Supporting Student-Centred Teaching with New Media - Case Study and Experience Report

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Abstract

The Student-Centred Approach builds upon the theory that students who are given the freedom to explore areas based on their personal interests, and who are accompanied in their learning by a supportive, understanding facilitator not only achieve superior academic results but also grow personally and socially. However, pure Student-Centred teaching is more demanding in terms of time as well as learning material. The basic idea underlying our approach is to combine Carl Rogers' Student-Centred Teaching with the use of the Internet. The case study shows that this combination has the potential of reducing the increased efforts in the longer run, while fully retaining its benefits, most prominently deeper learning processes and a higher degree of flexibility, self-confidence, and social skills.

Keywords

Student-Centred Approach, experiential learning, facilitator, Internet, Student-Centred-Internet Assisted Teaching (SCIAT).

INTRODUCTION

The purpose of this paper is to share the author's experience in the use of new media as a tool within an approach that aims to improve the quality and effectiveness of learning and teaching in cognitive as well as social terms. With this approach we aim to achieve, in the first place, deeper learning processes that provide more meaning to both learners and staff, by applying fundamental psychological and didactic principles. The approach is targeted at enriching and reorganizing ordinary presence courses for advanced students working in groups of modest size (say up 20 students per course). Experience in this area is intended to guide the adaptation of the approach to other kinds of courses including ones with a stronger orientation towards distance learning.

Last year, a case study involving advanced courses in requirements engineering and web design was performed to assess the relevance of combining Student-Centred Teaching, as developed by the well-known American psychologist Carl Rogers, with the use of the Internet. Furthermore, the author wanted to find out, whether a customized version of Student-Centred teaching would fit into our conventional curriculum and grading system. The answers to both issues are clearly positive, and the experiment provided some, in the author's view, significant learning regarding, technical, practical, didactic, as well as attitudinal issues that I wish to share with the readers.

In brief, the Student-Centred Approach is based on the hypothesis that students who are given the freedom to explore areas based on their personal interests, and who are accompanied in their striving for solutions by a supportive, understanding facilitator not only achieve higher academic results but also grow with respect to their personal values, such as flexibility, self-confidence and social skills. This approach, also known as experiential learning, requires specific personal attitudes on the side of the instructor who takes

over the role of a facilitator. These attitudes are highly transparent, open communication, positive regard towards students and the striving for deep understanding of students.

While the positive effects of the "pure" Student-Centred approach have been proved in a number of case-studies and are well-documented in the literature (Rogers 1983, Aspy 1972), its combination with using the Internet as a resource for acquiring knowledge as well as a repository to store and maintain documents is a novel asset. We refer to this combination as Student-Centred-Internet-Assisted Teaching (SCIAT). In our work we argue that, due to the fact that the Internet opens up vast knowledge sources and is available around the clock, it optimally supports Student-Centred teaching, being directed towards *learning as a whole person* including intellect as well as feelings, also known as *experiential learning*. SCIAT is also very well suited to support, small teams of students who cooperate on a project each by contributing his/her special knowledge and skills (Ryback1998). These groups and their members can follow their individual work styles, stay in their preferred locations and work environments and nevertheless share documents freely on the web such as to stay up to date in their cooperative work. In fact, all course participants unanimously appreciated the convenient access to their shared documents, allowing them to coordinate their cooperative project work between the presence phases.

From the instructor's (also the author's) point of view it became apparent that Internet-Assisted, Student-Centred Teaching (SCIAT) requires communicative and social skills that are very different from the qualifications needed for conducting conventional courses. Generally speaking, the case study led to the hypothesis that the Student-Centred Approach grows in effectiveness with respect to deepening learning- and teaching processes, if sufficient amounts of material are electronically available (eContent) and the instructors have advanced social- and communicative skills.

The paper describes the general method, its adaptation to conventional curricula, a particular setting for the method's application in advanced courses in requirements engineering and web-design. It also discusses the results from the students' and instructor's point of view. Further, we draw some general conclusions and derive hypotheses regarding time-effectiveness, quality and amount of eContent, the instructor's social skills, and the transition process.

Student-Centred-Internet-Assisted Teaching - method and theory

Student-centred teaching

In arguing on a learning style that has significance for the individual, Carl Rogers describes *whole-person learning*, being the goal of Student-Centred teaching, as follows: "Significant learning combines the logical and the intuitive, the intellect and the feelings, the concept and the experience, the idea and the meaning. When we learn in that way, we are whole, utilizing all our masculine and feminine capacities." (Rogers 1983, p.20). In this spirit, Student-Centred teaching can be characterized by the following goals. It aims toward:

> a climate of trust in which curiosity and the natural desire to learn can be nourished and enhanced;
>
> a participatory mode of decision-making in all aspects of learning in which students, teachers, and administrators have their part;
>
> helping students to achieve results they appreciate and consider worthwhile, to build their self-esteem and confidence;
>
> uncovering the excitement in intellectual and emotional discovery, which leads students to become life-long learners;
>
> developing in teachers the attitudes that research has shown to be most effective in facilitating learning;
>
> helping teachers to grow as persons finding rich satisfaction in their interactions with learners.

