

VIRTUAL STRUCTURES FOR MUTUAL REVIEW PROMOTE UNDERSTANDING OF OPPOSED STANDPOINTS

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ABSTRACT

Web based training (WBT) is able to reshape human interaction. Peer review processes, such as adhered to by journals and in the context of political processes such as accession to the EU, have aided in safeguarding quality in the academic field since long. University curricula, however, have not yet fully taken into account training for such mutual evaluation activities. One of the key approaches of the recently designed negotiation game "Surfing Global Change" (SGC) is to complement traditional roles of "teacher versus students". Therefore, in level 2 of SGC students write, review, assess and update standpoints while making use of a web based discussion forum. A statistical analysis of student activities is provided alongside conclusions regarding motivations of different clusters of students. Independent sets of skills might be discerned in the final academic result.

Taking the example of SGC's collaborative process design and teaching methodology, the present paper discusses the influence of various concepts and methodologies of education and training while focussing on student-teacher interactions.

Keywords: Peer review; e-learning; mutual evaluation; ethics of negotiation; collaborative student-teacher interactions; virtual social dynamics in e-learning platform; EU accession

MOTIVATION FOR THE METHODOLOGY OF MUTUAL REVIEW IN VIRTUAL COURSES

One key achievement of web based training is to create new structures of human interaction and public forums for communication. The *review* process is key to many real-world interactions. Societal development appears to be facilitated by comprehension of opposed standpoints. The motivation for devising the game "Surfing Global Change" (Ahamer, 2004; 2005e; 2006) was to create an environment in which optimized *consensus building* is learned in order to promote a sustainable future (Rauch, 2003; 2006). *Review* is used as a vehicle to impart such skills.

Why Mutual Review? Examples from Collaborative Institutional Cultures

Realities in professional life suggest that "truth" does not only consist in correct content (like $\sin \pi/2 = 1$), but very often also incorporates "reabsorbing acceptance of others' views" (for instance: do we agree on this analysis?). Do our universities (Rajasingham, 2005; Baumeister, 2005) provide sufficient training for such realities? Looking for some *examples*? Present day high-level procedures such as "accession of new member states to the European Union" (Figure: 1 and Figure: 2) (EU, 2007; Twinning, 2000; 2007; Ahamer, 2001), as well as largely applied mechanisms of quality control for safeguarding scientific progress and novelty, such as the widely known "double-blind peer review processes" in scientific journals hint at the fact that even in the sphere of technology a purely content-centred understanding of "what is *quality* of

work" has been phased out. A special focus of many e-learning journals is concentrated on "self- and peer-assessment" (Valcke, 1999; Van Deventer, 1999; Cassidy & Benson, 1999).

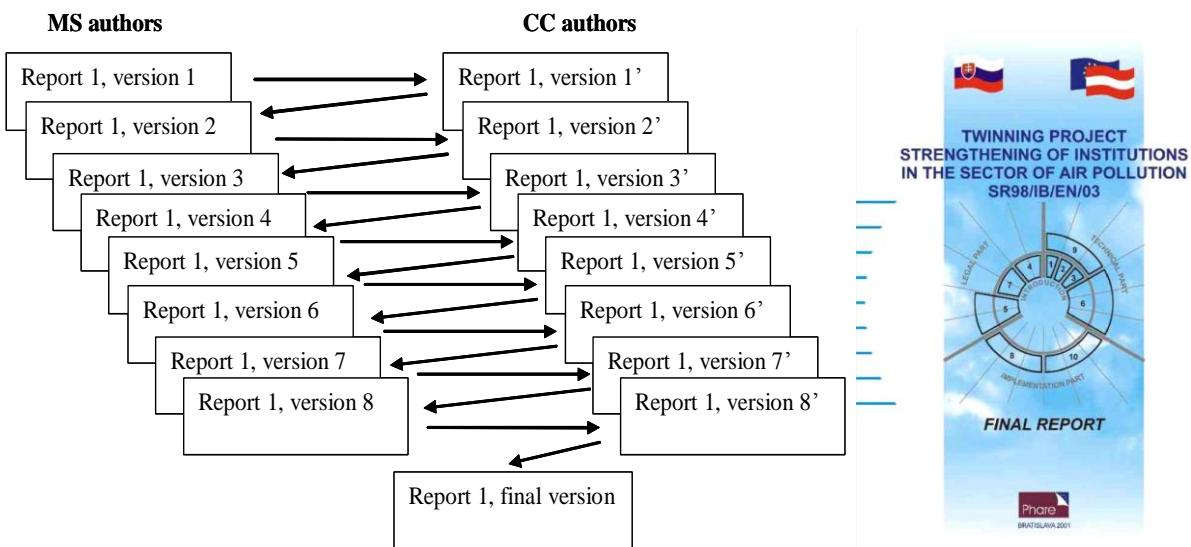


Figure: 1
Communication structure (at left: Ahamer, 2005) during a "Twinning Project" preparing the accession of new countries to the EU: MS= Member states and CC= Candidate Countries are iteratively preparing documents (typical report at right: Twinning, 2001). In Surfing Global Change, level 2 makes use of analogous review processes.

A basic experience in several professional environments and institutions that technologically "correct" solutions are still subject to approval by stakeholders with opposing views,

- such as emission factors for air pollution when establishing an energy concept of a municipality like Graz (Kommunales Energie-Konzept KEK: Ahamer, 1989; 1994; Prutsch et al., 1995; Kirchpal et al., 1995) or Villach (Themeßl et al., 1995), using the same methodology for the emission balance (Ahamer & Lesch, 1995) 0 and projection (Ahamer & Lesch, 1995a), or the results of internationally agreed algorithms for emission calculation such as in,
- a set of national Austrian CO₂ reduction measures (EEA, 2003; Ahamer, 1996; Kratena et al., 1998)
- a review process conducted in various stages and condensation of scientific standpoints for preparing the "bible of climate change" in the framework of the International Panel on Climate Change IPCC (<http://www.ipcc.ch>),
- the gradual consolidation process of concrete legal text during development and substantiation of "global climate protection measures" on the administrative level in the framework of the United Nations Framework Convention on Climate Change UNFCCC (<http://unfccc.int>) – in the sense of "negotiated knowledge" (Gray et al., 2004),
- the ping-pong like flow of declarations, assessments, standpoints and criticism exchanged between the three stakeholders enterprise, administration and the public, as a result of the EU wide obligation for

- “Environmental Impact Assessment”, when planning large industrial or traffic projects (UBA, 2005),
- the long tradition of “public participation in decision-making” (compare <http://www.partizipation.at>) and structures for such processes - such as Agenda21 (Ökobüro, 2005) developed after the Rio Conference - that exist based on the balanced interplay of societal stakeholders (G.O.A.L., 2003; Urban_Graz West, 2005) and the approximation of contrasting standpoints,
- the flow of reports issued by the European Union (assessments in the “Regular Reports” RR and Accession Partnership AP, left in Figure: 2) and the Candidate Countries such as the Slovak Republic (National Programme for the Adoption of the Acquis NPAA, right in Figure: 2) as consecutive annual steps for approaching and mastering the so-called “Copenhagen Criteria” for accession countries (Ahamer, 2002). The same process is presently undergone by the Turkish Republic.

