution of similar problems (Atkinson & Renkl, 2007; van Gog & Rummel, 2010; Kalyuga & Sweller, 2004).

The third perspective of research that deals with example-based learning is the cognitive-social aspect, which follows an observational learning process via a demonstrated model (Bandura, 1971). These studies focused on knowledge acquisition strategies of the novice observing an expert demonstration (e.g. van Gog & Rummel, 2010; Moreno & Ortegado-Layne, 2007; Yerushalmy & Elikan, 2010).

The fourth perspective of research that deals with example-based learning is CBR. Although some scholars see CBR as dealing not with examples but with models, this paper will not make that distinction. We will consider learning from models and from previous cases as types of example-based learning. CBR is a paradigm in Artificial Intelligence (AI) that solves a problem by recalling a previous situation and solving the problem using previous cases (Aamodt & Plaza, 1994). Cases in CBR refer to problem situations or occurrences (Kolodner, 1993/2014). A previously experienced situation that has been captured and learned in such way that it can be reused in the solving of future problems is referred to as a past case, previous case, stored case, retained case or precedent.

An historical review of CBR can be found in several resources (e.g. Aamodt & Plaza, 1994; Kolodner, 1993/2014; Voskoglou & Salem, 2014). CBR has applications in such diverse disciplines as law, business, medicine, engineering, and social and behavioral sciences (Adebayo, Adekoya, & Ekwonna, 2014; Kim et al., 2006; Marling, Montani, Bichindaritz, & Funk, 2014; Puente, van Eijck, & Jochems, 2013; Sung & Poggio, 1998; Syring et al., 2015; Tawfik & Keene, 2014; Voskoglou & Salem, 2014). With respect to education, CBR is at the core of constructivist learning approaches (Kolodner, Cox, & Gonzalez-Calero, 2005). Two styles of using case libraries as a resource were suggested: (1) Goal-Based Scenarios (GBS), and (2) Learning by Design (LBD). The GBS framework describes computer-based learn-by-doing (Dewey, 1916) environments that are designed to teach a set of target knowledge (Qiu & Riesbeck, 2002).

On the other hand, LBD is a project-based inquiry approach. Learners design and build working devices and get their feedback from the real world. Cases that are provided in the case libraries are read as part of the investigation or during design planning, help students identify what they need to learn more about, and give them ideas for their designs. Case libraries can serve as intelligent

resources while learning and as frameworks for articulating one's understanding. CBR as a pedagogical paradigm is implemented in various areas of teaching in elementary and secondary school, and for students of high education (Bagdasarov et al., 2012; Kolodner, 1993/2014; Kolodner et al., 2003, 2005).

Research has suggested that learning through examples enhances students' conceptual understanding and higher-order thinking skills while motivating them to be active participants in their own learning. In all of these pedagogical-cognitive perspectives, example-based learning is perceived as a means to advance learning processes (He, Yuan, & Yang, 2013; Huang, 2016; Jeong, Kim, Chae, & Kim, 2014; Marling et al., 2014; Thistlethwaite et al., 2012; van Gog & Rummel, 2010; Vinner, 2011; Yadav, Vinh, Shaver, Meckl, & Firebaugh, 2014; Yerushalmy & Elikan, 2010; Zaslavsky & Zodik, 2014). The examples in the specific learning environment used for this study offered a variety of possibilities for completing the academic assignment that the students were given. The examples were models or cases (similar to the use of examples in the third and in the fourth perspectives noted above). The examples were used at the stage of extending and refining knowledge, in accordance with Robert Marzano's model of learning dimensions (Marzano, 1992, 2007, 2010). That stage requires the learner to analyze, compare, and evaluate. Our students were asked to evaluate their first attempt in comparison with work from the library of examples; they then created a second, improved model on the basis of comparative evaluation. This will be detailed in the following pages.

The present study is focused on behaviors, emotional processes, and motivational aspects that accompany example-based learning in the context of an academic course at a college of education. Most of the studies of example-based learning have focused primarily on its cognitive contribution (Atkinson & Renkl, 2007; Syring et al., 2015). Very few have investigated students feel about using examples through learning processes (He et al., 2013; Jeong et al., 2014). The present study presents a new angle. It addresses academic emotions and motivational aspects that accompany learning in an example-based environment but its focus is not on the contribution of this environment to the advancement of learning processes.

3. Academic emotions

Students in the school environment experience myriad emotions on a daily basis (e.g. Azevedo et al., 2013; D'Mello & Graesser, 2011; Hargreaves, 2000; Lemke, 2012; Linnenbrink, 2006; Nemirovsky, 2011; Pekrun, Goetz, Titz, & Perry, 2002; Zeidner, 2007; Zembylas & Schutz, 2016). These include enjoyment, pride, curiosity, interest, anxiety, anger, envy, frustration, and boredom.

As research into emotions in an educational context has expanded, Pekrun et al. (2002) used the concept of *academic emotions* to define emotions directly related to students' processes of studying, classroom instruction, and scholastic achievement. Accordingly, academic emotions will include a diversity of emotions experienced at school or university in the context of academic achievement, beyond the sense of failure or success. In addition, the concept will include the emotional attitude to teaching and learning processes. Pekrun et al. (2002) found that academic emotions were significantly and directly linked to five factors: the student's motivation, learning strategy, cognitive resources, self-regulation, and academic achievement; these factors were found to be related to the student's personality and previous learning experiences.

Over the years, several theories have been proposed (Meyer & Turner, 2006) to explain the link between emotions and complex learning situations: (a) the academic risk theory, which refers to students who are willing to take on challenging learning experiences that present them with difficult tasks, demand readiness to risk failure, and require the ability to control negative emotions. These are contrasted with cautious students, who choose easy tasks, take fewer risks, and thus limit their opportunities for failure and its resulting negative emotions (see the review of risk-taking in an academic context, Zocco, 2009); (b) flow theory (Csikszentmihaly, 1990), which views emotional involvement in learning as a means of combating fatigue and laxity in performing learning tasks; (c) goal theory, which emphasizes the role of achievement: goals will evoke either positive emotions, when

the student will cope successfully with the challenge, or negative emotions, which will impair the student's ability to cope with the challenge (Dweck, 1999; Dweck & Leggett, 1988; McGregor & Elliot, 2002; Meyer & Turner, 2006).

Pekrun, Elliot, and Maier (2006) developed the control-value theory as a framework for defining academic emotions. This theory was based on previous models which viewed emotion construction as circular, moving around two bi-polar dimensions (Feldman Barrett & Russell, 1998; Russell, 1980; Watson, Clark, & Tellegen, 1988). The two important dimensions are valence (positive versus negative, or pleasant versus unpleasant) and activation (activating versus deactivating).

In addition, it was found that students' achievement goals are related to their academic self-perception and thus academic emotions are linked to the term academic self-concept, which distinguishes between general self-concept and academic self-concept related to learning processes (Marsh, 2007; Marsh & Craven, 1997). Whereas general self-concept is either a positive or a negative stance regarding the self as a whole (Bandura, 1997; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995), academic self-concept refers to learners' perception of their academic ability (Ireson & Hallam, 2009) and to self-perceptions in academic and achievement-measuring situations (Bong & Skaalvik, 2003).

