All for One & One for All [1]:
a Multi-Faceted Model for Assessing Collaborate Learning in Higher Education

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Abstract

The paper presents a case-study of an experiment that used a multi-faceted assessment model, borrowing insights from complexity theory, in a graduate course titled "applied evaluation". The students' final course-grades were derived from two sources:(1) a test , (2) an evolving team-based learning portfolio that was assessed by the team itself, based on a set of criteria which were negotiated, defined, documented and agreed upon within the team. The portfolios were presented in an exhibition where each team got/gave feedback to/from the other teams. The paper elaborates the multi-faceted mechanisms of the design, that (a) provided for a combination of participatory and external assessment, and of formative as well as summative evaluation; (b) presented the students with authentic tasks that required self regulation and high-order thinking; (c) made the students practice giving and getting written peer feedback; (d) addressed potential free-riding; and (e) created inter-dependent networks, that required frequent contacts. Findings from the students' reflections show that this facet of the model was especially problematic for them, because their collaborative work relied on face-to-face meetings despite the fact that everyone lived and worked in a different place. The model should therefore be amended to insure that the teams make optimal use of modern technology and conduct their meetings mainly in cyberspace.

Key words: evaluation, collaborative learning, complexity, higher education, portfolio

Introduction

> *Collaborative or team-based projects become more popular in both secondary and post-secondary classrooms […] Constructing effective evaluation tools can be a daunting task.* (Gueldenzoph & May, 2002).

Why is assessment of collaborative projects such a daunting task? Answers can be found in the literature dealing with the evaluation of complex enterprises.

Pawson (2004), for example, described complex projects as ones that consist of a chain of steps which is often not linear, and involves negotiation and feedback at each stage; are prone to modification as they are implemented; and change through learning as stakeholders come to understand them. This description can easily be applied to team-based projects; so can also the following one:"…*parts have causal implications for the whole, interactions among parts have causal implications for the whole, parts have causal implications for each other, and the whole has causal implications for parts*" (Byrne, 2013: 218)

Conceptualizing a team-based project as a complex enterprise offers insight into why evaluating collaborate learning enterprises is a challenging task and why traditional tools fail to produce satisfactory assessments.

Enterprises that include multiple diverse components, are referred to as **complicated;** when characterized by fluidity and uncertainty, recursive causality, disproportionate relationships and emergent outcomes, they are called **complex** (Glouberman and Zimmerman, 2002).

Attempts to cope with challenges of evaluating complicated and complex enterprises are continuously yielding creative notions and approaches (s.f. in Sever, 2012), mostly based on

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[1] "All for one and one for all, united we stand divided we fall." Alexandre Dumas, *The Three Musketeers*

the understanding that moving from linear models and positivistic evaluations to qualitative evaluations and non-linear models is required (Barnes, Matka & Sullivan , 2003).

A classical approach addressing collaborate learning is the *cooperative learning* approach. Its application, says Sharan (2010), may produce processes that are more complicated than first perceived. The constant evolution of cooperative learning, he warns, can be threatening and teachers may become confused by it.

Cooperative learning structures positive interdependence by having students work in groups to complete tasks collectively toward academic goals (Slavin, 1990). Unlike individual learning, which can be competitive in nature, students learning cooperatively capitalize on one another's resources and skills. Successful cooperative learning tasks are described as intellectually demanding, creative, open-ended, and involve higher order thinking tasks (Ross & Smyth, 1995). In such tasks, individuals must know exactly what their responsibilities are and be accountable to the group in order to reach their goal. All group members must be involved and each member must have a task that they are responsible for, which cannot be completed by any other group member.

When cooperative learning is successfully incorporated, each group member has a task/ role and believes they are responsible for their learning and that of their group; members promote each other's success, assist one another with understanding and completion of assignments ; "free riding" is eliminated by individual and group accountability (each student demonstrates mastery of the content being studied, each student is accountable for their learning and work; social skills are developed (i.e. effective communication, interpersonal and group skills) that are vital for effective cooperative learning; and groups assess their effectiveness and decide how it can be improved (Brown & Ciuffetelli Parker, 2009).