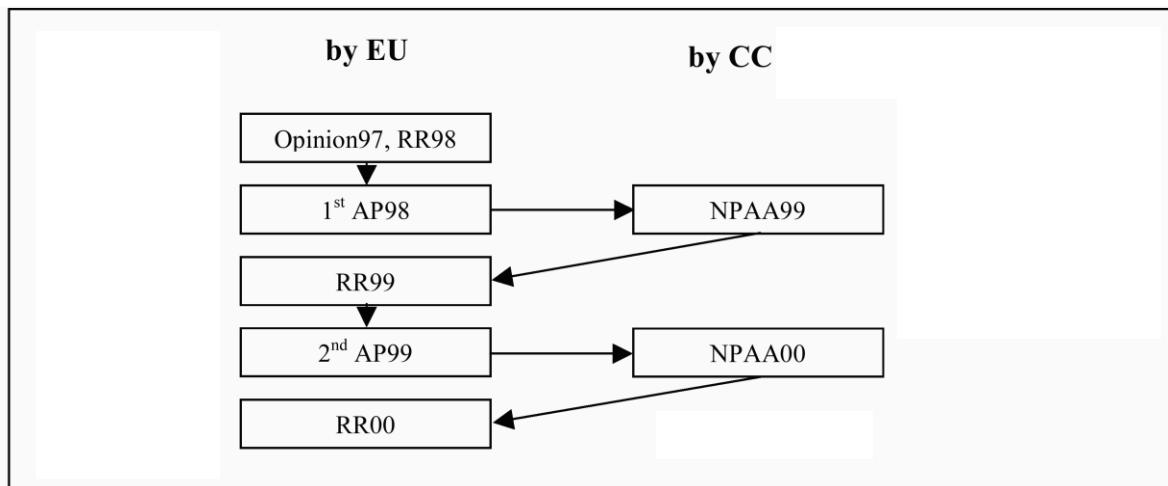


Figure: 2
The Accession Process as an interplay of documents authored by the EU (left) and a respective Candidate Country (right). Legend (for all years): RR= Regular Report, AP= Accession Partnership, NPAA=National Program for the Adoption of the Acquis.

Do Mechanisms Exist That Increase The Quality Of Students' Results?

Is anyone yet tired of pragmatism or even minimalism exhibited by students today? In light of the general motivation of our students as it is common to university classes (“just passing” vs. “intrinsic interest in formation”), and the probability distribution of motives for being differentiated into idealists and pragmatists at university, the web based game Surfing Global Change sets out to integrate these diverse protagonists in the scheme of consecutive levels in order to accomplish the overall target, namely to foster skills that facilitate a well-founded consensus at the workplace.

Ultimately, the hope is to increase motivation and finally achieve better training results for an entire class by using this game.

Therefore, it seemed appropriate to invent a mechanism that employs self-interest of students, but that nevertheless accomplishes visible improvements of quality following a gradual process. Such a process could couple the task of producing a result and the task of assessing others’ results by a simple system allocating individual ratings.

Can The Perception of Students' Work By Their Colleagues Be Improved?

What happens to seminar papers usually? Are such students' efforts lost (Levin, 2005)? It is often common that seminar papers are read by the lecturer and then archived—or completely lost (Figure: 3 left). Added value can be achieved by circulating such texts among students (Figure: 3 right). E-learning strategies (Stigmar & Körnefors, 2005) facilitate web based mutual benchmarking (Ahamer, 2004).

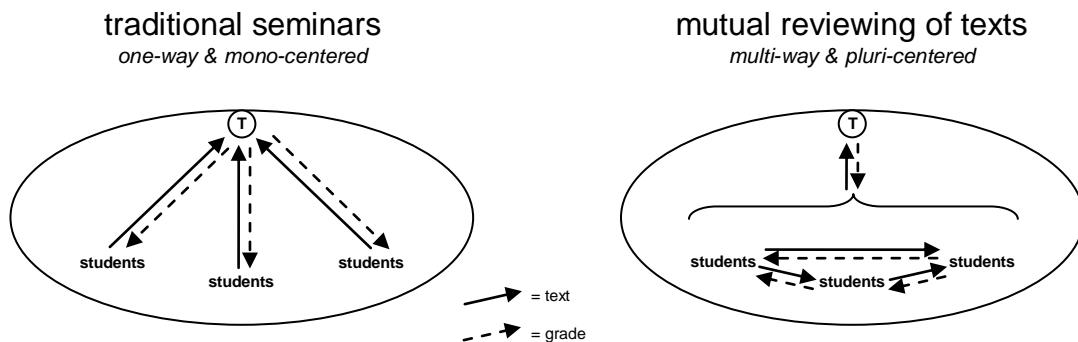


Figure: 3

A shift from one-way and mono-centred communication (teacher or trainer T only has the power to assess) to a multi-way and pluri-centred system of communication (also students have power to assess) is undertaken when applying level 2 of Surfing Global Change instead of written assignments in the classical sense.

Added Value of Mutual Review And Evaluation

Such a communication structure has clearly provided added value during recent years (Sabry & Baldwin, 2003; Barbera, 2004; Laister & Koubek, 2001; Ahamer, 2004; 2005) which was reflected by the improved quality of papers after several acts of review and in most cases an update (Ahamer et al., 2003), even if the entire course was held in the style of "distance learning" (Yip, 2004; Lipponen & Lallimo, 2004; Murphy, 2004) without any face-to-face meetings (Ahamer, 2005a). Value has furthermore been added by increased awareness of classmates' achievements and the possibility for students to silently compare their own paper quality with that of others (Zembylas & Michaelides, 2004; Caranfa, 2004) and without social pressure or criticism—similar to the Delphi method described in (Kolar, 1988). Others' seminar papers were noticed, recognised, read, pondered on and assessed (Salmon, 2002) while having in mind "how did others compose it?" Hence the students' learning effect was multiplied while they strived for good grades.

History of the Game "Surfing Global Change" SGC

Have such efforts already yielded results? Yes, as level 2 of a newly invented negotiation game Surfing Global Change (SGC) referred to as "writing and reflecting a standpoint".