An additional concept related to learning processes and academic emotions is social emotions. It is a longstanding, well-known fact that learning takes place in a social context. In light of this, Pekrun and Linnenbrink-Garcia observed that learning in an academic context evokes a variety of social-academic emotions related to the achievement of peers, such as admiration, envy, and empathy related to the success or failure of others. In an academic environment other emotions, which are not directly related to scholastic achievement, are aroused, such as love and hate within classroom-peer relations and in teacher-student relations. It was found also that social-academic emotions affect students' motivation to become involved in learning tasks. Hence, all academic emotions are seen to play a key role in students' involvement in studying (Linnenbrink-Garcia & Pekrun, 2011; Pekrun & Linnenbrink-Garcia, 2012).

The proliferation of studies on academic emotions in the last decade has led to the definition of academic emotions as a multifaceted phenomenon, which involves a diversity of parallel psychological processes. These include affective, cognitive, psychological, motivational, and expressive components (Linnenbrink-Garcia & Pekrun, 2011; Pekrun & Linnenbrink-Garcia, 2012).

In this paper, we will use the broad definition of academic emotions coined by Pekrun et al. (2002), and hence will refer to all the emotions that were aroused in the students in the direct context of a given academic task as academic emotions. The uniqueness of our study lies in the investigation of emotional processes and motivational aspects during example-based learning in teacher education learning environment.

4. The context

The data for this study were gathered during a one-semester Learning Processes course at a college of education, part of a cluster of courses for fostering thinking at the Center for the Development of Thinking and Learning. Two facilitators, the authors of this paper, were the course instructors. In addition to attending lectures and class discussions, the students studied independently from the course website. The course website contained texts that describe learning theories, as well as a designated library of examples to be used for the four course assignments. The designated library was used under our direction in accordance with calculated timing. This created optimal conditions for innovative research on learning through examples, as we will describe below.

The students were invited to construct knowledge, and to refine and redesign the initial version of each assignment following an encounter with a designated library of examples, which we named an "example-rich learning environment." Unlike studies of worked examples of procedures, the

examples used in this study did not provide a linear step-by-step guide for a specific construction of a uniform product, but represented a variety of possibilities for organizing the information.

The following considerations guided us in shaping the learning environment:

- (1) Learning that was based on constructivist principles of engagement and understanding performances. During the course the students were asked to read academic texts that describe certain learning theories. They then had to write a summary and recommendations for educational implementations that reflected the organization of the information, and the meaning attributed by the student to the knowledge that she gained. We allowed the students to present their tasks both textually and visually, such as through tables and figures. Perkins (1993) called this type of tasks “understanding performances”.
- (2) Iterative refinement—The students were instructed to perform the course tasks in two stages: (1) to create an initial version of the task without using the library of examples; (2) to refine and redesign the initial version.
- (3) Learning through a library of examples—The library was constructed by the two facilitators of the course. It contained examples that had been created by students in previous years. These examples included a variety of representations (texts, tables, and figures) of varying quality (in terms of writing level, details, and hyperlinking). The students were asked to refine the initial version by perusing the examples and to fine-tune their final version. Access to the library of examples (the experiences of others) can serve as intelligent resources and as scaffolds articulating one’s understanding (e.g. Kolodner et al., 2003, 2005).
- (4) The timing of accessing the library of examples—We (the course facilitators) adopted a unique pedagogical strategy. We determined in advance when the students could study the library of examples. It was made available for use only after the students had created an initial version of each task. Later, they were asked (as part of the task components) to study the examples and then to fine-tune their initial version. According to Ausubel (1968), the initial version reflected the students’ information processing, enabled building new schemes in the dipper stage of learning, and engendered meaningful learning.
- (5) Evaluating processes while using the examples—Based on Marzano’s model of classroom instruction (e.g. Marzano, 1992, 2007, 2010), who referred to extending and refining knowledge as an essential dimension in the learning process, our students had to reflect on and evaluate their initial version of the task and compare it to the knowledge presented in the examples that were created by previous learners. Subsequently, they had to extract both what might be learned from the examples and what might be appropriately applied for redesign the initial version. Throughout the course, our instruction emphasized students’ reflection on their learning process. At the beginning the students had to ask themselves how they want to represent their knowledge (by table, figure, text, etc.). In addition they had to try to distinguish the differences and the similarities between their product and the examples they had just studied. Thus our library of examples served as a resource for extending and refining knowledge (Marzano, 1992, 2007, 2010).
- (6) Autonomy—Students’ ability to choose during a learning process perceived as motivation-enhancing (Linnenbrink & Pintrich, 2003; Pugh & Bergin, 2006). Students were thus not given explicit instructions on how they were to use the library of examples. Rather, after they had built an initial version we enabled them free usage as each student chose. Similarly, the tasks were worded in open terms that offered them a variety of options in creating a final version.

The academic demand to study the case library containing other students’ examples, and to do so according to specific timing exposed academic emotions in the learning process. These emotions were found to be a central component of this study.

5. The research question

What can students' behaviors teach us about learning processes in an example-rich environment?
This refers to two dimensions:

- (a) What do their behaviors teach us about **emotional** processes?
- (b) What do their behaviors teach us about **motivational** processes?

5.1. Method

This was a qualitative study, in which data collection was performed via an open questionnaire about the students' preferences toward learning through a library of examples, their reflective journals during the course, and the two researchers' observations of the students' use of the library of examples.

5.2. Participants

The participants were 70 women students who took the one-semester Learning Processes course between 2010 and 2013. The course students were teachers on sabbatical or in in-service training, who filled a variety of roles in the education system: elementary and high school homeroom teachers, math and science teachers, special education teachers, music and drama therapists, occupational therapists, and speech therapists. Their ages ranged from 22 to 55 years.

5.3. Research tools

- (1) An open questionnaire to expose the students' preconceptions regarding the use of a library of examples in learning processes.
- (2) A designated library of examples; outcomes of understanding performances prepared by students from previous years (169 files). The library of examples served as the experimental learning environment.
- (3) Two intermediate reflective journal (reflective journal 2 and 3 below): On completion of each task, the participants were asked to fill in a reflective journal about their process thus far. The reflective journal included open questions, such as "Describe the process you underwent and how you felt while using the library of examples." In addition they were asked to evaluate their actual degree of usage of the library of examples on a scale from 0 to 3 (3 = maximum use).
- (4) A summative reflective journal: On completing the learning process of the course, the students were asked to answer a concluding question, which related to the entire learning process in an example-rich environment.
- (5) Participatory observations by the two researchers who were also the course facilitators. In each meeting of the course one of us served as the facilitator, and one of us was the observer. Both of us wrote field notes which included the narrative of classroom events, conversations in the classroom, quotes of particular students, and descriptions of behaviors related to the library of examples. The classroom observations were then compared for triangulation across researchers (Patton, 2002).

6. Coding and reliability

Data was examined only after the students in all four courses had received their final grades and the academic connection between them and the course facilitators, the authors of this paper, had been terminated. This allowed us the process of cognitive detachment and of familiarity between the researcher and the observed actors, and to re-observe the data in impersonal manner.

We performed content analysis of the data using the grounded theory approach. In this approach, the data is gathered from the field and analyzed comparatively and systematically, and the theory is constructed from the findings Corbin & Strauss, 1998/2015).

The coding categories were derived partly by a process of inductive analysis (Corbin & Strauss, 1998/2015; Patton, 2002) and partly by research on emotions in general (e.g. Linnenbrink, 2006), and on academic emotions specifically (Pekrun et al., 2006). All of the participants' data resulted in a total of 273 documents (70 preference questionnaires and 203 reflective journals). Analysis of this data was done in four stages. During the first stage, a set of four documents of seven students (28 in all) were selected at random. All notes identifying the age and background of the participants were removed and copies distributed to a pair of coders, the two facilitators of the course. Each coder was required to analyze the documents independently and devise a set of categories that could account for the learning processes demonstrated in the documents.

