An Educational Unit on

Learning to Do

Lifelong Learning in the 21st Century
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TEMPUS IV
Lifelong Learning in Applied Fields

Dorit Alt – Kinneret College Jordan Valley, Israel
Ruth Zuzovsky – Kibbutzim College of Education, Israel
Nomy Dickman – Faculty of Medicine, Bar-Ilan University, Israel
Ariela Gordon-Shaag – Hadassah Academic College, Israel
Nirit Raichel – Kinneret College Jordan Valley, Israel
Roxana Reichman – Gordon College of Education, Israel
Michela Bozzolan – GIMBE Institute, Italy
Kathleen McTiernan – Trinity College Dublin, Ireland
Ciara Ofarrell – Trinity College Dublin, Ireland
Andreia Monteiro – Inovamais, Portugal
Pedro Ramos – Inovamais, Portugal
Marina Ventura – University Institute of Lisbon, Portugal

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## Abbreviations:

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<th>Description</th>
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<tr>
<td>EDU</td>
<td>Educational Unit</td>
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<tr>
<td>LM</td>
<td>Learning Module</td>
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<td>EBP</td>
<td>Evidence–Based Practice</td>
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<td>BMT</td>
<td>Behavior Modeling Training</td>
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<td>ExBL</td>
<td>Experience–Based Learning</td>
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<td>PBL</td>
<td>Problem–Based Learning</td>
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<td>WBL</td>
<td>Work–Based Learning</td>
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<tr>
<td>CBL</td>
<td>Case–Based Learning</td>
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The EDU structure

The following document sketches the rationale, aims/objectives and outcomes of the EDU. These general aims and objectives are then translated into teaching/learning activities (referred to as Learning Modules – LM) which can be applied separately. The modularity of the EDU allows course instructors to choose a certain LM from this EDU and apply it in their already existing courses.

The document consists of two parts:

Part I presents a theoretical framework that points out the existing tendency to change the short period devoted today to professionals for work preparation, to a paradigm based on the developing "adaptive experts" who are able to continue to learn in order to cope with the changing and ever-growing complexities they encounter. Two dimensions along which professional growth occurs are presented: The efficiency dimension and the innovative dimension. The EDU aims and outcomes are also specified. General aims and outcomes are concisely indicated.

Part II briefly presents six Learning Modules (LMs) highlighting their basic definition, rationale, objectives and learning outcomes. In addition, for each case there is a practical example of how to create strategies to develop the skills, based on the theoretical body presented. Optional assessment tools for each LM are also provided. However, it should be noted that these tools are not content related (for this purpose – each teacher can apply the best suitable tools, based on his/her institutional/professional/curricula requirements). The suggested tools could help the teacher assess the extent to which the teaching/learning methods were efficiently applied in the learning environment according to students' reports.

A flowchart that illustrates the use of the EDU is shown below:
Part I – Theoretical framework

Introduction

"Knowing is not enough, we must apply. Willing is not enough, we must do" (Goethe, 1883).

"Learning to Do" is one of four dimensions of lifelong learning that were adopted and integrated in the current LLAF Tempus project. This dimension was first described in the report of the International Commission on Education for the 21st century led by Jacques Delors (1996) – “The Treasure Within” which may be informal or formal (Delors et al., 1996).

Another description that emphasizes occupational skills was given by the Canadian Council on Learning (CCL). According to this source, Learning to Do involves the acquisition of skills that are often linked to occupational success such as computer-training, managerial training and apprenticeships (CCL, 2010). The rationale of the EDU on Learning to Do was conceptualized in line with these descriptions.

Rationale of the Educational Unit on "Learning to Do"

In the face of changing realities, changes in the labor market, the growing knowledge base and the fast development of technologies, it has become clear that the short period devoted today to professionals' preparation for work is insufficient. Professionals must develop the ability to continue to learn in order to cope with the changing and ever-growing complexity of the context they work within. They should become “adaptive experts” (Hammerness et al., 2005; Hatano & Inagaki, 1986), by being engaged in educational and training focused on “learning to do”.

Being an adaptive expert involves not simply knowing existing best practices, but also having the skills and will to search for new practices when needed (Schwartz, Bransford & Sears, 2005). These capacities represent two dimensions along which professional growth occurs:

1. **The efficiency dimension** – this dimension involves greater ability to perform, usually by using effective routines;
2. **The innovative dimension** involves moving beyond existing routines, rethinking key ideas, practices and even values in order to change and even adapt to changing circumstances. This type of learning can be highly emotional as practitioners abandon their previous self-confidence.
People who are high on the efficiency dimension can rapidly retrieve and accurately apply appropriate knowledge and skills to solve a problem or understand an explanation. Efficiency is typical in situations with a high degree of consistency (lack of variability). The best way to be efficient is to practice and gain experience with important components of problems so that they become routine and easy to solve later. “Teach for it” (or “teach for the test”) is the best way to ensure transfer. Efficiency-oriented practice is often about problem elimination rather than in-depth problem solving. Because efficiency is so emphasized in our time-limited society, it tends to take over other ways of learning.

Experimental studies show that efficiency can often produce “functionally fixed” experts who become very good at solving particular sets of problems but do not continue to learn throughout their lifetime, except for becoming more efficient.

Learning for more than applying efficiently old routines requires another type of learning—more adaptive and innovative. Innovative learning requires interactions that reach beyond the immediately known. People often do not know what the final goal will look like at the outset. Interacting with other people and with artifacts is a powerful way to accelerate the development of innovation. Also, innovation can occur in moments of quiet reflection. Innovation and adaptability mean “favor the prepared mind”. That is to say that people need to acquire the kinds of well-organized fluently accessible sets of skills and knowledge that are represented on the efficiency dimension before turning to innovative learning. What is important in learning is the balance between efficiency and innovation. Keeping this balance leads to what Hatano and Inagaki (1986) called “adaptive expertise”.

An adaptive expert is characterized by a move from being efficient to being innovative. Lifelong learning often involves this kind of move, giving up old routines and transforming prior beliefs and practices. The processes of efficiency and innovation are assumed to be complementary; thus, an important feature of adaptive experts lies in their abilities to balance these two dimensions.
Aims of the EDU

This Educational Unit focuses on the opportunities for ongoing growth of practical professional capacities in each of the applied fields along the two dimensions of professional growth, and aims to provide opportunities to experience new (lifelong) modes of learning along the two dimensions,

Learning outcomes

Along the Efficiency Dimension

- Students will be able to update their knowledge of practices that "work";
- Students will be able to get access to scientific databases and obtain evidence that justifies a chosen practice that fits the context of their work;
- Students will be able to provide justification in the form of a "practical argument" that includes "a description of a valued outcome of action, theoretical rationale, empirical evidence for its desired results, and the fitting of the action with the situation" (Fenstermacher & Richardson, 1993); and
- Students will be able to apply the practice in real authentic professional situations and evaluate its effect (optional).