The history of this game Surfing Global Change is narrated in (Ahamer, 2004; 2005c), its overall set of rules in (Ahamer, 2004a; 2006). SGC was inspired by "ethics for technologists" (based on Kolar, 1988; Böhret & Franz, 1982; Böhret, 1975; Albrecht, 1996; BMFT, 1987; Braun, 1997; Covello et al., 1985; Hetman, 1973; Hochgerner, 1990; Huber, 1989; Illich, 1975; Neisser & Brünner, 1985; Nowotny, 1985; Rakos et al., 1988;

Stähli, 1998; von Thienen, 1983; Tschiedel, 1989; Walther, 1992; ZdK, 1991; Zweck, 1993; Ahamer & Schrei, 2006). SGC is a procedural shell, a "drama" (Fjuk & Sorensen,

1997) or scenario adaptable to whatever content. A more profound analysis of the objectives and the didactics and the educational value of this game can be found in the game concept (Ahamer, 2004b). Level 2 of SGC asks participants to compose, review, assess and improve a "standpoint" of one page per person while making use of a widely available web platform.

THE RULES OF LEVEL 2 OF THE GAME SURFING GLOBAL CHANGE

After learning and understanding basic content in level1, students "warm up" for levels3-4 by heading for the first truly interactive and differentiated web based activity: they prepare their own standpoint based on extensive research in the library, other literature and the Internet during the course of one week. Individually operating students must adhere to the following rules (Ahamer, 2004a, 2006):

- each student is to select a subject according to his/her choice within the limits defined by the trainer (e.g. single aspects of a case study)
- each student is to post under his/her name in the discussion forum a text comprising one page per person by a predefined deadline of maximum one week
- in case students wish to form groups they are to post a document with as many pages as participating students
- for the remainder of the course (maximum several weeks) all posted texts are to be reviewed: each single student has to download the text document (at home or at the premises of the university), read it, comment on it, and subsequently include the comments into the last version by making use of the function "track changes", common to programs such as MS Word
- the reviewing student is to post the commented document by making use of the "reply" function in the discussion forum, thus creating an extra thread for each initial standpoint and its comments regardless of the time of posting
- together with his labelled comments the reviewer awards to the author of the text a certain number of points (n, n = 1 to 5). The reviewer can award one to five points to the author's quality of work
- in case the reviewed author decides to post an updated version of his text, all previous reviewers are evaluated in terms of their review (5-n), which is equal to the difference between the points granted and the maximum of five
- each student may review every other student, the only restriction being (in order to avoid gifts) that a reviewed person cannot review her/his reviewer (new rule implemented as of since May 2003)
- in addition, the trainer is to read the final versions of all papers and subsequently grant points as well.

$$\text{(reviewer's potential evaluation)} = 5 \text{ points} - (\text{author's evaluation performed by reviewer})$$

This level 2 formula tries to introduce a momentum of game, risk and strategy into the originally merely fact-oriented review process, as reviewers will compromise between the colleagues' definite advantage and their own potential advantage.

This formula sets out to create border conditions for optimization of text quality employing the vehicle of "striving for one's own profit".

In sum, level 2 should lead students to view, compose, reflect and update a concise standpoint of their own.

Results of level 2 are several argued standpoints.

Social setting is constructive criticism & low-degree competition between named partners for several weeks.

Dramatic structure means that students deliberately are placed into a situation in which they have to evaluate;

- fact-based academic assessment vs. effects on the social relationships inside their class, as well as
- individual advantages vs. advantages of others.

PROCEDURES AND SOCIAL DEVELOPMENTS IN SURFING GLOBAL CHANGE

The overall design of the game SGC (left in Figure: 4) aims at training students for the "vicissitudes of professional life" (Rauch, 2003).

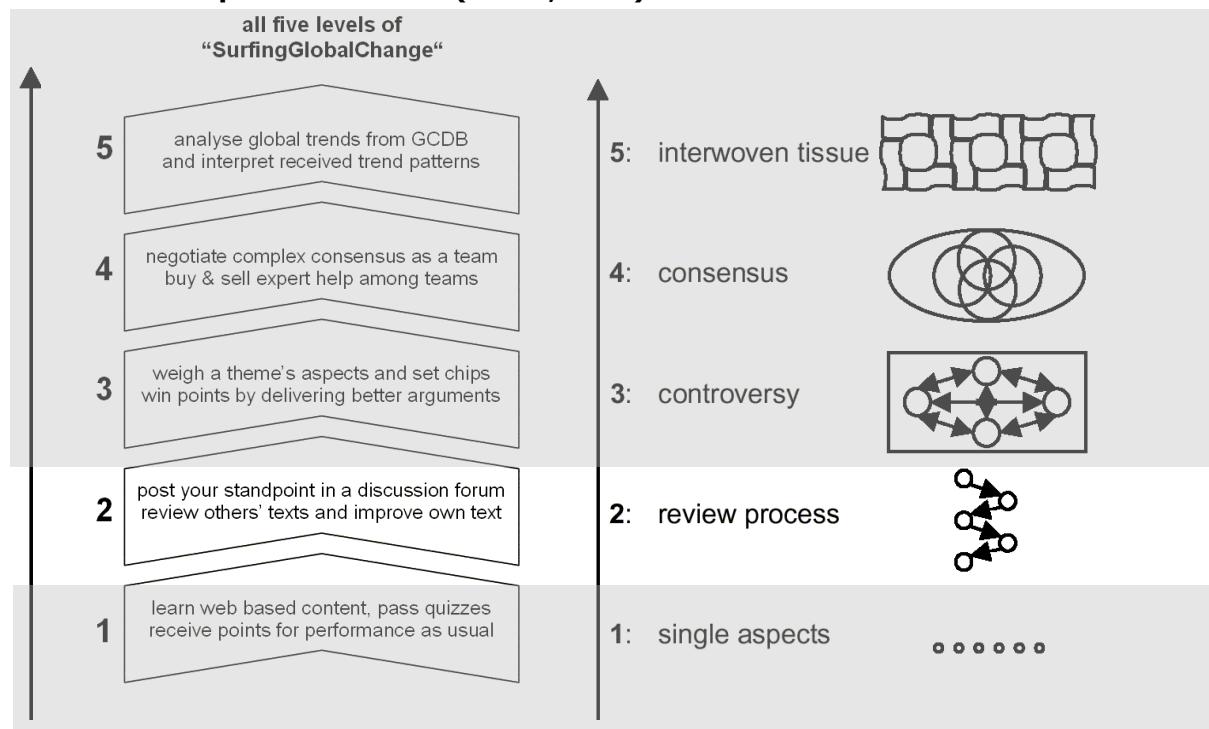


Figure: 4
Symbolic depiction of the communicative setting in which the five levels progress: the evolution from dwelling upon single technical details towards a coherent view. Level 2 of SGC is highlighted, since this is investigated in the present paper.