After completing the initial open coding, the categories were compared and a coding scheme was established, on which 95% agreement was reached. Each researcher then employed this new coding scheme to code independently a new set of 28 randomly selected documents. The results were compared again, and the coding scheme was further refined. In this stage a total of three main categories were generated. These categories were: *Actual usage of examples* (using or not using), *academic emotions* and the *valence of the emotions* referring to the example-rich learning environment. In the rate of the actual usage of examples we found three kinds of behaviors: "I opened all the examples files"; "I used only some of them, mostly the examples that were similar to my assignment"; "I didn't use any of them". Analysis of the open questions revealed many expressions linked to the academic emotions that accompanied the learning process. These included affective aspects such as happiness, tranquility, sense of threat, self-blame, and enjoyment; cognitive aspects such as curiosity, interest, mental block; physiological aspects such as a light in the eyes; and motivational aspects such as lethargy, lack of motivation, and willingness to make an effort. In addition to the academic emotions that emerged from the analysis of the open questions, emotion-related expressions and gestures were also noted from the observations. While sorting the academic emotions we found positive emotions such as happiness, enjoyment and curiosity, versus negative emotions such as sense of threat, fear and confusion. These two aspects have been defined in the literature as positive valence and negative valence (Feldman Barrett & Russell, 1998; Russell, 1980; Watson et al., 1988).

In the second stage the three main categories were tested by the two coders while analyzing all 273 documents. This third iteration with all of the documents revealed a core category: *The kind of preferences towards the example-rich learning environment*. This category included three sub-categories: (1) Using or not using the examples, (2) which emotions were involved, and (3) their valence (positive or negative). Sorting the academic emotions that emerged from analysis of the answers to the open questions revealed two main approaches to the use of examples. In the first approach, the initial preference expressed was not to make use of examples. We found sentences like: "I prefer independent thinking without anything that can close or block my thinking." We will refer to this approach as the *objecting* approach. In the second approach, the initial preference expressed was to make use of examples during the learning processes; we found sentences like: "I loved using the examples; it helped me a lot." We will refer to this approach as the *agreeing* approach. In this paper, we will not examine the preference of one approach over the other for advancing the learning process in an example-rich environment.

In the third stage we coded each set of four documents from each student in axial coding. In total we analyzed 252 documents (four documents * 63 students from whom we had full sets of documents.). In this stage, two main categories were defined: *The degree of usage of the library of examples* refers to the degree to which each student actually used the library of examples, on a scale from 0 to 3 (3 = maximal usage). The second main category was *the participants' type of emotional process* experienced while learning in an example-rich environment. We identified three types of academic emotional processes: (1) A learning process in which unpleasant academic emotions were aroused in relation to learning in an example-rich environment. These emotions were expressed immediately after the students received the first course task, even before they had opened the library of examples, and the same emotions continued throughout the entire learning process. Statements such as "I didn't like the idea of using examples from the beginning; it made me nervous all during the

learning process” were common. (2) A learning process in which pleasant academic emotions were aroused toward learning in an example-based environment. (3) A learning process that was characterized by changes in the emotional valence with which the students entered the example-rich learning environment. Three sub-categories of changes in the emotional valence were identified throughout the learning process in an example-based environment, for example: “In the beginning I felt frustration and confusion, and then [after using the library of examples] I felt satisfaction that I had understood and performed the tasks successfully (changed from negative to positive valence)”.

In the fourth stage of the coding process we looked for explanations of the various behaviors in the example-rich environment that the documents and our observations revealed. While contemplating these explanations we realized that our coding scheme is deeply connected to three new core categories: *Achievement goals*, *academic self-concept*, and *social-academic emotions*.

6.1. Achievement goals

The importance of students’ achievements in an academic context is well-known. Examining the data via the achievement-goal-focused theory added further depth to understanding the behaviors of the participants in the example-rich environment. This theory emphasizes the role of the goals in predicting academic emotions that will be aroused with exposure to certain goals (Dweck, 1999; Dweck & Leggett, 1988; Meyer & Turner, 2006). Two types of goals—mastery goals and performance goals—appear to motivate students to work on an academic task (Pekrun et al., 2006). Students focused on mastery goals aspire to develop new skills, to understand their current task, to improve on their present achievements, and to master the field of study. Analyzing the data revealed statements that reflected the mastery-goals of students learning in the example-rich environment such as: “Using the pool of examples enabled me to develop a range of ideas, styles and formulations and then to choose the ones that would work best for me in enhancing my learning.” Focusing on mastery goals maintains a high academic self-concept, and might also prevent negative academic emotions such as anxiety while coping with challenges or failure. In contrast, students focused on performance goals aspire to be the best and to obtain higher grades than others, and thus are preoccupied with evaluating their ability in comparison to their peers. This approach might cause them to have negative feelings and to worry about other people’s achievements instead of focusing on the task at hand. We found statements such as: “While comparing my assignment to those represented in the examples, I felt stupid and frustrated. They did a much better job than me, even though I’m working so hard to get a high mark in this course.” Studies have shown that more mastery-focused learning has an impact on learning quality. It is noteworthy, however, that performance-focused learning does not necessarily contradict mastery-focused learning (Senko, Hulleman, & Harackiewicz, 2011).

6.2. Academic self-concept

Academic self-concept refers to students’ perception of their ability to meet the course requirements and the way in which they cope with learning situations (Bong & Skaalvik, 2003; Ireson & Hallam, 2009). Academic self-concept is shaped by academic attitudes and emotions that have arisen during the learning processes (Lent, Brown, & Gore, 1997). This academic concept is based mainly on information from evaluations by teachers, lecturers, and peers and is created through a process of social comparison in which the students compare their abilities and performance to that of others (Linnenbrink & Pintrich, 2003; Marsh, Byrne, & Yeung, 1999; Marsh & Parker, 1984).