Along the Innovative Dimension

- Students will be able to relate to a practical problem that requires a non-conventional solution;
- Students will be able to work in teams in order to invent and suggest innovative solutions to the problem (problem–based learning);
- Students will be able to test their proposed practical solution and evaluate its benefits; and
- Students will be able to disseminate their tested solution.

Along the two dimensions, students will be able to develop:

- A critical stance
- Openness to feedback
- A will to change old routines
- Tolerance for uncertainty
Part II – Learning modules

1. The efficiency dimension
In line with the efficiency dimension, the following LMs are suggested:

1.1 Evidence-Based Practice – EBP

What is Evidence-Based Practice – EBP?
Evidence-based refers to any concept or strategy that is derived from or informed by evidence — most commonly, educational research or metrics of school, teacher, and student performance. EBP requires teachers to recognize that decisions should be based on the best available, current, valid and relevant evidence. All professionals need to understand the principles of EBP, recognize it in action, implement evidence-based policies, and have a critical attitude to their own practice in light of valid evidence. Without these skills professionals will find it difficult to provide 'best practice'.

Evidence-based practice conceives a professional action as an intervention and searches for research evidence regarding the effectiveness of this intervention. Research needs to find out “what works” and the main way, if not the only way, of doing it is through experimental or at least quasi-experimental studies.

In medicine, the term evidence-based practice (EBP) is defined as “the integration of best research evidence with clinical experience and client values” in order to guide clinicians to an optimal clinical decision for an individual patient (Sackett, Straus, Richardson & Rosenberg, 2000). According to these authors the EBP process comprises five methodological steps, each requiring specific knowledge and skill:

1. Translation of uncertainty into answerable questions;
2. Search for and retrieval of the best evidence;
3. Critical appraisal of evidence for validity and clinical importance;
4. Application of appraised evidence to practice; and
5. Evaluating the effectiveness and efficiency of executing steps 1–4.

In education, the case for evidence-based instruction has generated much discussion. On the one hand, although not leading to universal answers, the accumulated and available research evidence allows looking at practice through different theoretical lenses that guided the research. But on the other hand, answering the question of what works or what is effective can narrow what is
learned to a rather technological model where there is a separation between means and ends. Research in education should not only investigate the effectiveness of educational means but should at the same time inquire into the desirability of educational ends. The research should address not only the question “what is effective” but also the question “effective for what” (Biesta, 2007).

Rationale for this Module
During the last century, there has been an exponential growth of research and knowledge. Electronic access to full text articles and journals has started to become extremely available. Regular use of these resources is identified as one marker for lifelong learning among practitioners. Teaching EBP skills should be, as far as possible, integrated into professionals’ life-long learning about practices.

Objectives

1. Providing students the skills of how to translate uncertainty to an answerable question
2. Guiding students on how to systematically retrieve best evidence available
3. Giving students the opportunity to critically appraise evidence for validity, clinical relevance, and applicability
4. Creating an environment in which students can apply results in practice
5. Encouraging students to evaluate their performance and equipping them with relevant tools.

Learning outcomes

1. Translation of uncertainty into an answerable question. The student will be able to identify knowledge gaps during the course of practice and asks foreground questions to fill these gaps. The student should ask focused questions that lead to effective search and appraisal strategies.
2. Search for and retrieval of evidence. The student will be able to design and conduct a search strategy to answer questions. The strategy should be effective and comprehensive: likely to retrieve all relevant evidence. The student will be able to understand the strengths and weaknesses of the different sources of evidence.
3. **Critical appraisal of evidence for validity and worth importance.** The student will be able to appraise the validity of a study. The appraisal will include: the suitability of the type of study to the type of question asked, the design of the study and sources of bias, the reliability of outcome measures chosen, and the suitability and robustness of the analysis employed. The student will be able to appraise the importance of the outcomes and translate them into a meaningful summary.

4. **Application of appraised evidence to practice.** The student will be able to assess the relevance of the appraised evidence to the need that prompted the question.

5. **Evaluation of performance.** The student will be able to ask focused questions, search sources of evidence, appraise or use pre-appraised evidence and apply these in practice. The student will be able to reflect on how well these activities are performed.

**Assessment**

The evaluation targets are people’s reactions (participation, change in attitudes and self-efficacy); changes in knowledge and skills; behavioral modifications, and finally the real benefits for people assisted (Bozzolan et al., 2014).

The following table illustrates Tilson et al.’s BMC Medical Education (2011) proposal for categorizing assessment of EBP educational outcomes. However, this categorization can be easily adapted to other applied subjects.

**Categories of EBP Learner Educational Assessments**

<table>
<thead>
<tr>
<th>Assessment Category</th>
<th>Example of what is assessed</th>
</tr>
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<tbody>
<tr>
<td>1. Reaction to the EBP educational experience</td>
<td>Did the learners feel that the EBP educational experience provided benefit?</td>
</tr>
<tr>
<td>2. Attitudes about EBP</td>
<td>Do the learners value EBP as an important part of their role in healthcare?</td>
</tr>
<tr>
<td>3. Self-efficacy for conducting EBP</td>
<td>Do the learners have confidence in their ability to carry out the 5-step EBP process?</td>
</tr>
<tr>
<td>4. Knowledge about EBP principles</td>
<td>Do the learners know which study design is most appropriate for a prognostic study of a common condition?</td>
</tr>
<tr>
<td>5. Skills for performing EBP</td>
<td>Are the learners effective at conducting a search for systematic reviews?</td>
</tr>
<tr>
<td>6. Behavior congruent with EBP as part of patient care</td>
<td>Do the learners identify knowledge gaps and pursue best available evidence to address them?</td>
</tr>
<tr>
<td>7. Benefit to patients associated with EBP</td>
<td>Do the learners’ EBP actions result in improved patient outcomes?</td>
</tr>
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1.2 Behavior Modeling Training – BMT

What is Behavior Modeling Training – BMT?
Behavior or modeling training, introduced by Goldstein and Sorcher (1974, cit. in Taylor, Russ-Eft & Chan, 2005), is an instruction model based on Bandura’s social learning theory and is widely used in the training context. This theory describes learning as occurring along the processes of attention, retention, motivation and reproduction. Regarding the attention process, BMT involves the observation of models (e.g. a film where someone performs a behavior). Attention may be influenced by the sequence in which the behaviors to be learned are presented (e.g. from the easiest to the most difficult), by the way the key behaviors are highlighted. If the model is a person, attention is influenced by the model’s characteristics (if he/she is considered to be competent and shares characteristics like age and gender with the student), and by the student’s own characteristics, such as individual abilities or activation level (Taylor et al., 2005).