Consequently, a certain balanced rhythm of fact based analysis versus social strives for acceptance of one's own convictions is pursued.

SGC takes the well-analyzed diversity of learning styles (Sadler-Smith & Sadler, 2004; Aragon et al., 2002) as a whole into account. In this light, SGC's set of rules could be seen as a facilitator for social and academic evolution in class, along five levels

showing specific organic functionalities (right in Figure: 4). The levels of SGC set out to permit for an organic maturation of standpoints (left in Figure: 4):

- small isolated packages of traditional content representing only one side
- a process of gradual text-oriented criticism permitting deliberation on a one-on-one basis mediated via asynchronous virtual communication methods (i.e. discussion forum)
- a quick process of situation-dependent need to present and defend one's own arguments as a function of the adversary's behaviour and strategy on a many-to-many basis inside a team in synchronous real-time communication
- a consolidation process with less pressing time restrictions in real-time communication on a many-in-one boat basis if the need for consensus in synchronous real-time communication processes arises
- a closing activity of creating a view integrating many standpoints heard until now by creating an analysis outside severe time restrictions on an individual or freely chosen team "we just for us"-basis within web mediated asynchronous communication.

EXPERIENCES WITH THE FIRST IMPLEMENTATIONS OF SGC'S LEVEL 2

For Which Courses Has Level 2 Been Implemented Till Date?

Until now, SGC was implemented eleven times; therefore a detailed analysis of its first implementation is given here. Starting with the summer semester 2003, SGC was held mostly in the style of "blended learning" (i.e. with introducing face2face meetings plus work between the meetings supported by a web platform), or also in the style of pure "distance teaching" (i.e. without actual physical presence), at the University of Applied Science FH Joanneum and at Karl-Franzens University Graz. Each time the learners' perspective of the course quality (Ehlers, 2004) has been extensively asked for by means of surveys, from the feedbacks after the first implementation also a master thesis was made (Schinnerl, 2003).

- In March 2003, 46 students of the eighth and last semester of "Construction Engineering and Construction Management" (civil engineering, BBM99) completed two courses at 2 hours per week each (with obligatory attendance of the class, hence no "distance learning" was possible), namely for the subjects "Technology Assessment" (TA) and Systems Analysis and Biology" (SB) which amounts to 60 hours for both courses.
- In May 2003, 26 students of the eighth and last semester of "Electronic Engineering" (industrial electronics, IEL99) completed the same amount of credit hours entitled "Environmental Technology" (UT) and "Systems Analysis and Biology"(SB).
- SGC was held during the winter semester 2003/04 (level 2 was held between October and November) at the University of Applied Science FH Joanneum for students of "Industrial Electronics" (IEL00) in the style of "distance learning" due to changes in their curriculum, because students completed their internships at various locations.
- During winter semester 2003/04, SGC was held once under the title "Global Change" focusing on the topic of global water supply at Graz University for advanced semesters students of "Environmental Systems Science" (blended learning): SGC as a general scenario combined five lecturers in "team teaching" (6 hours per week) and allocated various

roles to the lecturers (responsible for case study themes 1 & 2 and in charge of methodology 1 & 2). Level 2 was held between October and January.

- In March 2004, 44 students plus incoming foreign students in the eighth and last semester of "Civil Engineering" (BBM00) completed one course at 2 hours on "Technology Assessment" (TA), which was partly split into two groups due to the high number of participants.

The following analysis concentrates on the first implementation (left in Table: 1); similar results were obtained for others. For example, students of electronics (second implementation) conducted more reviews per person than students of civil engineering (right column of Table: 1).

Facts and Statistics For Students of "Civil Engineering"

In BBM99 in March 2003, all but one student had posted written standpoints at a minimum of one page length after one week of preparation time. Within four weeks, 90 reviews have been carried out by 46 construction students as indicated in Figure: 5 in the web platform (see Figure: 6). This amounts to an average of 1.6 reviews per person (4th row in Table: 1), at a range of 0 to 6 reviews performed and 0 to 5 reviews received), of which 73 were useful for the game score as the students awarded points to their colleagues (=numbers inside the matrix of Figure: 5). A more detailed analysis of students of construction engineering (BBM99) showed later that there are 18 "symmetric or reciprocal" assessments (i.e. A reviews B and B reviews A, =green diagonal lines in Figure: 5), which could be attributed to apparent strategies utilised by students of a discipline inclined to notorious "informal collaboration" (Becker, 1996). (By the way, this gave rise to a subsequent adaptation of rules, namely to forbid symmetric reviews for the implementation of the second game.

Table: 1
Statistics for the first two implementations of SGC level 2 in 2003

aggregated statistical value	result for students of "Construction Management" BBM99	result for students of "Industrial Electronics" IEL99
class size (using only/some/no symmetric reviews)	46 (15/10/21)	26
total of reviews carried out size (of which symmetric reviews)	46 (18 = 39%)	64 (3 = 0.05%)
reviews per student	1.6	2.5
Average points distributed	3.7	3.9
percentage of papers updated	39%	42%
percentage of students being evaluated for reviewing	30%	54%
average of reviewer's ratings received in case of review activities	2.1	2.1

This objective was reached: compare 39% symmetric reviews with BBM99 and 0.05% symmetric reviews for IEL99 two months later: third row of Table: 1).

Six collaborating pairs of BBM99 students could be identified and additionally one distinct collaborating group of five students. These participants relied to 80% on "symmetric review processes" (an interpretation could be made by saying: "a merely