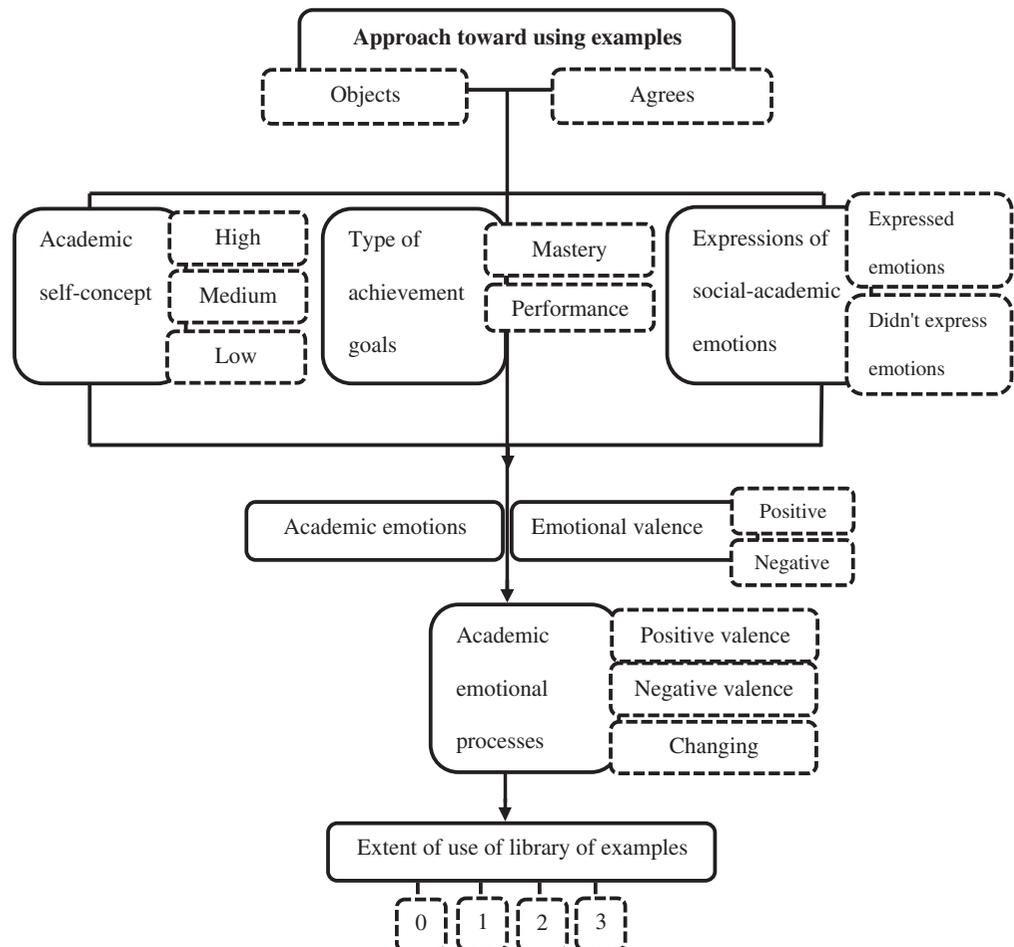
We found that the participants could tentatively be divided into three groups reflecting their academic self-concept level: high, medium, and low. A high academic self-concept level was characterized by expressions that testified to self-confidence, such as “I’m able to perform the tasks,” “I feel good about the learning process.” In addition, those students showed independence in carrying out the tasks. A low academic self-concept level, in contrast, was characterized by lack of self-confidence in the ability to perform course assignments. Here, we heard statements such as, “I always have a hard time with tasks that demand alternative thinking”; “why don’t you just teach us instead of making us generate the material all by ourselves?”

6.3. Social-academic emotions

As mentioned earlier, Pekrun and Linnenbrink-Garcia (2012) referred to social emotions in connection with academic emotions. In the present study, the “social-academic emotions” dimension relates to the way in which students in the example-rich environment perceive their virtual peers who are behind these examples and this reflects their degree of readiness for a dialogue with the examples. We found two kinds of expressions referring to the individuals (students from previous years) who had constructed the examples: anxiety about holding a dialogue with others or, alternatively, willingness to hold a dialogue with others. In addition there were students with no reference to those individuals. Figure 1 presents the way the coding categories were derived.

Figure 1 presents the process in which the categories took form over the various stages of data analysis. The analysis demonstrated that the category of “approach toward using examples” (agrees/objects) is a meta-category that explains the overall behaviors of learners in such an environment. This category reflects the learner’s consistent internal attitude toward using examples created by others. That attitude draws on three core categories that were discovered during the data analysis: academic self-concept, types of achievement goals, and expressions of social-academic emotions. Those categories explain the two categories: academic emotions and their emotional valence (positive/negative). The characterization of those two categories led to the category of academic emotional processes in an example-rich environment. Three kinds of processes were found: positive, negative, and changing ((a) from positive to negative; (b) from negative to positive; (c) from positive to negative and back to positive). This category of emotional processes experienced by learners in an example-rich environment was reflected on final account in their actual usage of the examples (three degrees).

Figure 1. From codes and categories to theory.



7. Results

The coding process led us to construct a profile of six user types of the library of examples. The study findings will first present the two main approaches to the use of examples that emerged from content analysis of all the data distributed during the course. We will then present unique characteristics of the six users of the library of examples.

Each approach is presented as a distinct type of user of the library of examples, which was apparent both in the observations during the course and in the students' descriptions of their use of the library, the learning environment of the course. We called them *academic emotional types* to differentiate them from personality-based emotional types. As soon as the students were instructed to study the library of examples, some of them objected and used it only partially. Others used it reluctantly or did not look at it at all. During content analysis, we found three objecting types (54%), who expressed unpleasant emotions toward learning in an example-rich environment. The prevalence of each type is expressed in parentheses by percentage:¹

- (1) Go alone (19%).
- (2) Threatened (6%).
- (3) Does not wish to be influenced (29%).

In addition, we found three agreeing types (49%), who found the library of examples useful on both cognitive-scholastic and emotional levels. Contrary to the objecting-type students, the agreeing-type students expressed pleasant emotions regarding the learning process and each one used the database in her own unique way:

- (1) Needs an example (27%).
- (2) Frustrated learner (6%).
- (3) Enthusiastic (16%).

In isolated cases, combination types were found (see Footnote 2), such as between “Does not wish to be influenced” and “Needs an example,” or between “Needs an example” and “Enthusiastic.” It is noteworthy that we were unable to determine a definite type for about only 1% of participants.

In the following section, we will present the types and their characteristics according to their frequency of usage of the library of examples (from low to high). In the description of each type, we will address the academic emotions that accompanied the use of the database, their valence, and emotions process throughout the learning process. In addition we will refer to the academic self-concept, achievements goals, social-academic emotions of each type and the actual degree of usage of the database, beginning with the “objecting” group.

7.1. Type 1: Go alone

From the outset, the “Go alone” type strongly objected to using the database because she felt able to cope with the tasks independently. Students belonging to this type often used expressions such as “by myself,” “mine,” and “alone.” Each time the “Go alone” type was directly asked to peruse the examples in the database, she refused, either politely or impatiently, as illustrated by the following quotes:

The examples didn't help me in any way [...] The initial version was also the given exercise, in most cases. (Sue)

When I work alone, I believe that my learning method is the best one for me. To internalize the learning, I prefer to work alone; I don't need examples. (Emma)

To reflect the consistency of the “Go alone” type, one student’s characteristics are presented below, as they were expressed in everything she wrote. In the preference questionnaire, which began with a question about the possibility of using a library of examples when teaching students in an elementary or high school classroom, this student’s answer reflected her basic attitude:

Learning from examples does not necessarily suit everyone. Some students are very independent thinkers and looking at other students’ work will not help them, but quite the opposite. (Mia, preference questionnaire)

In the first reflective journal, when asked to write the number of examples that she had used, Mia wrote “zero” (0). In other words, she had not used the library of examples following our initial instruction to do so. When asked to write the number of examples used in the third course task, she still wrote “zero” (0), and added the following comment:

I work quite independently [...] Everyone has their own style and I think that what I have written best reflects me and what I want to convey, I think in this way I will be more skilled and will acquire a deeper knowledge. (Mia, second reflective journal)

In the summary reflective journal, Mia was asked to expand on her experience with learning in an example-rich environment. Her response included the following:

I very much like to complete tasks according to my perception [...] I didn’t use the library of examples at all when doing the tasks. I managed by myself [...] It doesn’t suit everyone [...] I seem to have a more personal learning style [...] I didn’t make use of the example-rich environment. (Mia, summary reflective journal)

It can be said that this type of student was “immune” to our explicit instruction to peruse the examples as part of the learning process. Her answers reflected high academic-self-concept and mastery goals; she wished to undergo a personal specialization process and objected to the use of examples throughout. She expressed her wish to perform tasks alone, and perceived the examples as a learning environment of which she had no need. This type of student did not refer to the virtual colleagues who were behind the examples, and did not express any social-academic emotions. Throughout the course she expressed negative emotions about using the examples and didn’t change her approach (see Table 1).