The retention process is involved in the transfer of acquired knowledge to long term memory. This process involves the symbolic coding of the observed behaviors, which can be facilitated by mentally rehearsing that behavior (Taylor et al., 2005).

To facilitate the retention and symbolic coding of the skills to be learned, BMT defines learning points, consisting of detailed descriptions of the skills to be learned, in the form of a code or rule (an example would be: “listens and answers with empathy, in order to reduce the customer’s defensiveness”, instead of just mentioning “empathetic listening” (Taylor et al., 2005).

The motivation and reproduction processes occur simultaneously as the student practices the skills previously observed. This reproduction of behaviors, named skills practice or behavior rehearsal, is accompanied by feedback provided from the teacher or peers. This feedback, apart from its correction function, is intended to be a motivational factor through the social reinforcement it brings when behaviors are performed properly (Taylor et al., 2005).
**Rationale for this Module**
The transfer of learning to the workplace is a focal point of BMT and many techniques have been suggested to maximize it, namely: asking students while they are learning to establish objectives on how they will apply the skills to the workplace; providing the students’ superiors with training on the target skills; or creating a reward system in the workplace, related to the newly learned skills (Taylor et al., 2005).

**Objectives**
1. Presenting a set of well-defined behaviors (skills) to be learned;
2. Presenting one or various models which show the target behavior being performed correctly;
3. Creating opportunities to practice the behaviors;
4. Providing feedback and social reinforcement following the behaviors’ performance;
5. Taking measures to maximize the transfer of these behaviors to the work context.

**Learning outcomes**
Through their observations students will be able to:
1. Remember what the model did,
2. Replicate the model,
3. Use what was learned in the workplace.

**Assessment**
Pre- and post- test evaluations on the following criteria (Taylor et al., 2005): first, declarative knowledge (e.g., typically written tests using multiple-choice format); second, procedural knowledge–skills (skills assessed in simulation tasks or through paper–and–pencil situational judgment tests); third, training–related attitudes (e.g., self–efficacy); fourth, job behavior; and fifth, two results of trainee behavior: workgroup productivity and workgroup climate — both outcomes assessed in many evaluations of BMT supervisory training.
1.3 Case-Based Learning – CBL

What is Case-Based Learning – CBL?
CBL is a pedagogy that uses case studies or case reports that have been written for teaching purposes. Teaching cases can vary in length from brief vignettes used in medical studies to lengthier narratives (2–3 pages) employed in ethics courses to extended accounts (50 pages or more) used in business schools.
Case studies are written summaries or syntheses of real–life cases that require students to extract the key issues involved and to identify appropriate strategies for the resolution of the 'case'. Whereas a simulation or role play may require students to 'enact' or simulate working out a particular problem, a case study only requires thinking through the issues. Case studies are most often used in law, social work, psychology, management, medicine and education.

Shulman (1992) states that to call something a case is to make a theoretical claim. He argues that the story, event or text is an instance of a larger class, an example of a broader category. Cases used to teach are:

- principles or concepts of theoretical nature
- precedents of practice
- moral or ethic
- strategies, disposition and habits of mind
- visions or images of the possible.

These cases create motivation for learning, provide unique benefits for those who write them, serve as powerful antidote to overgeneralization of principles, and serve as instructional materials around which participants can form communities of discourse.

A case study is composed of an engaging and/or controversial story, usually a dilemma that requires a basic understanding of scientific principles (Shulman, 1992; Shulman & Colbert, 1988; Silberstein and Tamir, 1991). A case should be actually–based, complex problems written to stimulate classroom discussion and collaborative analysis, which involves the interactive, student–centered exploration of realistic and specific situations. CBL is the modern way of using narratives developed to provide authentic learning for students (Shulman, 1992). CBL is described as the catalyst for class discussions and lectures, as it is carefully implemented by the teachers and enthusiastically engaged by the students (Blackmon, Hong, & Choi, 2007). Case–based instruction is very popular in Law schools and in Business Administration schools. In education, the
choice of the cases must fit an accepted ideological framework. Writing cases is hard. Case–writing in education focuses either on problematic issues, success events or on performance of expert teachers (Shulman, 1992; Shulman & Colbert, 1988; Silberstein & Tamir, 1991).

Case studies can be used differently. In business they are oriented toward crisis management. In education they are often oriented toward management of routines and coping with the predictable. In such cases it is advised to present more than one case in order to avoid a prescriptive mode of learning.

The case study is in a sense a kind of simulation of a real–life situation in which the experience is secondhand and probably condensed. The important merit of the case study is that it allows a problem to be studied in a complex form, including elements of real–life events, which might be impossible to reproduce in the classroom. Typically the students are provided with case notes in advance and are expected to prepare their own solution to the problem or problems presented. Case studies open up opportunities for role play where it becomes necessary to shed light on particular encounters rather than general issues.

**Rationale for this Module**
CBL is deemed to provide opportunities for richer, profound exploration of concepts and ideas, through which learners obtain experience with analyzing ideas and solving problems rather than acquiring abstract knowledge. CBL’s main traits are that a case, problem, or inquiry is used to stimulate and underpin the acquisition of knowledge, skills, and attitudes. Cases place events in a context or situation that promote authentic learning

**Objectives (Blackmon, Hong, & Choi, 2007)**

1. Engaging learners in discussion.
2. Providing students with opportunities to analyze, propose solutions, evaluate potential solutions, solve problems, or make decisions.
3. Giving students an active role in the learning process.
4. Helping learners improve higher–order thinking ability and achieve deeper understanding of the to–be–learned content.
5. Combining the content of cases and the process of discussion.
Learning outcomes
Students will be able to:
1. Sort out factual data
2. Apply analytic tools
3. Articulate issues
4. Reflect on their relevant experiences
5. Draw conclusions they can relate to new situations
6. Identify problems as they perceive them
7. Connect the meaning of the story to their own lives
8. Bring their own background knowledge and principles
9. Raise points and questions, and defend their positions
10. Formulate strategies to analyze the data and generate possible solutions

Assessment

2. The innovative dimension
In line with the innovative dimension, the following LMs are suggested:

2.1 Work–Based Learning

What is Work–Based Learning – WBL?
Work–based learning has a fundamental characteristic, the connection between teaching practice and the organizational needs of companies. Learning occurs through activities that directly promote the professional skills required to meet the needs in a given sector of the company. This learning can occur in the workplace, where the student learns the job by doing it, or in contexts based on the work environment where the student will eventually work, along with lectures in the education institution (Nixon, Smith, Stafford, & Camm, 2006).
In this type of learning, educational objectives are identified and agreed on by the student, the educational institution, and the employer. The agreement depends on specific needs and interests of the three elements involved (Nixon et al., 2006):
1. The student, through his/her life plan, which includes personal and professional aspirations;
2. The educational institution based on its strategy, which includes dissemination, recruitment, student access, curricular programmes, and its concern in research and development;
3. The employer, depending on their business plan, which includes objectives in productivity, innovation, and workforce development. Learning initiatives in the workplace can take various formats, such as specific skills training for a particular job, coaching in the workplace, internships, brief (e.g. some weeks as part of a project) or long term (e.g. one year to pursue a profession in a company, as part of a course).