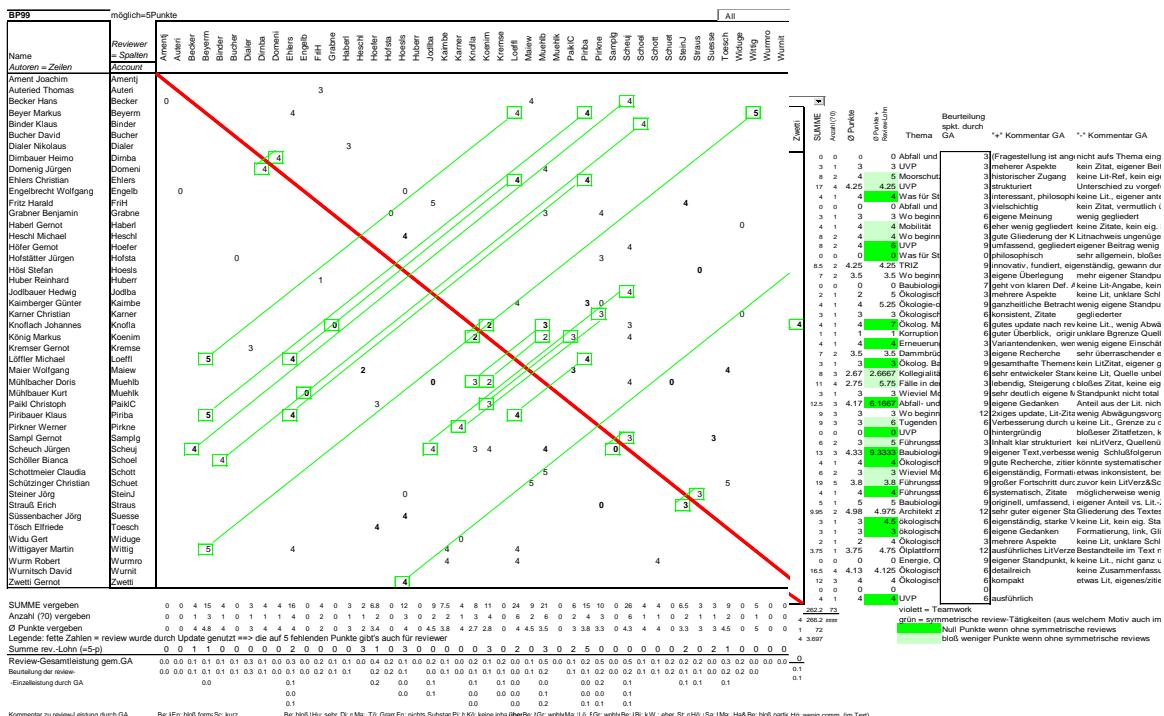
pragmatic attitude", "trying to get a good grade easily" but also "tendency to informal collaboration" or "more socially motivated than scientifically motivated").

A detailed look shows that 12 students (26%, dark green rectangle in Figure: 5 right) would not have attained any points without such "symmetric reviews", the students represented by the light green rectangles have "only" increased their total score. The average rating given in a review process amounted to 3.7 points (range from 1 to 5), the sum of ratings for having reviewed papers (as a result of the 18 updated standpoints posted, which equal 39%) was 266, and the average sum of ratings awarded was 5.7.

The sum of ratings for reviewers was 30 (obtained from 14 individual ratings=30%, on average 2.1, range from 1 to 5).

The 18 posted updates are indicated by bold numbers in the matrix and yield the ratings for the reviewers.

Being the trainer, the author has additionally assessed all papers in the traditional way (right box in Figure: 5 and with short written feedbacks in the rightmost column) and has also assessed the quality of reviews in order to compare the old and the new grading systems.



Correlations and Comparisons: Figures Could Answer Questions

One initial objective was to verify whether the grades resulting from the system of game rules would approximate the qualitative assessment of the papers delivered by the students in a satisfactory manner, which were subsequently evaluated by the trainer.

The screenshot shows a Microsoft Internet Explorer window displaying a WebCT course page. The title bar reads "Technologiefolgenabschätzung - WebCT 4.1.2 - Microsoft Internet Explorer". The main content area is titled "Technologiefolgenabschätzung" and shows a "Discussion Messages" section for a topic named "level2 - kleine SA BP99". The status is listed as "locked". Below this, there are several messages listed in a threaded format. The messages are:

Status	Subject	Author	Date
0/5	Moorschutz oder Kraftwerk	Hans Becker (Becker)	March 3, 2003 2:03pm
	Moorschutz oder Kraftwerk	Wolfgang Maier (Maiew)	March 3, 2003 3:55pm
	Re: Moorschutz oder Kraftwerk	Wolfgang Maier (Maiew)	March 5, 2003 2:20pm
	Re: Moorschutz oder Kraftwerk	Joachim Ament (Amentj)	March 5, 2003 5:58pm
	Re: Moorschutz oder Kraftwerk	Jürgen Scheuch (Scheuj)	March 10, 2003 4:44pm
0/2	Baubiologie und Bauökologie	Gernot Haberl (Haberl)	March 3, 2003 2:12pm
	Baubiologie und Bauökologie	Gert Widu (Widuge)	March 3, 2003 5:16pm
0/6	Wo beginnt Korruption?	Wolfgang Maier (Maiew)	March 3, 2003 3:33pm
	Wo beginnt Korruption?	Elfriede Tösch (Toesch)	March 3, 2003 4:14pm
	Re: Wo beginnt Korruption?	Christoph Paikl (PaiklC)	March 5, 2003 2:03pm
	Re: Wo beginnt Korruption?	Wolfgang Maier (Maiew)	March 5, 2003 2:31pm
	Re: Wo beginnt Korruption?	Michael Heschl (Heschl)	March 7, 2003 1:11pm
	Re: Wo beginnt Korruption?	Wolfgang Maier (Maiew)	March 9, 2003 10:14am
0/1	Abfall und Deponieproblem	Joachim Ament (Amentj)	March 3, 2003 3:37pm
	Abfall und Deponieproblem		

Figure: 6

The functionality of the bulletin board (=discussion forum) is used for the level 2 review process: a single thread corresponds to one student's standpoint that is subsequently commented on by colleagues in the course of several weeks, and eventually updated by an improved version prepared by the author

With this motivation in mind, a number of comparisons and correlations were undertaken with the wealth of material the quantitative approach of attributing scores and numbers apparently provides. The following figures indicate that any clear correlations would be extremely surprising.

In his function as a trainer for eleven years, the author has taken into consideration the abundance of shortfalls of grading the “quality” of a paper such as dependence on personal mood, daytime, cohesion with one’s own opinion and sensibility or lack of the same to formalistic details or style.

Additionally, it appears as very likely that two or more trainers might arrive at very different final grades, especially in subject matters such as the present ones with strong social components.

On the other hand, apparent patterns of interest menace to distort the students’ functionality as a reviewer. The total of arguments has motivated to shift the task of grading from the one trainer to the sample of students, who on an average invest at least some noticeable effort. The result of this approach is for the trainer—hopefully only in the first year—a tremendous increase in time devoted to assessing and documenting authorship and reviewership, and to comparing the old and new methods of assessment.

Construction Students Are Monitored When Forming “Informal Subgroups”

As mentioned, 12 students have based their awarded points on “symmetric assessments” (i.e. without such they would *have received zero points in level 2, see green areas in Figure: 5*), three of whom belong to the distinct cluster of collaborative five mentioned above. Figure: 7 compares how these clusters were rated by the trainer (see the five steps horizontally).