7.2. Type 2: Threatened

This type, who objected to perusing the examples, felt threatened, anxious, and experienced unpleasant emotions on encountering examples created by others. This type of student was task-focused; her achievement goal was to perform a good work at least like the other students. She expressed a sense of inferiority compared to the creators of the examples in the database. She expressed a general sense of threat when exposed to the performance of previous students the moment she glanced at the examples in the database:

[The examples] really messed me up. Challenging examples stress me out. [...] (Jane)

One or two examples were enough to make me feel small; tiny [...] If the earlier generations were like angels, then we are like humans. (Olivia)

Another student described how perusing the examples intimidated her: Some of the examples frightened me by their level of precision and design [...] (Alison)

Similarly to the “Go alone” type, students of the “Threatened” type did not use the library of examples, but preferred to “Go alone”; her answers reflected low academic-self-concept. Through observing the way in which the students worked in the example-rich environment, we saw that in the preference questionnaire, this type of student agreed to make use of the library. However, after looking at several examples and conducting a stressful and threatening comparison with her own

performance, she changed her mind. For the “Threatened” type, the encounter with the examples shifted the emotional valence from positive to negative. She felt that “good” examples undermined her self-confidence and impaired her ability to perform the required tasks. To avoid this difficult experience, she declared that she would look at no more examples and completely refrained from using them, despite our explicit instruction to do so during the initial refinement of each task. Her extent of use of the database was 0.4.

7.3. Type 3: Does not wish to be influenced

This type of student constituted the largest group among the study participants. Throughout the course, students of this type expressed negative emotions about using the examples and didn't change their approach. Those students were afraid that looking at previous students' examples would influence their creative process. They expressed the intense wish to undergo the process independently and to produce a personal, original result, as described by one of the students: “I'm the one who has to reinvent the wheel” (Laurie). The “objecting” type of students were channeled by the desire to undergo the learning process by expressing their individual creativity, which influenced their use of the library of examples (the extent of use of the database was 1), as their quotes attest:

I didn't want to damage my ability for creative thinking, but wanted to find the ideas myself. I looked at the examples only because I was asked to. (Lisa)

I had the feeling of missed opportunity. Looking through the database blocked my creative thinking [...] This kind of database just sent me to sleep. (Wendy)

I don't like looking at an example. It might be constricting, threatening, unhelpful. Even though, in the end, I did get a bit of help from examples of previous years, I wouldn't recommend it. (Anne)

The words recurring in this type of student's answers expressed the fear that the personal creative process would be damaged and blocked. Some students were even willing to compromise by producing an inferior outcome for the sake of undergoing an individual specialization process, which the outcome would reflect. This is described in the following quote: “I prefer to go through a process and to refine it myself without copying or using fixed features, even though my result is not usually first-rate and perfect.” Some students reinforced the sense of impairment to their personal creative process as a result of studying the database, and expressed feelings similar to those of the “Threatened” type, as presented in the following examples:

Scrutinizing examples reduces my motivation to keep on working. The comparison makes me less confident in my work and makes the work harder. (Lisa)

The comparison gives me less confidence in my own work. I was influenced by the environment and noticed that I gave up and followed the examples [...] Help!!! (Diane)

For students of the “Does not wish to be influenced” type, perusing other students' examples distorted her ability to create something “genuine” of her own, as Diane wrote: “In my opinion, it's ridiculous to duplicate an idea that isn't mine.” The “Does not wish to be influenced” students have a medium academic-self-concept. They don't have very strong confidence in their academic abilities but they are focused on mastery goals. This type recoiled from “social” influences on their creative process, expressed fear of the dialogue with others—the creators of the examples—and resisted the use of examples out of the sense of potential harm to their ability to produce a creative outcome. They made very little use of the examples, only when compelled, felt dissatisfied and even sometimes expressed anger toward us, the course facilitators, for not understanding their approach. Studying the examples apparently led them to compare their results to those of others and

damaged their self-confidence. They would not have independently chosen to use the database if they hadn't been explicitly instructed to do so as part of the learning process in the course.

In conclusion, the objecting group ranged between those who felt absolutely no need to look at the examples, as they felt able to cope with the task, and those who felt that it would threaten their ability to create knowledge or would threaten their creative process.

In the next section, we will describe the "agreeing" group, who had a positive / pleasant experience of learning in the example-rich environment.

7.4. Type 4: Needs an example

Type 4 students were conspicuous during the observations. This type has low academic-self-concept; throughout the course they were apprehensive about the given task, and as soon as they had received the instructions, asked to see examples to perform the task as required. Studying the database relaxed these students and increased their sense of performance readiness in two ways: On the one hand, they were relaxed because the examples clarified the task requirements, and on the other hand, looking at the examples gave them more confidence in their ability to perform the task successfully, as described by the following students:

I felt relieved because it helped to clear the mist and I understood what I was supposed to do. (Lizzie)

While I was studying the database of examples, I thought what a pity I hadn't opened it right at the beginning because it would have saved me time and extra work. That's how I got right to the heart of the issue, to what was expected from the task, without unnecessary guesswork. (Nicole)

I thought that I wouldn't succeed in processing and summarizing the material, but after checking other examples, I saw that it was possible. (Paula)

For this type, studying the database of examples and finding a good example was a virtual way of reaching out for help while creating one's personal knowledge. Students who belonged to the "Needs an example" type had performance goals; they used the library of example to clarify what was expected of them in each individual task. In general, they studied examples that resembled their initial version and improved them according to what they learned from these examples (the extent of use of the database was 2). They felt confident and comfortable in drawing on good examples, which laid out their path. Beforehand, they had asked themselves: "What exactly do they want from me?" "What are the task boundaries?" Studying examples created by others provided a clear outline of the task and the details required. Sometimes they felt stressed about their task performance ability: "The task looks difficult and complicated; will I be able to do it?" Looking at others' examples created the sense of a manageable academic target and strengthened their sense of capability to complete the task. "Needs an example" students started the task with negative valence; after using the library of examples, their academic-emotions changed to positive valence. Similar to the "Go alone" type, these students neither mentioned the creators of the examples nor expressed social-academic emotions toward them. As the process advanced, some of the students of this type continued to study examples, and even became enthusiastic about example-based learning.