 A number of cooperative learning techniques are available. Some, like *reciprocal teaching*, apply student pairing in which partners take turns reading, asking questions of each other, receiving immediate feedback. Doing so, students use meta-cognitive techniques such as clarifying, predicting and summarizing. Other techniques use small groups of four or five students, among them *STAD*, for example, where students are placed in small teams and are graded on the team's collaborate performance on tests, although the tests are taken individually.

In addition to, or in place of external evaluation (e.g. on tests), team-based projects may use *participatory evaluation* tools, such as *intra-group peer evaluations* and *self evaluation*.

Intra-group peer evaluations used for performance appraisal are becoming an integral part of today's team-based organizations. Teams with peer evaluations have been found to have higher levels of workload sharing, voice, cooperation, performance, and member satisfaction than teams that relied on external evaluations (Erez et.al (2002) . However, the research on peer-evaluations' validity in a team context is limited and some findings suggest that they can be influenced by rating bias (May & Gueldenzoph, 2006).

Self-evaluation, defined as students judging the quality of their work based on evidence and explicit criteria, is usually applied as a low-stakes assessment, seen as a potentially powerful technique because of its impact on student performance through enhanced self-efficacy and increased intrinsic motivation. Evidence about the positive effect of self-evaluation on student performance is particularly convincing for difficult tasks (Maehr & Stallings, 1972).

Bearing in mind all the above, a model has been constructed that (a) makes the subtle complexity of collaborate learning visible, by welding together (with adaptations) several cooperative learning techniques into a complicated and complex team-based learning task, and (b) builds into it a mixed-methods evaluation structure that aims to cope with the complexity of that task. The framework chosen for the team-based collaborate learning was

an evolving portfolio, which also served as a platform on which several assessment/evaluation mechanisms were operated.

The model and the experiment which applied it in a graduate course are presented henceforth.

The experiment

46 students took a graduate course titled "applied evaluation in view of future education"[2]. The course examined the place of evaluation in future education– as a professional discipline on the one hand and as a way of thinking on the other hand.

The course requirements were: presence at lessons; mandatory weekly reading; constructing an evolving team-based portfolio according to specific instructions, presenting it in an exhibition and taking a final test.

The course's staff included a teacher[3] and an assistant. The teacher's involvement was mainly in the classroom, while remaining in the shadows of the team-based portfolio and refraining from active involvement its processes. Consulting the teacher's assistant during the preparation of the portfolios was recommended, but not mandatory.

A student's final course grade was based on two sources: the test and the portfolio.

The test

After the course ended, the students took an individual open-book test in class. The test was individual and covered the full course - its lessons as well as the mandatory bibliography. It consisted of four parts, each offered choice between 2-4 questions, and required high order thinking. Taking the test was conditional on submission of the portfolio.

The team-based portfolio

A learning-portfolio is a collection of materials a student (here: a team of students) produces and selects to document, summarize, and highlight his/her growth, experiences and strengths (Smith & Tillema, 2008).

"rules of the game" [4]

The students group into teams of 4-6 members (by their own choice).

Each team constructs an evolving portfolio, which contains the following components:

1. A name/title of the portfolio
2. 12 lesson-based compartments – one for each lesson of the course:
3. Evaluation
   a. A list of the team's criteria for evaluating the portfolio.
   b. Documentation of the meeting/s in which these criteria were constructed, negotiated and agreed upon.
   c. A verbal assessment of the portfolio on each of the criteria, by each team member - explained and justified.
   d. The team's assessment of the portfolio, on each of the criteria and a final grade for the portfolio as a whole. Team members can add a verbal reservation to assessments of any criterion, but the final score of the portfolio must be consensual, signed by each member of the team (- only a score that got full consensus can be submitted.)

At the 11th lesson, all portfolios will be presented at an exhibition, in a format similar to poster-sessions in conferences .Each team will have its own "stand", where the portfolio will be open for review and a notebook for feedback from members of other teams will be posted on the stand. A rotating representative of the team will be present at the stand, available for

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[2] Given in the first semester of 2000
[3] The writer (i.e. myself)
[4] Instructions given to the student at the beginning of the course.

explanations and dialogue with visitors, while the other members (taking turns) will visit the other portfolios.