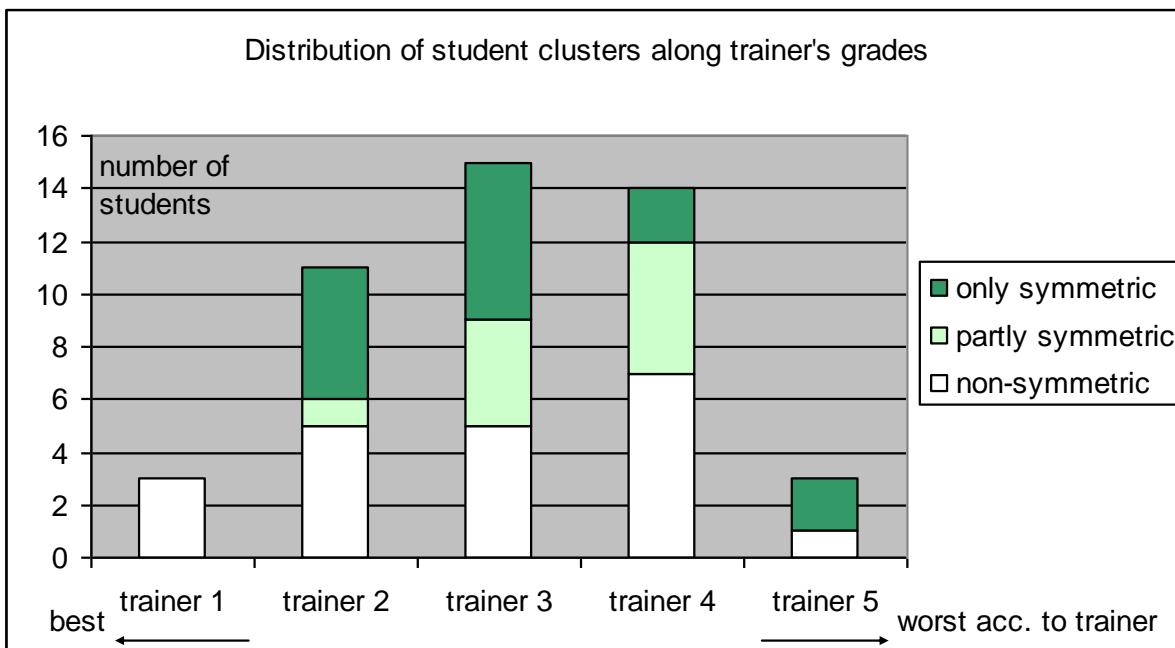


Figure: 7

How do the three student clusters (defined by their participation in “symmetric review activities” fall into the five categories of grades (for the level 2 standpoint paper) distributed by the trainer? Data for SGC level 2 by students of “Construction Engineering” in March 2003 (BBM99).

Figure: 7 shows that “the best according to the trainer are non-collaborative” and that “the ones collaborating most are second or third best according to the trainer”: two

fundamentally different mentalities and strategies for success? This incidence of "informal collaboration" gives rise to comparing overall performance in SGC for the three clusters of students [always the same colours are used in Figure: 5, Figure: 7 and Figure: 8, black=average of class]. Overall performance is distributed as follows in consecutive order (only 1 is significantly separated from 2 and 3):

1. indicates no "informal collaboration", i.e. "symmetric reviews" at all (i.e. not belonging to a subgroup that does any symmetric review in level 2) [white]
2. indicates only "informal collaboration", i.e. not being active outside the subgroups with apparently agreed mutual aid for attaining ratings [green]
3. indicates additional "informal collaboration", i.e. reviewing both on their own and within said subgroups [light green].

This means: "pragmatism" leads to better overall results? (Depends on what is measured!) It was said that the quality of the paper as assessed by the trainer would be weaker with "green" students than with "white" students (see the bars with different colours in Figure: 7), but not to such an extent as initially expected. Similarly, final grades of the clusters do not substantially differ from one another (rightmost bars in Figure: 8, strong inclusion of "social skills" in levels 3-4).

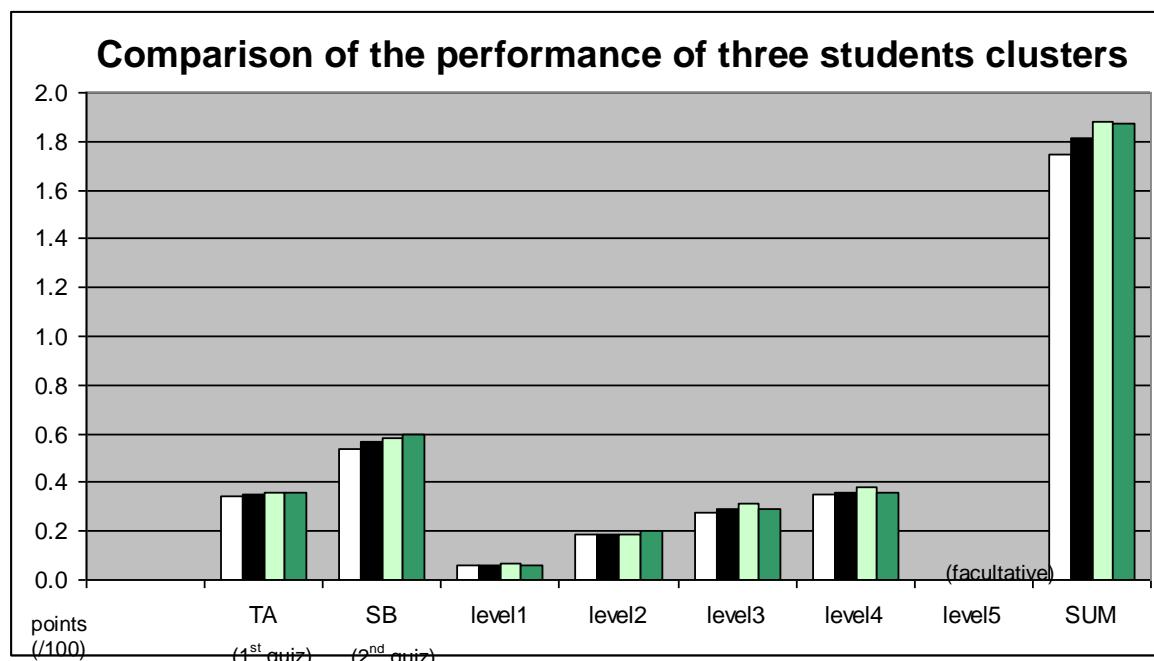


Figure: 8

In this bar chart the average points achieved by students from three different clusters of behaviour in level 2 are exhibited (no "informal collaboration", in white, additional informal collaboration" in light green, exclusively "informal collaboration" in dark green and average of all students in black). Even if not highly significant, data show that best overall performance is achieved by students combining "own hard work" with "strategic action" (light green bars) if interpreted in a benevolent way, especially in theegotiation oriented and team-oriented levels 3-4. At any rate, "informal collaboration" (i.e. building social structures) does pay off!