7.5. Type 5: Frustrated learner

In the preference questionnaire, this type of student started with positive approach and responded that she would readily study the library of examples. She was focused on performance goals and wanted to get give in a successful product. However, after attempting to study the examples, the "Frustrated learner," whose academic self-concept was low (as demonstrated in the quote below), became frustrated by comparing her own work with that of others, and her emotions changed to

negative valence. The examples that she studied reflected the weak points of her own creation. The frustration motivated her to learn, however, as shown in the following quotes:

I blamed myself for omitting such simple information [...] [I felt] challenged; I can do this, too, with a bit of work [...] I remembered my strong points, which would be expressed in my final product, and it came out even better than the example that had impressed me so much. (Shirley)

Another student described a similar process:

[I felt] frustrated with my lack of organization and how my results were not nearly as good as those that were suggested [...] [I felt] satisfied that I had created something that I liked and that seemed to meet certain goals. (Frances)

The sense that I'm not clever enough, because how could they [the students in previous years] present the material so well? Afterwards, I saw that each one had her own method, and I developed my own outcome. (Belinda)

This type of student expressed social-academic-emotions with negative valence when she began to use the library of examples. She felt frustration when viewing knowledge that had been formulated and constructed by others with similar intellectual capabilities because of the quality of the knowledge and its mode of presentation. However, "Frustrated learner" students did not let the frustration prevail but channeled it into study motivation. After coping with the tasks, their academic emotions became more pleasant, and changed to positive valence. The "Frustrated learner" students interacted with many examples (the extent of use of the database was 2.5) and discovered that they were capable of creating results as good as those created by students in previous years. Studying the library of examples compelled the students to forgo their positive emotions at having constructed the primary knowledge, overcome their frustration from comparing their own achievements with those of others, and proceed with their academic goal by recognizing their strengths.

7.6. Type 6: Enthusiastic

"Enthusiastic" type students began the course with a high academic self-concept. The example-based environment seemed to increase their positive emotional activation and they felt excited and intrigued while learning in the example-based environment. This type of student related to the library of examples as a gift preceding the learning. The "Enthusiastic" type did not usually limit herself to specific examples or to examples through which she could understand how to perform the task. She focused on mastery goals and saw the perusal of the database as a whole as an important stage in constructing her own knowledge. This type of student studied all the examples in the database (the extent of use of the database was 3) and emphasized how much she enjoyed the rich variety of possibilities: "[...] And I **very** much enjoyed learning about other creative ways and benefiting from the work of my predecessors." (Carol)

The "Enthusiastic" type student was interested in "seeing a lot." When the question "To what extent did you use the examples for performing the task?" was repeated in all her reflective journals with the appropriate wording, she answered that she had studied all the examples in the database. The analysis of the reflective journals showed that such a student perceived the study of knowledge constructed by others as an important and enjoyable process, and as a significant component in the construction of her own body of knowledge. These students perceived the use of the library of examples as an "intergenerational" dialogue with others. They described their learning experience, their sense of having expanded their knowledge, and of having created a virtual dialogue with students from previous years, whom they had never met. They also described their joy and gratitude in learning from the examples, as reflected in the expressions and metaphors used by Jill and Katie:

It is important to see other people’s views. Other people’s ideas open a door to expanding the individual’s ideas, to break out of the internalized type, to enable collaborative learning. It is important to see what others learned, to examine the points that I understood, to see the overall vision from the outside and not from the personal position. (Jill)

I was very happy to hear and to see other people’s products, to expand, to add, to upgrade, to correct, to feel humble, part of something bigger, not only that I am creating but that there are other women and that something can be learned from each one. Another advantage is flexibility. I’m not limited just to my own product, but am exposed to other creations and other people’s minds, and I am grateful to them. (Katie)

The “Enthusiastic” type student felt part of the learning community and expressed many social-academic emotions. She had imaginary conversations with others, actually experiencing them in her mind’s eye. She saw the learning process as a social construction of knowledge. Her acknowledgment of the fact that “everyone has knowledge” enabled her to perceive the knowledge that she created as a link in the overall fabric in which she held a dialogue with creators of knowledge from previous years. The perception of learning in an example-based environment as a social dialogue is reflected in Jill’s repeated use of the verb “to see” and in the many verbs that Katie used to describe her learning process, especially the exceptional expression: “to hear and to see other people’s products.” The students’ dialogue with the examples reinforced our understanding that they perceived this environment as an opportunity to participate in a virtual learning community.

Two main approaches—the “objecting” approach and the “agreeing” approach—were found during the learning processes in the example-rich environment. These led to identification of six user types presented in Table 1. Their characteristics were documented in the observations and continued to appear in all of the reflective journals following varied tasks. These findings emphasized the consistency of each user-type’s approach to the example-rich environment. A profile for each type of academic emotional user of library of examples is presented in Table 1.

Table 1. A mosaic of academic emotional types of example users according to their approach toward using library of examples

Approach toward using examples		Objects to use examples			Agrees to use examples		
Type		Go alone	Threatened	Does not wish to be influenced	Needs an example	Frustrated learner	Enthusiastic
Academic self-concept		High	Low	Medium	Low	Low	High
Type of Achievement Goals		Mastery	Performance	Mastery	Performance	Performance	Mastery
Expressions of Social-academic emotions		Disregard of others who presented the examples	Anxious about holding a dialogue with others	Anxious about holding a dialogue with others	Disregard of others who presented the examples	Willing and happy to hold a dialogue with others	Willing and happy to hold a dialogue with others
Emotional valence	Before	Negative ^a	Positive ^b	Negative	Negative	Positive	Positive
	During	Negative	Negative	Negative	Positive	Negative	Positive
	After	Negative	Negative	Negative	Positive	Positive	Positive
Type of academic emotional process		No change: negatively valenced	Change in the valence of academic emotions	No change: negatively valenced	Change in the valence of academic emotions	Change in the valence of academic emotions	No change: positively valenced
Extent of use of database		0	0.4	1	2	2.5	3

^aNegative, unpleasant emotions.

^bPositive, pleasant emotions.

The data presented in Table 1 reflects a mosaic of academic emotional types of example users. The data shows that learning through examples created by others is not a trivial process, and that a combination of academic emotional aspects accompanying the learning process seems to determine the extent to which examples are used. That combination includes: academic self-concept, type of achievement goals and expressions of social-academic-emotions. In addition, learning in example-rich-environment can create a variety of emotional processes.

8. Conclusion and discussion

The starting point of the present study was the wish to see what students' behaviors can teach us about learning processes in an example-rich environment. Its purpose was to advance theoretical and practical knowledge in an academic learning-environment context, which included learning from examples.

The data analysis revealed varied behaviors and varied expressions of academic emotions during learning in an example-rich environment. These behaviors and expressions reflect the multifaceted phenomenon of academic emotions (Pekrun & Linnenbrink-Garcia, 2012) in a context of learning through a library of examples. Characterization of the emotions led to a distinction between types and to identification of three "objecting" types and three "agreeing" types, each of which demonstrated its own characteristic behavior in the example-rich environment. We found expressions of happiness and fear, interest and understanding, emotions reflecting the degree of enjoyment and emotional arousal during the learning process, and emotions relating to physical sensations while learning. All these were also manifest in the students' gestures and language.

Sorting the academic emotions that were expressed showed that the types of emotions could be characterized according to two bipolar dimensions of valence and activation, similar to the dimensions defined by Russell (1980). The academic emotions aroused regarding the example-based environment reflected the valence of emotions (unpleasant versus pleasant), from a state of unpleasantness, expressed through fear and the sense of threat, to a high level of pleasantness, expressed through joy and enthusiasm in an example-based environment. In addition, the expressions reflected different levels of high or low activation, which were manifested through different intensities of emotions toward examples, such as stress/enthusiasm, and drowsiness/calm.