The final portfolio (after corrections, if necessary) will be submitted by the last (i.e. 14th) lesson of the course (to enable establishment of eligibility for taking the final test)

Constructing the lesson-related compartments (instructions)

- Each compartment must contain at least one *item* for this specific lesson.
- Each *item* will be submitted and signed by one of the team- members and will include (a) a *supplement/extension* to this lesson , (b) a justification of its relevance, and (c) written feedback from another team member (with his/her signature).
- Steps:
  a) " *Supplement*/*extension*" - find some relevant material from external sources (such as: newspapers, radio, TV etc; from an evaluation conducted in your own workplace; an article which you suggests to add to the course's bibliography for ; an interview with a professional evaluator; an evaluation report or evaluation plan that might illuminate some aspect of this lesson; etc.)
  b) *Justification/reasoning* - add a written explanation why this "supplement" is relevant for this specific lesson and its bibliographical item[5] : what does it illuminate, what aspect of the lesson does it connect to, etc.
  c) *Feedback* - Present your item to another member of the team and get his/her written feedback. Feedback must be fair, courteous and balanced: addressing both strengths and weaknesses of the item.
- A team member can submit a certain item only to <u>one</u> team member, and can only give feedback to one <u>other</u> member (no "swopping" within a pair).
- Construction of the 12 compartments must be fairly distributed among the team-members (see the pre-designed matrix for teams of your size)

Table 1 below reveals the model's major facets and their rationale/purpose. Some of the facets are marked by *L* because they address learning aspects of the model. They aim to foster various characteristics of collaborative/cooperative learning, high-order thinking and self efficacy. Other facets (marked by *E*) induce aspects of evaluation, such as: assessment for learning, low-stakes formative evaluation, high-stakes summative evaluation etc.

The case study

This method was chosen for examining the experiment, in accord with Yin's (2013) comment that "*Many evaluations [..] portray 'complexity' as an important feature justifying the use of case studies"* (op.cit: 329)

The many facets of the complex collaborate learning experiment will henceforth be described in details following Yin's (2013) reference to "*the importance of describing the actual features associated with the labeling of an intervention as 'complex', rather than relying on the use of the label alone* (Yin, 2013; 329)

The case study addresses three questions :

1- <u>Feasibility</u>: To what extent was the model materialized in the reality of the course? Was it possible to keep its "rules of the game"?
2- <u>Uniqueness</u>: What tacit facets of the model shaped the students' experience?
3- <u>Challenges</u>: What problems, if any, did the model induce in the course?

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[5] The syllabus specified mandatory reading for each lesson

Table 1: The multi-faceted model:

Evaluation tool (weight)	Facets and nature of tool	purpose/ rationale
Test + portfolio (100%)	Mixed-methods measurement of achievements	Fractal teaching: studying a variety of alternative evaluation tools in the course, being evaluated by them "for real"
Test (50% *) or 80% - see below	Individual	E : balance the student's dependence on team members contributions;
	External evaluation (by teacher)	E: Balance biases of students' self evaluation of their portfolio
	open-book test	$E+L$: Less stress & anxiety (Theophilides & Dionysiou, 1996), encourage HOT[6] instead of memorizing (Agarwal et. al., 2008`)
	Eligibility for test- taking depends on submission of the portfolio	$L+E$: (a)preparation for test is subtly included in the preparation of the evolving portfolio; (b)deadline for the portfolio
Portfolio (50%) (or 20% if team's own score exceeds teacher's hypothetical score by 10 points or more)	Team-based	L: (a) develop teamwork skills; (b) collaborative learning; require HOT (Gueldenzoph & May, 2002).
	Evolving with the course	L: create continuous involvement and active learning of the students along the course;
	adding course- related supplements for each lesson	L: authentic task ; knowledge-building; creativity, personal associations , personal meaning of the lesson; self efficacy
	Justification of item's relevance	L: Explication of personal line of association; HOT (analysis & synthesis), meta-cognition
	Choice of best items	E: presenting strengths (Birenbaum, 1997)
	Portfolio exhibition (all teams) – within the course only	E: an alternative evaluation tool; external feedback (from members of other teams) before final submission
	consensus mandatory;	L: Collaborative learning ; negotiating ;interactions/networking
	Pre-designed generic matrix of item submission	$E+L$: Equality in division of labor in the team; no free-riding; Meeting the complicated "rules of the game" is almost impossible if not pre-planned
	Giving and getting feedback	E: Assessment **for** learning, formative evaluation; Experience feedback under conditions of symmetry
	Signing each submission/ feedback	E: Making everyone's contribution visible. Avoiding free-riding
	Teams name their portfolio	E: Extracting the essence of what the complex enterprise as a whole meant for the team
	Team evaluates its own portfolio as a whole	E: participatory evaluation; discover the complexity of assessing complex tasks; combines assessment **for** learning with high stakes evaluation **of** achievements ; complex product
	Team's score never replaced by teacher's score; if inflated, it's weight is lowered (from 50% to 20% of final score)	E: students empowered, with restriction of the benefit of inflating the score
	Assessment based on criteria which were negotiated, defined, documented and unanimously agreed upon within the team	$L+E$: self regulation (criteria not prescribed by authority); reaching consensus; experience with setting criteria for assessment,
	Can be amended after getting external feedback at the exhibition	E: Formative evaluation
	teacher's hypothetical assessment of portfolio	E: subtle standard –setting for high stakes evaluation - coping with students' positive bias (i.e. toward inflating final score)