A learning initiative in the workplace involved, for example, the participation of companies in the construction of the curriculum in a graphic design course. Although students had fulltime classes in their institution, the companies were involved in the structuring of the course content, the creation of facilities, and information and communication applications for use in the course, and the integration of students in real work projects (Nixon et al., 2006).

**Rationale for this Module**

This is an educational approach that focuses on skills development in close link with the tasks and job requirements of specific organizations. Probably the most critical element of work-based learning is the possibility of applying recently acquired skills and knowledge. This is where the value of work-based learning is truly realized. Differently said, there is a direct link between the needs of a company in terms of the skills required from a potential new employee, and the process of education which prepares and guides the student according to the profile of skills that he/she needs to develop in order to occupy that position or to perform that specific task.

**Objectives (Nixon et al., 2006):**

1. Linking learning to the task: learning is achieved through the performance of tasks and the solving of situations or problems found in the workplace.
2. Promoting innovative thinking: consisting of the use of new approaches and techniques to deal with new problems.
3. Cultivating an autonomously managed and self-regulated learner: learning takes place without the presence of direct or formal instruction. It is expected that students take responsibility for their own learning.
4. Taking into account personal development and organizational performance improvement.
Learning outcomes
Students will be able to:

1. Students will be able to apply recently acquired skills and knowledge in specific tasks.
2. Students will be able to identify the needs of a company in terms of the skills required from a potential new employee.
3. Students will be able to identify the skills that they need to develop in order to occupy that position or to perform that specific task.
4. Students will be able to train and develop skills in real time and in a realistic context.
5. Students will be able to obtain feedback and reflect on their performance.

Assessment
Work-based learning assessment can be divided into two types: the products of the period of work itself (e.g. reports completed in the job, leaflets, webpages, presentations to colleagues), and the extra pieces of work (e.g. portfolios, reflections, videos of practice). Southampton Solent University outlined several typical assessment tasks. These are examples of types of assessment that are appropriate for assessing placement or work-based learning. The nature of these will depend on the subject studied, the learning outcomes, the size of the assessment, and the unit level.

1. Reflection – the student undertakes the work as normal, and then reflects upon it.
2. Portfolios of evidence – these are a combination of shorter pieces of work, possibly including some evidence that work has been completed, with some reflective element.
3. Presentations – the student completes the work and then does a presentation on his/her experience to an audience which might include employers.
4. Videos of practice behavior.
5. Project – a defined piece of work that is part of the normal job, that has a clear beginning and end, but which contributes to the job.
6. Case study – a piece of work that is drawn from normal work but which exemplifies some key principles/theories.
7. Research project – this is research on the workplace, which is outside the normal role of the job.

Examples are given at the following link:
2.2 Problem–Based Learning

**What is Problem–Based Learning?**

Problem–Based Learning is a practical and active teaching technique, focused on the research and solving of real problems, developed in the Faculty of Medicine of McMaster in Canada. It fits within the constructivist theory of learning, which envisages learning as an active process by which students build new ideas and concepts based on their own knowledge. Students select and transform information, produce hypothesis and make decisions, while also organizing their individual knowledge in cognitive structures. In educational terms, this theory implies that learning and skills development is an autonomous task of students, i.e., students are encouraged to discover basic principles for themselves (Savery & Duffy, 1996)

**Rationale for this Module**

Problem–based approach to learning is an instructional method in which students learn through facilitated problem solving. In PBL, students center on a complex problem that does not have a single correct answer. They work in collaborative groups to identify what they need to learn in order to solve a problem. They engage in self-directed learning (SDL), and then apply their new knowledge to the problem and reflect on what they learned and the effectiveness of the strategies employed. In this way they learn both content and thinking strategies.

This type of learning leads not only to the acquisition of technical skills, specific to the subject or field, but also allows, by its own nature, the development of skills like problem analysis and solving, critical thinking, cooperation and team work, decision making and self–regulation that can be transferred to other contexts.

Although there are several different developments and applications of the model, it is possible to distinguish some basic principles that characterize and define this approach (Walker & Leary, 2009): a) Students are presented with ill–structured problems, open–ended or unsolved problems, which stimulate students to generate ideas about possible causes of the problem and also about different ways of solving them. The problems presented do not have a single solution and should encourage students to explore different paths in order to solve them; b) Problem–based learning is a student–centred approach in which students determine what they need to learn. It is up to the students to decide
what the key components of the proposed problem are, define the gaps in their knowledge, and acquire the missing knowledge; c) The role of the teacher is to facilitate or act as a tutor during the learning process. Initially the teacher guides the students with meta-cognitive questions, but the orientation decreases along the process. Teachers can also provide lessons and content targeted to model the learning process, which students need to pursue in order to be successful in the task; d) The problem must be chosen taking into account its degree of authenticity. It should be related to actual practice in the field, or to actual events in the “real world”. As such problems are inherently interdisciplinary, students are required to investigate multiple issues within several areas to reach a viable solution to the problem.

Objectives (Chin & Chia, 2004; Hmelo-Silver, 2004)

1. Promoting intrinsic innovation: To present ill-structured, interdisciplinary, unsolved and authentic problems which stimulate students to generate ideas about possible causes of the problem and also about different ways of solving it.
2. Promoting flexible knowledge: To encourage students to explore different paths in order to solve ill-structured problems.
3. Developing effective problem solving skills: To encourage students to determine what they need to learn. It is up to the students to decide what the key components of the proposed problem are, define the gaps in their knowledge, and acquire the missing knowledge.
4. Developing self-directed learning skills:
   a. To guide the students with meta-cognitive questions.
   b. To provide lessons and content targeted to model the learning process, which students need to pursue in order to be successful in the task.
5. Effective collaboration skills: To encourage students to work in groups.
Learning outcomes (Problem–based learning [http://www.studygs.net/pbl.htm])

1. Students will be able to discuss the problem statement and list its significant parts.
2. Students will be able to list strengths and capabilities each team member has regarding the problem statement solving process.
3. Students will be able to develop, and write out, the problem statement in their own words.
4. Students will be able to list possible solutions, order them from strongest to weakest, and choose the best or most likely to succeed.
5. Students will be able to list actions to be taken with a timeline.
6. Students will be able to research the knowledge and data that support their solution.
7. Students will be able to write their solution with its supporting documentation.
8. Students will be able to present and defend their conclusions.
9. Students will be able to review/reflect on their performance.