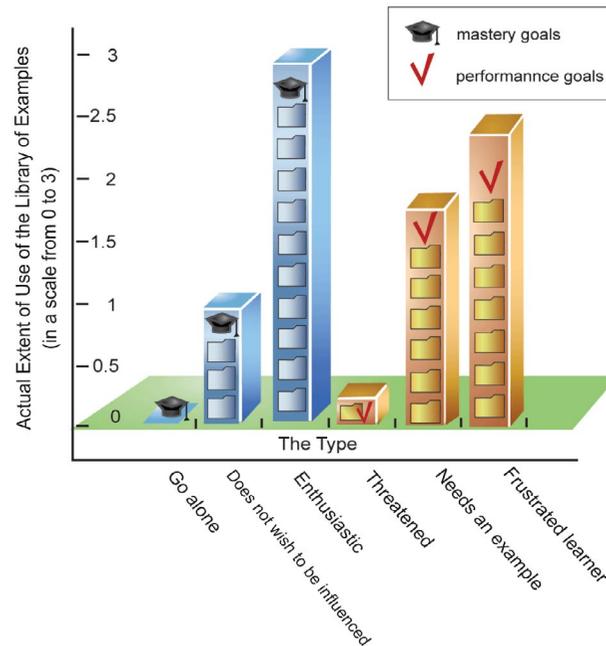
Tracing the emotions expressed at different points during the learning process and examining the findings via motivational perspective: referring to the academic self-concept level, the achievement goals, and the emotional processes of each type (see Figure 1 and Table 1) led us to characterize two new groups, which we had not distinguished at first. In the next section we will explore the range of findings from our study, using the following concepts: achievement goals, academic self-concept, and the type of emotional-academic processes that occurred in the example-rich environment. Then we will attempt to delineate the new groups from a motivational perspective, and offer a profile for each type in the example-rich environment within an academic context.

8.1. Academic emotional types—a motivational perspective

8.1.1. Achievement goals

It was found that learning in an example-rich environment enables a profound distinction between two groups of types, with mastery-focused students on one pole (64%): the "Go alone," "Does not wish to be influenced," and the "Enthusiastic" types; at the other pole were performance-focused students (39%) belonging to the "Threatened," "Frustrated learner," and "Needs an example" types. Until that point had it seemed that extent of example usage, which creates two similar sized groups—the objecting group and the agreeing group—was the central overarching category that separated the academic emotional types into two subgroups. Now, however, we found that the

Figure 2. A mosaic of academic emotional types: the extent of use of the library of examples and the achievement goal of each type.



dimension relating to achievement goals is an important overarching category, which throws light on the motivation for external behavior.

Figure 2 presents each type’s actual extent of use of the library of examples, on a scale from 0 to 3, while relating to each type’s achievement goal. The hat  icon shows the schematic representation of the mastery-focused goals and the check  shows the schematic representation of the performance-focused goals.

In Figure 2, it is evident that the “Go alone” type and the “Does not wish to be influenced” type, who belong to the objecting group and hardly used the database, were working toward mastery goals. The other two types, “Needs an example” and “Frustrated learner,” who did make use of the examples, were working toward performance goals. Hence, the actual extent of example usage, which was an external criterion for division into two groups—either agreeing or objecting to using examples—does not reflect each type’s internal motivation for learning through examples.

8.1.2. Academic self-concept and Academic emotional process

Three levels of academic self-concept were expressed through the learning in the example-rich environment: high academic self-concept, medium academic self-concept and low academic self-concept. In addition, two types of academic emotional process in the example-based environment were found. The first type is an emotional process in which the academic emotions underwent no change and remained throughout the entire learning process as it was in the beginning. In this process there were two options: (1) A process in which the students experienced emotions of negative valence or (2) A process in which the students experienced emotions of positive valence. In the second process changes occurred in the academic emotions regarding the use of examples (see Table 1).

Observation of the six academic emotional types especially through the academic achievement goals dimension explained the academic emotional changes that occurred during the learning process in the example-based environment. The mastery-goals group includes the three types who did not experience an emotional change during the learning in the example-based environment (64%) and the performance-goal group includes those who did undergo an emotional change as a result of the example-based learning environment (39%).

The types with negative valence who did not experience emotional change were “Go alone” and “Does not wish to be influenced”. The “Go alone” type strongly objected in advance to the use of examples; this stemmed from a high academic self-concept. These students did not feel the need for examples because they had their own conception of the area under study and how to cope with the task. Such students thus experienced the examples as interference, similar to findings in the literature concerning experts’ approach to learning from examples (Kalyuga & Sweller, 2004; van Gog & Rummel, 2010).

The “Does not wish to be influenced” type objected to the use of examples; this stemmed from the sense that their creative ability was being put to the test. Their academic self-concept appeared intermediate (compared to the “Go alone” type). The example-based environment evoked a high level of negative activating emotions, reflecting the annoyance caused by the academic demand to study examples.

The type with positive valence who didn’t experience emotional change was the “Enthusiastic” type students. This type began the course with a high academic self-concept. The example-based environment seemed to increase their positive emotional activation and they felt excited and intrigued while learning in the example-based environment.

The second process, in which changes occurred in the academic emotions regarding the use of examples, characterized the three types with a low academic self-concept: “Threatened,” “Frustrated learner,” and “Needs an example.” The encounter with the example-based environment caused them to compare their performance with that of others presented in the examples (Linnenbrink & Pintrich, 2003). For the “Threatened” and “Frustrated learner” types, the encounter with the examples shifted the emotional valence from positive to negative. The “Threatened” students felt anxious and refrained from further perusal of the examples. The “Frustrated learners” swayed between positive and negative academic emotions, and succeeded in moving from feelings of frustration to feelings of self-efficacy. For the “Needs an example” type, the examples provided a response to their academic needs, and caused a change from negative to positive emotional valence.

Through observing the two academic emotional processes described above via the theory dealing with achievement goals, we can now characterize the two new groups.

The “Go alone,” “Does not wish to be influenced,” and the “Enthusiastic” types, who did not undergo an emotional change, were focused on mastery goals. Each type attempted to advance her own individual learning. The “Go alone” and “Does not wish to be influenced” types, who belonged to the objecting group, felt that the example-based environment might obstruct their individual learning process. The “Enthusiastic” type, however, felt that the example-based environment enriched her capabilities and enhanced the possibility of mastery in the area under study. It is interesting to note that the group of mastery-goal-focused students was composed mainly (48%) of those who objected to the use of examples, and in actual fact, did not make use of examples at all (“Go alone”—19%) or made very little use of them, and only when forced to do so (“Does not wish to be influenced”—29%).

In contrast, students belonging to the “Threatened,” “Frustrated learner,” and “Needs an example” types were focused on performance goals. During the learning, they compared their own academic abilities with those of previous creators of examples, a comparison that evoked negative academic emotions. Among the “Threatened” and the “Frustrated learner,” types, the example-based environment created the negative academic emotions through comparing their own academic performance with the outcomes presented in the examples. The “Needs an example” type approached the task with a sense of stress because of the fear of failure or of misunderstanding the task. The example-based environment served as an additional explanation of what was required in the task, thus relieving their stress and enabled them to feel capable to perform the task appropriately.

Table 2. Academic emotional types: characterization of users of library of examples according to achievement goals

Types that have mastery goals	Academic self-concept	Valence of the academic emotional process	Types that have performance goals	Academic self-concept	Valence of the academic emotional process
Go alone (OT) ^a	High	No change: negatively	Threatened (OT)	Low	Change
Does not wish to be influenced (OT)	Medium	No change: negatively	Frustrated learner (AT)	Low	Change
Enthusiast (AT) ^b	High	No change: positively	Needs an example (AT)	Low	Change

^aObjecting types.

^bAgreeing types.