[6] HOT = High Order Thinking

Findings

The case study's findings will be presented and discussed against the questions it explored.

1 –Feasibility of using the model in an academic course: **To what extent did the model materialize in the reality of the course? Was it possible to keep its "rules of the game"?**

   The students grouped into 10 teams of their choice, with 3-6 members in each.

   10 team-based portfolios were submitted. Each contained all the required components. The scores the teams gave to their portfolios were accepted for 50% of the students' final score.

   All portfolios were presented at the exhibition on the 11th lesson and finally submitted by the last lesson; all students were eligible for taking the test .

   Adherence to the pre-designed generic matrices for the division of items[7] was kept by most but not by all of the teams. Some of the teams made good use of their own matrix to divide among them in advance the lessons for which each of them was responsible as "submitter" (provider of items) and those for which he/she would serve as feedback providers. A few teams ignored their matrix. They assembled a pool of items which were freely collected during the course, then, at some stage - before the exhibition - they chose from the pool those items which seemed most appropriate for the portfolio. Although all teams managed to submit the required number of items in total , a team's departure from its pre-designed matrix produced incomplete networking , unequal division of the 12 lessons among the team members (e.g. two of the members were detached from each other in terms of submission-feedback) and unequal processing of the lessons. Such diversions might be avoided if monitoring of adherence to the matrices, by the staff, is added to the model.

   The adapted poster-session paradigm was applied in the exhibition as planned, but the feedback provided in it was less meaningful than expected.

   Each team presented its portfolio on its stand and left one of the team (in rotation) at the stand while the rest of the team visited the other teams' stands.

   The exhibition was taken seriously in terms of investment in the presentation of the portfolios, and turned out to be quite a happening. Here's one students' reflection on its merits: *The idea of an exhibition of portfolios is a good one, and applicable in our work at school, for several reasons: (a) getting acquainted with the subject of alternative assessment via an exhibition; (b) the ability to get an idea of our work's quality, in comparison to other teams; (c) getting* [external] *assessment/feedback to our work from the staff and from other teams. This is a process of formative evaluation because it was possible to get feedback, correct and improve – otherwise the evaluation of the portfolio would have been just summative* (d) *knowing that there would be an exhibition on a certain date required intensive work in order to meet the deadline, and designing our team's common conception at a rather early stage.*

   In conferences, genuine feedback is hardly expected of the visitors at poster sessions; the same also happened in our exhibition, despite the expectations inherent in the model.

   The feedback the portfolios got from other teams in the exhibition was superficial, mostly compliments and general sayings: *"just excellent"; "Interesting presentation;well done!"*
This might reflect the limitations of inviting feedback in a context of symmetry where the quality of another team's product has no bearing on one's own final grade: The portfolio's "rules of the game" created interdependence within teams, which made for an atmosphere of

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7 **Example : a generic pre-designed matrix for (K=4) - a four-members team**

Submitting Giving feedback	A	B	C	D
A	IV	VII	XIII	
B	VIII	X		I
C	XII		II	V
D		III	VI	IX

collaboration; there was little to gain, and much to lose, from internal competition. The idea of competition did however arise when preparing for the exhibition – vis-à-vis other teams. *Before the exhibition we deliberated if we should "expose" to the other teams specific things in the way we worked (knowledge is power !) but given that this was a teaching and formative occasion, we decided to bring before the other teams the whole process of our work, hoping that others would do the same.*

The superficial feedback to the portfolios could however also result from the time boundaries of the lesson's framework. If each student wanted to see all portfolios of the nine other teams, time for delving into each portfolio was indeed too short.