Assessment

1. The CLHES questionnaire (Alt, 2014) (see APPENDIX A).
2. The CPLE scale (Tenenbaum et al., 2001) (see APPENDIX B).
   The full Hebrew version of the scale is also provided (APPENDIX C).

2.3 Experience–Based Learning

What is Experience–Based Learning – ExBL?
Experience–based learning is included in the group of motivational and humanistic theories of learning. This theory is characterized by the central role that is assigned to the students’ experience in the learning process. The theory proposes that learning occurs when the students analyze of their experience through reflection and reconstruction, and derive meaning from it. Here, experience is understood as past life events, current life events, or activities implemented within the teaching process (Andresen, Boud & Cohen, 2000). The many forms of learning based on experience include: internships, study visits, laboratory experiments, case studies, action research, role–play and simulations. Other more subtle forms may include computer simulations, use of realistic models, activities with visual aids, group discussions, and autobiographical writing, among others (Andresen et al., 2000).
Rationale for this Module
Learning is the process whereby knowledge is created through the transformation of experience. This definition emphasizes several critical aspects of the learning process as viewed from the experiential perspective. First is emphasis on the process of adaptation and learning as opposed to content or outcomes. Second is that knowledge is a transformation process, continuously created and recreated, not an independent entity to be acquired or transmitted. Third, learning transforms experience in both its objective and subjective forms. Finally, to understand learning, we must understand the nature of knowledge, and vice versa (Kolb, 1984, p. 38). Experience-based learning calls upon students’ life experience, involves the whole person, promotes reflection on experience, and stimulates the search for new experiences and, thus, promotes the continuation of the learning process. Kolb (1984) developed a model based on experiential learning, vastly used in the current educational context. This is a four-stage cyclical theory which combines experience, perception, cognition and behaviour. Kolb’s learning cycle shows how experience, through reflection, is translated into concepts, which in turn are used as guides to undergo active experimentation, or to engage in the search for new experiences: The first stage, concrete experience, occurs when the student obtains an experience, for example, a laboratory activity; The second stage, reflective observation, occurs when the student intentionally reflects on the lived experience; The third stage, abstract conceptualization, occurs when the student tries to envision a theory or model from what was experienced; The fourth and final stage occurs when the student tries to establish a plan to test the built theory or hypothesis, in a future experience.

Objectives
1. Mobilizing various cognitive, emotional and sensory aspects of students through the use of role-play, simulations or educational games;
2. Promoting a greater level of involvement in the learning experience through the use of role-play, simulations or educational games;
3. Recognizing and using relevant life experiences of students, in order to link learning to significant personal experiences;
4. Encouraging a process of reflection about the experience.
Learning outcomes
In terms of the learning outcomes, this activity includes experience (completion of group work), reflecting on the experience (when students recall and describe their experiences in the group work), conceptualization (when students are asked to devise ways of solving situations and overcoming obstacles) and solution testing (when students discuss the proposed solution). This will lead to a new experience, more reflection, and planning for a future action (e.g. using the developed solutions in later group projects)
1. Students will be able to obtain a concrete experience during an activity.
2. Students will be able to reflect on the lived experience.
3. Students will be able to envision a theory or model from what was experienced.
4. Students will be able to establish a plan to test the built theory or hypothesis, in a future experience.

Assessment
A central feature of the assessment of ExBL is reflection. A model positing three stages of reflection associated with experiential learning activities is suggested by Boud and Walker (1990, pp. 61–80; cf. Boud, Keogh, & Walker, 1985). The model draws attention to
i. preparation for experiential events, where it is important to focus on the learner, the learning milieu, and the skills and strategies employed in reflection;
ii. reflection during an experiential activity, with its phases of noticing and intervening; and
iii. reflection after the event, redirecting the individual to experiencing, attending to feelings, and re-evaluating the experience.
Practical examples

1. The efficiency dimension

1.1 Evidence-Based Practice – EBP

Presenting clinical scenarios or asking students to share a problem encountered in clinical practice; framing a focused, answerable question in a structured format. Several formats are taught: 3-part (patient–intervention–outcome), 4-part (patient–intervention/exposure–comparator outcome), or 5-part (patient–intervention/ exposure–comparator–outcome–time) questions.

Theoretical instruction backed by a supervised practical session with online connection. A variety of databases should be shown such as Cochrane, MEDLINE, CINAHL, Evidence-Based Medicine, SumSearch, tripdatabase.com, with the relative benefits discussed.

Critical appraisal of evidence for validity and clinical importance should be obtained by Hurd's (1998) list of desired educational outcomes in being able to distinguish:

1. evidence from propaganda (advertisement)
2. probability from certainty
3. data from assertions
4. rational belief from superstitions
5. science from folklore

Examples include applying the identified evidence to the specific context that led to the quest for evidence. This requires exploration of the generalizability of the evidence to the specific scenario, and 'particularizing' outcomes by adjusting for patient–specific risks.

An example of an evidence-based data source is WHAT WORKS CLEARING HOUSE (WWC) that was developed in the USA. It is designed to inform decision makers in the fields of education, health, medicine, and social policy regarding what works in their fields. WWC expresses its preference for data derived from experimental and quasi-experimental studies. By specifying a fixed set of questions to be answered concerning each study, WWC experts believe they have produced coding schemes that prescriptively determine the validity and reliability of studies and thus assure the results’ trustworthiness.
1.2 Behavior Modeling Training – BMT

A way of applying BMT is by developing, presenting and providing various videos that illustrate the different stages of, for example, a lab procedure, and asking students to watch each video and practice every step of the experiment. Each video should focus on one of the main points of the activity performed by a model. For example:

Video 1 – Prepare the necessary lab materials
Video 2 – Prepare samples
Video 3 – Specific procedures for sample analysis
Video 4 – Record the results

Each video can be accompanied by a description of the procedure presented, in which the importance and function of this step of the procedure is highlighted. Students should watch the videos in groups and may have it available for further consultation if necessary.

After watching each video, members of the group should practice the task presented as often as necessary, until they achieve the required behavior. The role of the teacher is to monitor the students’ performance and to provide information on the adequacy of the performance as well as ways to improve it.

To promote the transfer of learning, the procedure can later be repeated in a real work situation, for example in an Analysis Laboratory that offers its facilities and assesses the quality of the procedure, taking into account the current market standard.

1.3 Case-Based Learning – CBL

Based on Planning for Case-Based Learning (retrieved 27, September 2014), examples of cases with commonly encountered formats are provided with a brief description and likely implementation strategies.