Figure: 8 above shows the average score for the single levels and the two quizzes as a function of these three student clusters. As can be seen, level 2 contributes (only) to 10% of the overall grade of the course in this case of BBM99; this percentage might be higher in later courses.

The result suggests that "informally collaborating" students are not weaker than the average, but rather on the contrary more successful in all levels than "single warriors".

This result can even be seen as counterintuitive (at least to the author) compared to the classical rule "cheating is forbidden" and "everybody works on their own".

One conclusion can be drawn here: SGC employs a method of grading that combines various skills and therefore yields different patterns of student grades than traditional methods. One important objective of SGC is also to improve students' capacities, not only to monitor them.

Which Strategic Decisions Are The Students Facing?

Seen from the students' point of view they are the ones who decide: "how often do I assess" and "how strict am I when awarding points"?

Table: 2 show the result of cross-correlation analysis (practically of all parameters visible in Figure: 5 but not reported here in greater detail). The strongest correlations are notably:

- often reviewed papers get significantly more points
- altogether frequent and generous reviewers perform more reviews
- on the other hand, assessments by teachers are uncorrelated with assessments by peers.

**Table: 2
Aggregated correlation results for level 2 applying to all samples of students (all construction and electronics students in 2003)**

Criterion	correlated with
number of reviews received as author	<ul style="list-style-type: none">• points received as author• number of reviews undertaken• number of points awarded• number of reviews received as author• not correlated with: points received from trainer
points received as author	

Table: 2 suggest that;

- papers that are reviewed more often get significantly more points (might be interpreted as "interesting papers make a better impression")
- papers receiving better reviews are written by more generous reviewers and for frequently read papers (might be interpreted as "sovereignty leads to generosity").

On the other hand, the level 2 rules yield a measure of quality which is not correlated with the trainer's perception of quality. This statistical result can be interpreted as "level 2 produces an illegitimate measure for quality" or as "level 2 produces a neglected but necessary additional dimension of what is called 'quality'".

It is up to the readers to make a decision based on their individual didactic visions!

WBT LEADS TO REINTERPRETING "ASSESSMENT"

The described complementary system of grading certainly surpasses what we are used to in academic life. It is an experiment.

In any case, the application of such peer reviews additionally to traditional authoritative review methods demands some willingness to take risks and to make new experience. Added value has shown up to a significant extent and positive feedback was received from students via anonymous web based surveys, as well as personally. Coherence with real-life professional procedures appears to be better. Last but not least the trainer is happier than when demanding classical seminar papers and presentations.

Is Peer Review Principally Unjust?

In the present case the lecturer has balanced out possible "injustice" by;

- embedding the review process into a multitude of other assessment algorithms during all five levels
- combining with "trainer's assessment", as well as
- a generally mild style of grading given the situation of almost completed studies and the orientation towards writing the diploma thesis during the last weeks at university.

One motivation for implementing the present system of rules was based on the question: how can social feedback be organized in a way that fact-based quality of complex results is safeguarded or even enhanced? (Would this question apply also to the review system of scientific journals?) A visible statistical discrepancy between traditional assessment and assessment incorporating students' peer review becomes apparent. The questions are consequently:

- Are results of peer reviews systematically wrong?
- Are results of traditional reviews by teachers subject to systematic flaws?
- Do both measuring systems measure the same parameters?
- Are both assessed parameters relevant for the professional life of the students?
- Where the "true parameter" to be found is: based on teacher reviews or those conducted by peers?
- Could eventually both algorithms of measurement be combined in a satisfactory manner?

The author draws the conclusion that peer reviewing complements classical grading to a valuable extent, given that the resulting effects of "pragmatism" are controlled.

Taking the standpoint of a physicist and being inspired by Heisenberg's uncertainty relation, the interpretation can be made that "the act of measuring affects the measured parameter":

- with classical grading methods students tend to optimise efforts in favour of a study-and-repeat paradigm
- with peer review-based algorithms students tend to optimise their efforts in favour of a secure-positive-peer-feedbacks paradigm,

hence two such differing styles of measurement might produce an uncertainty relation for errors:

$$(\Delta \text{ authoritative assessment}) \times (\Delta \text{ peer assessment}) \leq \text{some principal limit}$$

What are the implications of designing a set of rules?

Analyses of the course procedures have shown that there can be a discrepancy between the two following functionalities of rules:

- rules in a course should mirror the students' activities by adequate grades with high fidelity (according to a set of previously defined and hopefully generally accepted criteria for good work, such as depth of research and analysis, clear understanding of the issue, appropriate arguments supporting one's own standpoint and quality of presentation)
- rules in a game should optimally enable suitable dynamics of the activities and the social processes (game dynamics in the case of SGC) by maximizing the amount of events that enable students to actively learn.

Regarding Surfing Global Change, priority was given to the second function of "rules".

Relevance of Dilemmas In Assessment And Grading

All in all, the above mentioned dilemma ("ensuring justice" versus "enhancing evolution and learning") can be seen as equivalent to and symbolic for the tension between attempted justice and attempted pragmatic functioning of a society in general.

Therefore, the process of inventing and implementing Surfing Global Change (or similar systems of more complex assessment) is a limited example in a nutshell of how boundary conditions for a positive and thriving development of an evolutionary society could be designed.

HOW SGC CAN BE INTEGRATED WITH OTHER LEARNING CONCEPTS AND MODELS

SGC and Intercultural Communication Factors

In this paper, "intercultural communication" is understood in a wider sense, namely to also mediate between the "cultures" of technologists and ecologists, pragmatists and idealists or just members of different faculties and different scientific roots. SGC fills "intercultural distance" by guided attempts to mutually perceive standpoints, thus avoiding (as severely criticised in the Journal of Intercultural Studies) "McDonaldisation (...), namely a lack of definitive or authentic content in goods, services and relationships, (...) a centrally conceived and controlled form [being] comparatively devoid of distinctive substantive content" (Wilkinson, 2005).

The balance between conceiving learning as an individual versus social action is searched since Aristotle, as posits Corbeil when "learning from children" (Corbeil, 1999): "learning is an individual action with a social content". The slow pace of level 2 permits time for absorbing the others' culture or scientific disciplines patterns of reasoning.

As a second-order effect of throughput of arguments, in such a "community of practice" (Corbeil, 1999) also values of the partners are absorbed by the players after reflective phases (Greenbank, 2003), both in the positivist and interpretivist approaches.

The Dutch "classical" author of intercultural studies, Geert Hofstede (Hofstede, 1994) deduces from his worldwide study of patterns of societal behaviour and collaboration that two of his descriptors correlate with open, modern societies: small "power

distance” (easy accessibility of bosses and peer-orientation) and high “individualism” (in the sense of self-motivation and self reliance instead of protection by a group or kin) (Ahamer, 2005). SGC aims at training such behavioural structures by immersing players into the needs of explaining and understanding the arguments.