2 – Uniqueness: What tacit facets of the model shaped the students' experience?

Many of the model's facets emerged beautifully in the students' reflections and in teams' documentation of their (mandatory) tem-meetings. However, presenting them here would require much more space than this paper allows. Here are but a few short citations in which facets of the model are echoed

- **The evolving nature of collaborative learning** was illustrated in a team's title of their portfolio (and in their explanation of its meaning)

 "The symphony that never ends" -is a continuous process of a team that gathered for a short period, acted with inter-personal interactions, attended classes, searched for additional reading material, recommended it to peers and got feedback from them. The process has not ended, actually this is just the beginning, each team member departs with the feeling that learning hasn't ended here/ [...] Kant developed the idea that a teacher mustn't teach thoughts but teach how to think. This is the feeling with which each of us team members has concluded the course and the team work process."

- **Vagueness, uncertainty**

Since the task is vague and the associations of the owner [of an item] *are personal, I depend on his explanation/argumentation to be punctual/relevant/with my feedback."*

- **Anarchy and emergence**

There was a difficulty in organizing the work – lack of responsibility-taking, disorder in the division of word, lack of common understanding of the task. After attending two lessons and getting clarification from the teacher's aid, common ideas started to consolidate .Today, as we sit here analyzing the process of our common work, we discover that a process happened that we were unaware of ...

- **Interdependence and responsibility**

Until now I haven't been part of a group in which every product of the others would also have impact on me, as a subject of evaluation. [.... This understanding sharpened the need to be responsible both for the learning processes which I underwent in the course and the need to be responsible for the learning of my mates in the group.

- **Feedback and interdependence**

"*the quality of my colleagues' item, which I have to give him feedback on it, will have impact on the grade which I myself will get at the end, because it will be part of the portfolio which I share responsibility for. Therefore the feedback I'll be giving must not refer to the characteristics of the person who submitted the item, neither to how much he tried and made an effort (which is common among teachers). My feedback reflects my own interest to improve, I can't just do with compliments. I must supply accurate information as best as I can. At the same time I also need the owner of this item in order to better understand what he meant and what the meaning of this item was for him.*

- **Threshold setting**

We also discovered that we needed to decide what would be the threshold by which we decided if a specific item returns for additional processing or is accepted as it is.

The novelty of providing feedback under conditions of symmetry

 [giving] *a written assessment of colleagues' work – a situation in which I'm both an evaluator and an evaluated in a group of equals - is very different from what I was used to*

- **Active learning, task-oriented (for feedback); subtle preparation for the final test**

Giving feedback on products in areas which I'm not proficient in, required learning the issues, in our case reading the bibliography…

- **Knowledge-building**

The portfolio contains a lot of material which transformed from raw material – information - into knowledge; our group members' knowledge, after going through processing and connecting to issues discussed in the different lessons.

- **Developing team-work skills**

We all agreed that having to work together trained us all for patience, listening to other people's opinions, coping with contradictions and accepting criticism.

We arrived at this (3rd) meeting with a common understanding/insight that we'd allegedly worked as a team, but the "veil of ignorance" (…) was missing from our interactions:

- **Assessment for learning**

[…] I ask myself if - in face of Birenbaum's definition of a portfolio as "an instrument combining teaching and assessment" - we can't […]serve both roles? Maybe this is the uniqueness of our portfolio.

- **Self regulation, self efficacy**

In our team's portfolio we took responsibility both for our personal learning and for the learning of the other team members. We tried, each of us alone and as a group, to see the strengths and weaknesses of the items and the feedbacks, we learned from our team- mates and expanded our knowledge.