1. Extensive, detailed case study.
   - Frequently used in business courses,
   - Often centers on a particular decision, the people who made it, the people affected by it, and the impact of that decision on all parties.
   - May run 100 pages or more. Usually the student reads the entire case individually and prepares an analysis of the decisions with recommendations for change. The case is then discussed.
2. Descriptive, narrative cases, parts of which are given successively.
   - Up to 5 pages
   - 1–2 paragraphs per page
   - Designed to be used over the course of two or more class meetings.
   - Disclosed to the students one page at a time, with discussion, hypothesis generation and development of learning goals and study questions for each part of the case.
   - Objectives are given to the student toward the end of the case.
   - This style of case originated in medical settings.

3. Mini-Cases
   - Designed to be used in a single class meeting,
   - Usually tightly focused.
   - Useful for helping students apply concepts, for introducing practical applications in lab settings, or as a pre-lab exercise designed to make lab work more meaningful.

4. Bullet Cases
   - Two or three sentences with a single teaching point.
   - Similar to problems commonly used on exams, however, students discuss them in small groups.

5. Directed Case Study
   - Short cases are followed immediately with highly directed questions.

6. Fixed Choice Options (Multiple Choice Cases)
   - May be a variation on bullet cases above,
   - A mini case with 4–5 plausible solutions. In groups students must choose and defend one solution.
   - Useful for policy, ethics, design decisions.
   - Good for short, in-class uses.
   - Multiple choice questions might convert easily to these.
2. The innovative dimension

2.1 Work-Based Learning

Job shadowing
The technique of job shadowing is a short term educational experience, usually a working day (8h), where a student follows and observes an employee of a company in his/her daily work activities, getting to know the specifics of a particular profession. This technique allows students to:

1. Get to know the technical requirements and skills needed to perform and progress within a particular profession.
2. Become familiar with the typical working environment of a particular profession.
3. Get to know the details of executing a profession in the “real world”.
4. Encourage the development of behaviours that are appropriate in the workplace, such as courtesy, promptness, respect and cooperation.

Procedures involved in developing a job shadowing initiative at the institution:

1. Contact potential partners to know their willingness to participate in the initiative.
2. Meet with the selected partner to check the adequacy of the workplace in terms of available and relevant learning opportunities.
3. Proceed with the establishment of protocols on issues such as contacts, health and safety, schedules, costs involved, etc.
4. Develop a plan in collaboration with the company for the students’ observation activities, which provides them with diverse work experiences with regard to the profession being considered.
5. Develop a method for assessing the initiative, in conjunction with the company, in terms of interest, adaptation and attitude of the student.
6. Guide the student in advance about the nature of the initiative, and job shadowing plan established and expected results.
7. Promote the integration of the experience of job shadowing in the learning process of students.
A student may for example follow a Town Hall Environmental Engineer in his/her activities.

At the company level or the host institution:

1. Provide the student with different and enriching experiences of observation, enabling him/her to know the key aspects of a particular profession through observation of one or more employees in the real world.
2. Provide the student with a job shadowing performance assessment which will be prepared by the employee who was followed by the student.
3. Ensure the safety of the student in the course of the initiative.
   The student will be responsible for:
4. Meeting the schedules, and abiding by rules of conduct and safety of the host company.
5. Following the established job shadowing plan, following and observing the employee when performing specific tasks, making the necessary records and clearing eventual doubts along the process.

In short, through contact with work contexts in the “real world” and by following and observing an employee from a company or institution in the exercise of his/her profession, job shadowing allows students to obtain knowledge about specific tasks, thus becoming aware of the particularities of the profession and of the skills and technical procedures required. It is also intended that students learn how to behave appropriately, as required by today’s professional world.

2.2 Problem–Based Learning

In practical terms, this approach has several phases in which students take responsibility for the chosen learning path, and teachers, not assuming a passive role, appear as catalysts and facilitators of that same path (Goodnough, 2006):

1. Presenting the problem – an authentic problem, real and relevant to the subject is presented to the students in an ill structured manner.
2. Forming groups – groups of students, usually consisting of five members discuss the problem. At this stage, the key points of the problem are defined by the group. Students also assess the knowledge they already possess, and the knowledge they need to acquire (learning needs) in order to reach a solution.
3. After a phase of individual research and study, the group comes together to share their results in order to recycle the previous phase by building a better definition of the problem, presenting and discussing hypotheses or pointing out existing gaps to fill.

4. In the process, the teacher can act as a facilitator, providing students with useful strategies for the process of problem solving, or teaching important content.

5. Preparation and presentation of the answer – after the processes of defining the problem and searching for information are completed, students prepare an answer or solution to the problem. This solution must be presented, along with the reasoning and theoretical background used in its making.

How to apply the above process? To start the process, in a preparatory phase, groups of 5 members each are created.

Step 1 - Presenting a problem
The teacher presents a problem or scenario which is not completely defined. This problem should require more knowledge than the students already possess, encouraging the process of discovery and learning.

Example of a problem involving methods of water analysis: “Several species of a public aquarium are perishing. What is the best method to analyze the water and check for a pathogen that may be causing the problem?”

Step 2 - Defining the exact problem (“What do we know?”)
In this phase the teacher guides students to write down everything they know about the problem and create a concrete definition of the problem, based on that knowledge.

For example, given that this is a public aquarium, dependent on the revenue to continue its activity, students can define the problem as “What is the fastest method of analyzing the water to prevent further loss of revenue?”

Step 3 - Identifying learning needs (“What do we need to know?”)
The teacher guides students to list information or knowledge they need to acquire in order to advance in finding a solution to the problem. At this stage, students begin an independent search of information (books, online data bases, internet in general, etc.), to fill the identified needs.

The teacher can act as a facilitator by informing students about effective ways to research, or by teaching classes on topics raised by students.

An example of needs raised by students would be knowledge about methods of analyzing water.
Step 4 – Analysis solutions (“What should we do?”)  
At this stage the students, based on the knowledge acquired, draw one or more solutions and test their adequacy. In this case, students may use laboratory equipment and experiment with various methods of analysis (e.g. chemical analysis: volumetric analysis; instrumental analysis: electrochemical, radiochemical, thermal, etc.).

Step 5 – Presenting and supporting a solution  
Finally, students are asked to draw up a document or an oral presentation, in which the most viable solution is presented, accompanied by information that supports their choice.

2.3 Experience-Based Learning

After carrying out a practical group work (e.g. a week later), involving the execution of experimental procedures and preparation of a joint report, students are asked to reflect on the experience of participating in a group.

Each group is asked to:
1. Identify and describe a situation or incident in which they felt comfortable in the context of the task, and where they found it easy to overcome an obstacle.
2. Identify a situation or incident in which they felt uncomfortable, excluded from the group, blocked in the progress of the task, or in which they found it difficult to overcome a particular obstacle.