These findings show that academic emotions regarding learning in an example-rich environment constitute a multifaceted phenomenon, with external-behavioral expression (actual use of examples) and deeper, internal expression (type of achievement goal and academic self-concept). The academic emotional valence for the mastery-focused students remained unchanged throughout the learning process, whereas, for the performance-focused students, it might change during a learning process in an example-rich environment. This complexity of academic emotional types is presented in Table 2.

8.1.3. Social-academic emotions

As mentioned earlier, Pekrun and Linnenbrink-Garcia (2012) referred to social emotions in connection with academic emotions. In the present study, the “social-academic emotions” dimension relates to the way in which students in the example-rich environment perceive their virtual peers who are behind these examples and this reflects their degree of readiness for a dialogue with the examples. Our study indicates that this dimension is related to the type of achievement goal adopted in the example-rich environment.

Subsequent to examining the motivation for learning in the example-rich environment among all the different types and sorting the types into two groups according to the type of achievement goal, we also examined the way each type expressed their social-academic emotions. It was found that both groups, the mastery-focused group and the performance-focused group, expressed academic-social emotions in three ways, as presented in Table 1.

Hence, from among the six types identified, two types did not relate to their virtual colleagues who were behind the examples, and did not express any social-academic emotions. These were the “Go alone” and “Needs an example” types, who were focused on different achievement goals (mastery and performance, respectively (see Tables 1 and 2). The other four types perceived example-based learning as a type of social learning in which they were exposed to the ideas and thoughts of the students who had created the examples, and accordingly, expressed the social-academic emotions in contradictory ways. Thus, these expressions reflected either a sense of threat or a sense of opportunity and the wish for fraternization and the creation of a dialogue. The “Threatened” and “Does not wish to be influenced” types, who were focused on different achievement goals (mastery and performance, respectively), felt threatened by studying other people’s examples. The “Frustrated learner” type, who was performance-goal oriented, at first felt chagrined by others’ success at reaching “such a good outcome.” Later on they reconsidered, interacted with the examples, and discovered that they, too, were capable of creating products as good as those of their predecessors.

In contrast, we identified an “Enthusiastic” type who enjoyed entering this environment. “Enthusiastic” students navigated through the examples, delighting in the variety of ways of presenting knowledge created by others. They sometimes even entered a dialogue with the examples and experienced excitement, joy, and arousal.

Therefore, we saw that an example-rich learning environment might evoke two types of social-academic emotions in both mastery-focused and performance-focused students: emotions that express either willingness or fear regarding the study of other people’s examples. In addition, some students expressed no social-academic emotions toward learning in an example-rich environment. These types did not attribute a role to the example-creators in their individual learning process. Thus, the social-academic emotions in an example-rich learning environment are an additional important dimension accompany the way that students will make use of the examples.

The six academic emotional types identified in our study were each activated by their unique academic emotions and their achievement goals. The processes that caused each student to behave in a particular way in the example-rich environment were found to be complex. These were related to each type’s focused achievement goal, academic self-concept, and to the type of social-academic emotions aroused in the example-rich environment. In other words, students’ external behavior in an example-rich environment does not reflect their motivations for using or not using examples. Therefore, in an example-rich environment, a certain type of external behavior also does not indicate whether it is goal-motivated on mastery or performance focus, or which social-academic emotions activate the student.

8.2. Implications for learning and teaching in an example-rich environment

The contribution of the present study is in the investigation of emotions and motivational aspects in an example-rich environment. It may be useful in explaining the degree of willingness to use this environment.

Regarding the review of research on example-based learning presented above, our findings add a new theoretical component. Our findings show that in the case of some students, examples would disturb their learning process, while other students needed the aid of examples as an integral part of their learning process. To that extent, the present study broadens the implications of the theory and emphasizes the widely varied, even contradictory preferences of learners in an example-rich environment.

Our findings concerning the approaches of students in an academic college to an example-rich environment do not correspond with the perspective that example-based learning is enjoyable and enhances motivation for active participation for all students (e.g. Thistlethwaite et al., 2012; van Gog & Rummel, 2010). Rather, it depends on the student type. The kind of emotions aroused during the learning process in such an environment will vary from one type to another in accordance with the characteristics presented above (see Tables 1 and 2).

In light of this, our findings and their interpretation introduce the issue of effective teaching methods in an example-rich environment, into the discussion. The teacher’s/facilitator’s/lecturer’s awareness of the six types and their characterization in an example-rich environment is important. Awareness of the mosaic of academic emotional types invites empathic attention to students’ academic emotional needs in an example-rich environment and aids in understanding that for some types, the study of examples hinders, and for other types, enriches, their learning process.

Instructors who chose to use pedagogical methods based on learning from examples, must make students aware that there are varied types of learners. Teachers must grant legitimacy to students who are not interested in using examples and provide them with alternative options. Even those who teach in an environment that is not example-rich must be attentive to differences between students, and aware that some students need examples for optimal understanding of academic tasks and to

feel confident and capable in undertaking them. The teacher must then prepare the appropriate examples accordingly, and give students access to examples that are relevant to each academic task.

Requiring teachers to integrate libraries of examples in their instruction poses certain difficulties. The professional literature has treated some aspects of the difficulty in building such libraries (Marling et al., 2014; Tawfik & Keene, 2014). Our study offers a pedagogical strategy for building a library of example compiled from tasks submitted by students from former years. In addition integrating library of example in the learning process can, in some cases, impede self-learning. Our pedagogical strategy was to make the library of example available for use only after the learners had created a preliminary version of each task on their own.

The present study did not focus on elements concerning the library of examples itself. Further research is needed to determine other facets, such as the optimal form of a library of examples that will enable effective learning, the features of a good example, the best way to present them, and the activities required of students in use of such a library.

The present study is qualitative research conducted in the context of an academic course at a college of education. It invites researchers of education to conduct quantitative research to measure the influence that academic emotional type of example user has on their learning outcomes and achievements. In addition, it invites researchers broaden their scope and to attempt to consider the weight of the motivational dimension as well as the unique weight of each individual dimension in the range of academic emotions in an example-rich environment, as well as deepening their understanding of the type of relationships between these dimensions. Moreover, it will be interesting to track the behavior of students in various example-rich learning environments, including examining the disciplinary aspect. This will help to enrich our insights concerning the modes of motivational and academic emotional expression that shape the mosaic of types in example-rich environments.

Dan Pagis' poem, "Conversation" (1989), which was quoted at the beginning of this paper, describes a unique conversation among four people who "talked about the pine tree." On first reading, each one seems to be talking about himself. However, a second reading reveals a conversation between different worlds, which share their points of view and form a joint, synergetic, surprisingly rich universe. In its structure as well, leading from superficiality to depth, and finally to fusion and identification, this poem reflects the process that we, the researchers, underwent on the journey towards the understanding of the complexity of academic emotional types in the context of an example-rich environment. The mosaic described in this paper is a call to those working in education in general and in academic education in particular, to listen and intelligently to join the choir in a manner appropriate to the age of accessible information in an example-rich environment.

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Author details

Hava Greensfeld^{1,2}
E-mail: greensfeld@gmail.com
Efrat Nevo¹
E-mail: efi.nevo@gmail.com

¹ Department of Education, Michlalah Jerusalem College, Bayit Vegan, P.O.B 16078, 29 Haari St, Jerusalem 92192, Israel.

² The MOFET Institute.

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Note

1. Two students were characterized as belonging to more than one type, which is why the prevalence sum is greater than 100%.

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