- **Attractive, intriguing, arousing curiosity,**

The first thing I did when preparing for writing an assessment for the [team's] *portfolio was spreading all its items on my desk so that I could read them all in some order. 10 minutes later, a knock on the door –two friends arrived for a visit. She studies archeology, he – computers. They enter the room and ask: "what's with the mess?!" I answer "something for an assignment at the university."5 minutes later each of them was busy reading the items. They stayed for two hours. During the 1st hour they read almost the whole portfolio, during the 2nd hour we drank tea and discussed issues arising from the portfolio. Conclusion: if a pairof an archeology student and a computer student were reading items from the portfolio for a whole hour, it most certainly is attractive.*

- **Lasting effect of the collaborative learning**

The results, in my opinion are very honorable, impressive and comprise a collection of meaningful connections to what was learned in the course – which will no doubt be a central part of the memory which remains with us of this course.

3 – <u>Challenges</u>: What difficulties/problems, arouse during the course?

Some of the students (all educators themselves) felt threatened by the complexity produced by the "rules of the game": *I was afraid of this course. I didn't know what she* [i.e. the lecturer] *wanted and I certainly didn't think that I'd gain something from it…'.*

Or being expected to rely on their own resources for creating add-value to the course (by providing "extensions") *: Some of the team members were doubtful about the ability to expand the material. They were of course proven false when they started to search for materials and discovered that they're able to depart from the learned material and expand it with their own authentic items.*

Or for giving feedback – even criticism – to their peers, especially when they felt not knowledgeable enough on the subject; *How can I give feedback on something I'm not knowledgeable about, or at least not as knowledgeable as the person who'd delved into it?*

Several of the model's mechanism (e.g. interdependence and the requirement for transparent division of labor, and for documented meetings in which criteria were established) made it necessary for them to have intensive interactions with their team-members and required coordinated cooperation between people who were strangers to each other . It was technically quite problematic for them, because their collaborative work relied on face-to-face meetings ,

which were difficult to coordinate because each member lived elsewhere and only came to Jerusalem (the city of the university) on the day of the course.

It was difficult to work in a team of five people who didn't know each other before. There was a technical difficulty to find a time that fitted all team members. As a result of these two reasons, conflicts arouse among the team members. At certain points one member even threatened to leave, which enhanced the tense atmosphere in the team.

This difficulty was felt even in teams that did use ICT: *The technological era enabled contacts among team members and saved a lot of time – but the problem of tacit knowledge remains unsolved; it's difficult to overcome it via technological knowledge.*

Discussion and conclusions

The model presented in this paper offers a mixed methods evaluation tool, combining not only two techniques but also their different paradigms: one positivistic (a test), the other constructivist (a portfolio)

Its positivistic paradigm and evaluation method rest on the infrastructure of a formally structured *cooperative learning* experience (Slavin, 1990), here applied to an entire graduate course. Unlike classic cooperative learning techniques, which organize the classroom activities in an alternative format where the teacher's role changes from giving information to facilitating students' learning, the present model organizes cooperative learning beyond the classroom – while regular lessons are given by the teacher in the classroom

The present model is coherent with existing recommendations for conditions needed for effective evaluation of collaborate learning (Gueldenzoph & May, 2002) but adapts them to the complexity of the team-based project by certain modifications: (a) a *foundation that supports collaborative evaluation* was formally created by the interdependence enforced by the "rules of the game". (b) *Specific criteria* for assessment of products are articulated, by the students themselves (not by the teacher of the course). (c) *Ensuring honest student participation* was achieved mainly by the mechanism of transparent accountability (making everyone sign each product); and also by setting the condition of "not exceeding the teacher's score by more than 10 points".(d) *Formative feedback* was obligatory all along the course – but provided by team-mates and not by the teacher. Feedback from the teacher's assistance was available for students who chose to consult her, but not mandatory. Summative feedback at the end, actually high stakes evaluation, was provided, in more than one way: one was basically participatory - the teams' final score on their own portfolio, a score that had real meaning for their final course grade; another was external (by the teacher) – evaluation of the final test, which reflected to a meaningful degree the individual benefits from their collaborative learning. Assessment of the collaborate process was inherent in the reflections the team-members were required to include in their portfolio.

The multi-faceted mechanisms of the model's design also provided for a combination of participatory and external assessment, and of formative as well as summative evaluation; presented the students with authentic tasks that require self regulation and high-order thinking; made the students practice giving and getting written peer feedback; prevented potential free-riding; and created interdependent networks, that required collaboration and frequent contacts.

The findings support the feasibility of using an evaluation model based on the conceptualization of a team-based project through the lenses of complexity theory; they also show its added value for evaluating cooperative learning enterprises by the quality of their products - provided that mechanisms exist that make the quality of products dependant on quality processes and shield the team from submitting unworthy products.