Students are instructed to be descriptive and include details they find relevant to the situation. The descriptions are then compiled and organized into two groups: positive experiences and negative experiences. The sharing of experiences can occur through brainstorming when all contribute both with their own experiences and participate in the discussion, or when each student is given a certain time to develop his/her particular situation, followed by a joint debate.

They are then asked to choose a difficult situation (e.g. difficulty with participating in the work group, difficulty making decisions in groups, difficulty with performing some of the tasks) and, in groups, discuss the reasons that lead to the situation, along with better ways to solve the issue. The solutions are then presented to the general group, where they are discussed and debated.
The role of the teacher in this process is to:

1. Highlight, from among the set of shared experiences, those obstacles and weaknesses common to the various groups.
2. Promote the sharing of experiences and constructive debate among the students.
3. Assist students in seeking personal solutions to difficult situations and in discussing courses of action with colleagues, in order to improve their performance.
4. Assist students in sharing and testing ideas and solutions, in order to solve and overcome obstacles.
Sources and references

Part I – Theoretical framework


Part II – Learning modules
1. The efficiency dimension
1.1 Evidence–Based Practice – EBP


http://www.biomedcentral.com/1472–6920/11/78


1.2 Behavior Modeling Training – BMT

1.3 Case–Based Learning – CBL

http://projects.coe.uga.edu/epltt/

Planning for Case–Based Learning
http://www.bioquest.org/lifelines/PlanningStages.html

2. The innovative dimension

2.1 Work-Based Learning

Guide to the Assessment of Work Based Learning (WBL)


2.2 Problem-Based Learning


http://community.dur.ac.uk/pestlhe.learning/index.php/pestlhe/article viewFile/82/202


Problem–based learninghttp://www.studygs.net/pbl.htm


### 2.3 Experience–Based Learning


## APPENDIX A

*The CLHES questionnaire: factors, sub-factors, item descriptions and internal consistencies (Cronbach’s alpha)*

<table>
<thead>
<tr>
<th>Factors and sub-factors</th>
<th>Item</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructive activity</td>
<td>c1. In this course, I was given opportunities to investigate real problems</td>
<td></td>
</tr>
<tr>
<td>(F1)</td>
<td>c2. During this course, I was given opportunities to raise questions about complex problems</td>
<td></td>
</tr>
<tr>
<td>Knowledge construction</td>
<td>c3. During this course, I was given opportunities to search for possible explanations for real problems</td>
<td></td>
</tr>
<tr>
<td>(A1)</td>
<td>c4. I was asked to analyse data regarding a significant problem I have raised during this course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c5. During this course, I was asked to draw conclusions from a research work, in which I have participated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(five items)</td>
<td>.85</td>
</tr>
<tr>
<td>Constructive activity</td>
<td>c6. In this course, I have learned skills with which I can deeply explore a subject of interest to me</td>
<td></td>
</tr>
<tr>
<td>(F1)</td>
<td>c7. I could examine in depth a major issue in this course</td>
<td></td>
</tr>
<tr>
<td>In-depth learning</td>
<td>c8. In this course, I have focused on a central subject which I was required to deeply understand</td>
<td></td>
</tr>
<tr>
<td>(A2)</td>
<td>c9. In this course, I have learned how to deeply investigate a certain subject</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c10. In this course, we &quot;jump&quot; from one subject to another without examining any subject in depth*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(four items, item c10 was omitted due to a low loading result)</td>
<td>.81</td>
</tr>
<tr>
<td>Constructive activity</td>
<td>c16. This course addressed interesting situations in reality</td>
<td></td>
</tr>
<tr>
<td>(F1)</td>
<td>c17. The course focused on giving relevant meaning to the learned concepts</td>
<td></td>
</tr>
<tr>
<td>Authenticity</td>
<td>c18. The course addressed real life and interesting events</td>
<td></td>
</tr>
<tr>
<td>(A3)</td>
<td>c19. The course was rich with real-life examples that interested me</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c20. The course did not address real life examples*</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>(five items)</td>
<td></td>
</tr>
<tr>
<td>Constructive activity</td>
<td>c21. In this course, ideas were presented from several points of view</td>
<td></td>
</tr>
<tr>
<td>(F1)</td>
<td>c22. I have learned about complex real issues in this course</td>
<td></td>
</tr>
<tr>
<td>Multiple perspectives</td>
<td>c23. I have realised that the reality is complex and multi - dimensional, in this course</td>
<td></td>
</tr>
<tr>
<td>(A4)</td>
<td>c24. In this course, I had to question and criticise accepted ideas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c25. In this course, ideas were presented from only one perspective, and were not allowed to be criticised*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(four items, item c25 was omitted due to a low loading result)</td>
<td>.77</td>
</tr>
</tbody>
</table>
The CLHES questionnaire: factors, sub-factors, item descriptions and internal consistencies (Cronbach’s alpha)

<table>
<thead>
<tr>
<th>Factors and sub-factors</th>
<th>Item</th>
<th>Cronbach's alpha</th>
</tr>
</thead>
</table>
| Constructive activity (F1)  
Prior knowledge (A5) | c26. This course dealt with subjects I have learned in other courses  
   c27. The subjects learned in this course were related to prior knowledge I have gained  
   c28. Things I have learned in this course have helped me understand the issues I have learned in other courses  
   c29. The subjects in this course were related to diverse contents of knowledge  
   c30. The subjects in this course were not related to other things I have learned in other courses* | (four items, item c30 was omitted due to a low loading result) .82 |
| Teacher– student interaction (F2) | c11. In this course, the teacher allowed me to think about my learning and how to improve it  
   c12. In this course, the teacher considered my learning pace  
   c13. In this course, I could set myself some learning goals  
   c14. In this course, the teacher encouraged me to think about my learning and ways to improve it  
   c15. In this course, the teacher made me think about the advantages and disadvantages of my learning | (five items) .89 |
| Social activity (F3)  
Social interaction (H1) | c31. This course included a variety of learning activities with other students  
   c32. I was given opportunities to learn with other students in this course  
   c33. I could collaborate with other students in this course | (three items) .90 |
| Social activity (F3)  
Cooperative dialogue (H2) | c34. Arguments and discussions were held during this course  
   c35. It was possible to express original ideas in this course  
   c36. In this course, I could express my opinion, even when it was different from other students | (three items) .84 |
# APPENDIX B