Moreover, intercultural understanding can only be trained by real encounters that take place between individuals.

(Heslep, 1998), versus just studying the theoretical concepts of such. Web based forming of a discursive community produces such a forum. SGC provides “Spielraum” (Roth et al., 2001) for training communicative situations, by including the balance between one’s own and others’ interests. The outlay of SGC does not focus only HiFi user interfaces (Hufnagel, 2004) but this low-tech solution (Cassidy & Benson, 1999) relies on the ready-to-use web platform WebCT. Analysis shows that the balance of content-centred virtual dialogue tools (MacGregor, 2002) versus personality-centred dialogue tools (Heaton, 2002) is highly dependent on culture, among others depending on the picture of “authority” (called power distance in the famous ethnographic studies of Hofstede (Hofstede, 1994; Tschancl, 2001). Cross-cultural differences can be blended with “learning styles” (Graff et al., 2004).

SGC In The Light Of The “Enlarged” European Dimension

Everyday scenarios have repeatedly proven that any attempt to communicate may have different connotations (referred to as “interference in communication” (Pekarovičová, 1999). If unsuccessful, such an incongruous approach becomes a negative transfer (instead of a positive transfer in the event of a successful communication process) or “faux amis” (false friends, see Pekarovičová, 1998). Inside SGC, the feedback process is already deliberately built-in, thus effectively clearing up unsuccessfully transferred parcels of communication.

In the course of the EU enlargement, such “interferences” have often been observed (Ahamer, 2002; 2005). From her standpoint inside a former Candidate Country, a member of the Slovak Academy of Sciences has expressed this phenomenon as follows (Kluvanková-Oravská, 2001): “The transition process from command and control to democratic society may result in significant areas of conflict”. “The key element missing in the *former command and control approach* to decision making is *consensus building and public involvement*.”

Despite considerable progress in the area of economic reform towards a free market economy, “development of *civil society* and implementation of democratic and *transparent decision making* progress on all levels of society is in question.” Public sentiments of “responsibility” have not yet fully produced. In principle, such a double nature is at the core of any transition process (Zigrai, 1996).

Also “organisational development” is such a transition process (Ruohomäki, 2003). - ‘Competence in transnational communication’ would establish a link between the culturally determined perception of reality within one’s own and foreign cultures (Pekarovičová, 1999; Krumm, 1995) (especially in multinational governance (Ruberti, 1997), which prompted Graz University to launch a new initiative called Global Studies (2007).

SGC and the Impact of Concepts Pursuant To Progressive Education And E-Didactics

Educational theory of progressive education (in German “Reformpädagogik” or “alternative Pädagogik”, in French “éducation nouvelle”) has focused for more than a

century on self-reliance (Global Studies, 2007), thus often facilitating the ecological movement (Hasenclever, 1998), rooted in pedagogues of international importance such as Fröbel, Pestalozzi (who introduced the word "gardener" of children instead of preschool "teacher"— hence the word "kindergarten") and Montessori (Hentsch, 2000) that presently appears to experience a revival throughout (Eichelberger, 1995; Wild, 1993; Böhm, 1995) European schools and—interestingly enough—despite the "computer antipathy" of alternative educational approaches has considerably influenced omnipresent "digital game based learning" (Gee, 2005; Burns, 2002; Prensky, 2001).

The (most important, see Grippe, 2002) US educationist John Dewey – in continental Europe mainly absorbed in the Netherlands (Berding, 2000) – focuses on experience and participation, and consensus. Nonetheless, he is seen to lead out of the "unfruitful dualism between child-centred and subject-centred education", just as SGC prompts participants to "communicate" by taking the example of a "subject". According to a paper on pedagogy (Gray et al., 2004), a "conscious pedagogic principle" for SGC level 2 is "collaborative learning, involving reflective thinking, social learning (from peers) and a 'reward pedagogy' with regular and timely feedback", and similarly "coaching (facilitating) similar to Vygotsky's (Vygotsky, 1978) theory of the zone of proximal development in which people learnt new skills by following the example of others".

The present concept clearly surpasses also older paradigms as "situated learning" (Luck & Norton, 2004) or "goal based learning" (Schank et al., 1994), because the communication with peers becomes constitutive for generation of new experience – instead of the interaction with content. As compliant with constructivism, an iterative process of "constructing" the target *and* the solution is performed (Maher, 2000; Dorst & Cross, 2001), as formulated in newly emerging branch of science "design studies" on developing technological artefacts (Perry, 1998). In this sense, work on "open and distance learning" means to design structures (Love, 2002) for human communication (Luck, 2003).

In the sense of "distributed learning", SGC favours no teacher-centred (Kynäslahti & Wager, 1999), but a learner-centred approach (Ljóså, 1998) where former teachers move as tutors to the meta-level (Figure 5 in Gudmundsson & Matthiasdottir, 2004). In any suitable pedagogical framework (Goodyear, 1999);

- The educational setting
- The pedagogical framework
- The organizational context

match with each other. Hence, the web's distributed technology (Baumeister, 2005) mirrors best a peer structure, in level 2 this structure is "spiced up" by students' assessment competencies (Sluijsmans & Moerkerke, 1999).

SGC Impacted By Systems Analysis and Interdisciplinarity

True interdisciplinary practise dwells on a fact-based dialogue (ITAS, 2005) between disciplines: this is the idea SGC is based upon. Virtual discussions "immerse" (Burbules, 2004) in dialectics, with the objective to "transform" (Kalantzis & Cope, 2004) the participant.

Members of our technological science evolve from spectators-users to participants (Rohracher, 2005); which is the intention of "Surfing Global Change". The practical-minded politician perceives only limited success of her/his head-on "measures" to "improve" the complex system of reality.

In system dynamics (Sterman, 2000) such reluctant behaviour is called “resilience”: unseen interactions ensure that the systems state bounces back to almost where it was before “measures were carried out”.

When playing “Surfing Global Change”, players can visibly “see” the opposing arguments being embodied in the team-mates articulation of “opposing truths”.

CONCLUSION

The train of thought in this paper arches from the concrete example of a web based peer discussion structure (as part of the negotiation game “Surfing Global Change” SGC) to the resulting patterns of participants’ behaviour. Presenting examples from the EU accession and other cases of discourse-based democracy, Level 2 of SGC implements the added value of mutual review and enacts principles of intercultural communication, progressive education and interdisciplinarity.

Experience has shown that in SGC “best *overall* performers” are the “*second best*” participants in an academic *and* communicative sense (i.e. “bright pragmatists”), *opposed to* those that excel in only one sense. Such finding could be helpful for everyday professional and pedagogic life.

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