The findings also point at some needed amendments in the model, to ensure that the teams make optimal use of modern technology (including web-based portfolios for example) and conduct their meetings mainly in cyberspace.

Today's technology enables much easier team-work than was done in that course. Technology can be used to control and monitor interactions, to regulate tasks, rules, and roles, and to mediate the acquisition of new knowledge. Virtual Classrooms (i.e. geographically distributed sites linked by audio-visual network connections), chat, discussion threads, application sharing (e.g. spreadsheet on another colleague's screen across a network link for the purpose of collaboration); Collaborative Learning in Virtual Worlds that takes advantage of unique features offered by virtual world spaces - such as ability to record and map the flow of ideas, use 3D models and virtual worlds mind mapping tools. And the sky is the limit.

References

Agarwal, P.K., Karpicke, J. D., Kang, S. H. K, Roediger III H. L. and K. McDermott (2008). Examining the Testing Effect with Open- and Closed-Book Tests. *Appl. Cognit. Psychol. 22*: 861–876

Barnes, M. , Matka, E. and H. Sullivan (2003) Evidence, Understanding and Complexity: Evaluation in Non-Linear Systems. *Evaluation, 2003; vol. 9: pp. 265-284.*

Brown, H., & Ciuffetelli, D.C. (Eds.). (2009). *Foundational methods: Understanding teaching and learning*, p. 507. Toronto: Pearson Education.

Birenbaum, M. (1997). Tools for collecting evidence of achievements – (a) portfolio. In*: Alternative approaches to assessing achievement.* Tel Aviv: Ramot.: 88-105 (Hebrew)

Byrne, D. (2013). Evaluating complex social interventions in a complex world. *Evaluation, Vol. 19* (3): 217-228

Erez, A., Lepine, J. A. and Elms, H. (2002), Effects of Rotated Leadership and Peer Evaluation On The Functioning and Effectiveness of Self-Managed Teams: A Quasi-Experiment. *Personnel Psychology, 55*: 929–948

Glauberman, S. & B. Zimmerman (2002) . Complicated and Complex Systems: What would successful reform of Medicare look like? http://publications.gc.ca/pub?id=235912&sl=0

Gueldenzoph, L. E.,& May, G. L. (2002). Collaborative peer evaluation: Best practices for group member assessments. *Business Communication Quarterly*, *65*, 9-20.

Maehr, M. & Stallings, R.(1972*).* Freedom from external evalua*tion*, *Child Development*, *43*: 177-185.

May, G. L. & L. E. Gueldenzoph (January 2006).The effect of social style on peer evaluation ratings in project teams. *Journal of Business Communication, 43,* (1): 4-20

Pawson, R. (2004). Simple Principles for the Evaluation of Complex Programmes. in M. Kelly, A Kanaris, A Morgan, B Naidoo, E Barnett-Page, C., Swann, G Powell, C Bannon, A Killoran and T Greenhalgh (eds). *An Evidence-Based Approach to Public Health and Tackling Health Inequalities: Practical Steps and Methodological Challenges*. London: Sage

Ross, J.,& Smythe, E. (1995). Differentiating cooperative learning to meet the needs of gifted learners: A case for transformational leadership. *Journal for the Education of the Gifted, 19*, 63-82.

Sever, R. (2012). *Challenges of Evaluating Complicated and Complex 'Glocalized' Interventions*, Paper presented at the 10th conference of the European Evaluation Society (EES) in Helsinki, Finland. October 1-5, 2012

Sharan, Y. (2010). Cooperative Learning for Academic and Social Gains: valued pedagogy, problematic practice. European Journal of Education, 45,(2), 300-313.

Slavin, R. E.(1990). Cooperative Learning. New Jersey: Prentice-Hall.

Smith, K. & Tillema, H. (2008). "The Challenge of Assessing Portfolios- in Search for Criteria" in A. Havnes & L. McDowell (Eds.) Balancing Dilemmas in Assessment and Learning in Contemporary Education, New York: Routledge, Taylor and Francis Group, pp. 183-195.

Yin, R.K . (2013). Validity and generalization in future case study evaluations. *Evaluation*, *Vol. 19* (3): 321-332