## The CPLE scale

<table>
<thead>
<tr>
<th>Factors and abbreviated items</th>
<th>Factor loading</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1. Arguments, discussions, debates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 The unit allowed for arguments, discussions and debates</td>
<td>.724</td>
<td></td>
</tr>
<tr>
<td>2 The unit encouraged originality of ideas</td>
<td>.659</td>
<td></td>
</tr>
<tr>
<td>3 The unit allowed for constant exchange of ideas between student and teacher</td>
<td>.818</td>
<td></td>
</tr>
<tr>
<td>4 I learned to develop mind tools in this unit (e.g. critical thinking)</td>
<td>.550</td>
<td>5 items</td>
</tr>
<tr>
<td>5 Multiple perspectives of situations were often presented in the unit</td>
<td></td>
<td>.86</td>
</tr>
<tr>
<td><strong>Factor 2. Conceptual conflicts and dilemmas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 The unit posed some dilemmas for me</td>
<td>.503</td>
<td></td>
</tr>
<tr>
<td>7 The unit caused confusion among conceptual ideas</td>
<td>.826</td>
<td>3 items</td>
</tr>
<tr>
<td>8 The unit caused conflicts for me among various concepts</td>
<td>.758</td>
<td>.70</td>
</tr>
<tr>
<td><strong>Factor 3. Sharing ideas with others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 The unit allowed social interaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 The unit comprised a variety of learning activities</td>
<td>.737</td>
<td></td>
</tr>
<tr>
<td>11 I was given sufficient opportunities to express myself</td>
<td>.874</td>
<td></td>
</tr>
<tr>
<td>12 I was given sufficient opportunities to share my own experiences with others</td>
<td>.439</td>
<td>4 items</td>
</tr>
<tr>
<td>13 The unit motivated me for further learning of related subjects</td>
<td>.569</td>
<td>.84</td>
</tr>
<tr>
<td>14 The unit taught me how to arrive at appropriate answers</td>
<td>.376</td>
<td></td>
</tr>
<tr>
<td>15 The unit resources effectively conveyed information to be learned</td>
<td>.823</td>
<td>3 items</td>
</tr>
<tr>
<td>16 The unit enabled me to use knowledge acquired for abstract thinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 The unit taught me to investigate concepts</td>
<td>.519</td>
<td></td>
</tr>
<tr>
<td>18 The ideas in the unit motivated me to learn</td>
<td>.572</td>
<td></td>
</tr>
<tr>
<td>19 The unit encouraged me to examine several perspectives of an issue</td>
<td>.741</td>
<td></td>
</tr>
<tr>
<td>20 The unit motivated me to think reflectively</td>
<td>.689</td>
<td>6 items</td>
</tr>
<tr>
<td>21 The unit motivated me to use knowledge acquired for abstract thinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factors and abbreviated items</td>
<td>Factor loading</td>
<td>Cronbach’s alpha</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Factor 6. Meeting students’ needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 The unit took into consideration my needs and concerns</td>
<td>.715</td>
<td></td>
</tr>
<tr>
<td>23 I felt pleased with what I learned in the unit</td>
<td>.305</td>
<td></td>
</tr>
<tr>
<td>24 The unit helped me to benefit from my learning difficulties</td>
<td>.801</td>
<td></td>
</tr>
<tr>
<td>25 The unit allowed for the negotiation of the instructional goals and objectives</td>
<td>.793</td>
<td>5 items</td>
</tr>
<tr>
<td>26 The unit helped me to pursue personal goals</td>
<td>.758</td>
<td>.85</td>
</tr>
<tr>
<td>Factor 7. Making meaning, real-life examples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 The learning environment encouraged me to think</td>
<td>.687</td>
<td></td>
</tr>
<tr>
<td>28 The unit focused more on making meaning of the learned concepts</td>
<td>.747</td>
<td></td>
</tr>
<tr>
<td>29 The unit addressed real-life events</td>
<td>.844</td>
<td>4 items</td>
</tr>
<tr>
<td>30 The unit was rich in examples</td>
<td>.728</td>
<td>.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.92</td>
</tr>
</tbody>
</table>
APPENDIX C
The Hebrew translation of the CPLE questionnaire

<table>
<thead>
<tr>
<th>קריאת ההודעה</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>ברוך</strong> זה אפיפיור ההלחנה שליהם דין</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. <strong>ברוך</strong> זהاف של היום תוך נ назад</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. <strong>ברוך</strong> איפשר החולית של היום ב לעתים</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. <strong>ברוך</strong> איפשר לבראש העיר, לפי א anda של היום</td>
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APPENDIX D

Revised Study Process Questionnaire (R-SPQ-2F)

This questionnaire has a number of questions about your attitudes towards your studies and your usual way of studying.

There is no right way of studying. It depends on what suits your own style and the course you are studying. It is accordingly important that you answer each question as honestly as you can. If you think your answer to a question would depend on the subject being studied, give the answer that would apply to the subject(s) most important to you.

Please fill in the appropriate circle alongside the question number on the “General Purpose Survey/Answer Sheet”. The letters alongside each number stand for the following response.

A — this item is never or only rarely true of me
B — this item is sometimes true of me
C — this item is true of me about half the time
D — this item is frequently true of me
E — this item is always or almost always true of me

Please choose the one most appropriate response to each question. Fill the oval on the Answer Sheet that best fits your immediate reaction. Do not spend a long time on each item: your first reaction is probably the best one. Please answer each item.

Do not worry about projecting a good image. Your answers are CONFIDENTIAL.

Thank you for your cooperation.

1. I find that at times studying gives me a feeling of deep personal satisfaction.
2. I find that I have to do enough work on a topic so that I can form my own conclusions before I am satisfied.
3. My aim is to pass the course while doing as little work as possible.
4. I only study seriously what’s given out in class or in the course outlines.
5. I feel that virtually any topic can be highly interesting once I get into it.
6. I find most new topics interesting and often spend extra time trying to obtain more information about them.
7. I do not find my course very interesting so I keep my work to the minimum.
8. I learn some things by rote, going over and over them until I know them by heart even if I do not understand them.
9. I find that studying academic topics can at times be as exciting as a good novel or movie.
10. I test myself on important topics until I understand them completely.
11. I find I can get by in most assessments by memorising key sections rather than trying to understand them.
12. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.

13. I work hard at my studies because I find the material interesting.

14. I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes.

15. I find it is not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics.

16. I believe that lecturers shouldn’t expect students to spend significant amounts of time studying material everyone knows won’t be examined.

17. I come to most classes with questions in mind that I want answering.

18. I make a point of looking at most of the suggested readings that go with the lectures.

19. I see no point in learning material which is not likely to be in the examination.

20. I find the best way to pass examinations is to try to remember answers to likely questions.

Scoring is in the following cyclical order:

5. “

Deep Approach Score: \[ \sum \text{All Deep Motive scores + all Deep Strategy scores} \]
Surface Approach Score: \[ \sum \text{All Surface Motive scores + all Surface Strategy scores} \]
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