(Rogers 1983, p. 3 adapted and shortened)

The Student-Centred approach is based on the empirically proved hypothesis (Aspy 1972) that students achieve superior academic results and even personal growth in terms of higher self-confidence, openness to experience, etc., if they learn in an atmosphere or climate that can be characterized by three basic attitudinal conditions: realness, acceptance, and empathic understanding. These necessary and sufficient conditions must be held or lived by the instructor, better facilitator, and reciprocally be perceived by the students.

> *Realness*, genuineness, or transparency in the facilitator means that he must be real in the relationship with his student, be the person he is and not use any masks of facades in communicating with the students.

> *Acceptance*, prizing, or respect towards student implies that the facilitator accepts and respects the whole personality of the student and feels basic trust in her constructive tendency, her striving for solutions in her own way.
>
> Deep understanding, often called *empathic understanding*, means that the facilitator actively listens to the students with the ultimate goal to profoundly understand their questions, motivations, intentions, and the meanings of their communication as well as solutions.

Besides the above attitudinal conditions that contribute to establishing a facilitating, fruitful atmosphere for learning, Carl Rogers proposes three more conditions for essential, whole-person learning (Rogers 1961):

> Significant learning occurs more readily in relation to situations perceived and recognized as problems by those who wish to learn. Students in required courses are apt to view the course as an experience in which he/she expects to remain passive. The essential implication of this observation is that we need to permit students, at any level, to be in real contact with problems they consider relevant, so that they perceive problems and issues which they really care about and wish to resolve.
>
> There exist many resources of knowledge, techniques, of theory, which constitute raw material for use. It seems that these resources be made available to students, not forced upon them. Aside of the usual resources, such as books, maps, tools, materials - both in electronic form or in as hardcopies -, the teacher can be considered as a human resource, who would want to make himself/herself available to his/her class in numerous ways. He would want to let his students know they can call on his knowledge, yet he would not want them to feel they must use him in this way. She would want them to know her own way of thinking about the field, even in lecture form, if they wished. Yet, lecturing should be perceived as an offer rather than a must. He would want the quality of his relationship to the group to be such that feelings could be freely communicated, without becoming a restrictive influence. Thus excitement, enthusiasm, boredom, disinterest, or pleasure of one's own learnings could be shared among all participants of a class. In general, whatever resource the teacher supplies -- she would feel and hope to be perceived as offerings to be used rather than guides or requirements.
>
> The basic humanistic hypothesis upon which the teacher builds is that students who are in contact with real problems wish to learn, want to grow, seek to find out or desire to create. He/she sees his/her function as that of developing a climate in the class that these tendencies can evolve.

In the author's view, the conditions stated above reoccur in the literature (Cognition and Technology Group, 1990) under terms like 'authenticity of the problem', 'situated cognition', 'anchored instruction', and 'cognitive apprenticeship' to be provided by the facilitator of teaching. Also, Roger Schank's (Schank 1997) popular phrase "We learn best what we feel most" seem to succinctly express the situation.

Summarizing, Student-Centred teaching requires particular personal attitudes from the facilitator as well as at least a certain degree of openness from the side of the curriculum as well as the students. From my personal experience I'd like to add the requirement on, or at least the benefit of social skills and techniques like moderation (Freimuth, 2000). These help to make group processes more transparent, to converge faster and hence to improve student satisfaction (Bruffee, 1999). We postpone the discussion of these didactic requirements to the final Section and proceed by discussing technology-based issues.

Combining student-centred teaching with internet technology

The Internet and numerous derived technologies are particularly well suited to be used with the Student-Centred approach. This is because, optimally, they provide students with the capability of freely exploring material that is considered relevant for the solution of the tasks they set for themselves, after consultation with the facilitator with and his/her agreement. In SCIAT students, supported by their instructor, typically use the Internet in two ways. The first way is to use the Internet as a knowledge source in so far, as students search for relevant knowledge. Thereby they need to actively ask themselves what material might be useful for fulfilling their task and need to assess, which documents, journals, libraries, books, institutions might provide the information they need. Once found, students need to evaluate the sources with respect to their relevance for the solution they seek. Needless to say, all lecture notes and a reading list is provided by the instructor in a downloadable format.

The second way the Internet is used in SCIAT is as a repository of students' documents as well as a communication medium for discussion with their colleagues as well as the facilitator. Using web-space as a repository for intermediate, partial solutions is particularly helpful in situations in which small teams of students cooperate on the same project. This is because each team member can consult and discuss documents with his/her team-mates and also with the facilitator. These same documents can further immediately be used for presentation in those courses that are organized as laboratories. In our case study, we prepared an index page with entries for each team and individual student. Students' emails were also maid available. Whereas read access was provided

for all students of a course and the facilitator, only the members of each small team had write access to their respective workspace. In order to further improve the communication between students and between students and instructor, a discussion forum can be set up, although in our case it was not widely used.

Summarizing, New Media can be used to provide resources on an individual basis independent of time and location and further to facilitate communication. Students need to actively engage in and direct their learning process, set expectations and carefully select information they consider useful. An essential point is the students' motivation to use these vast capabilities. This, in my view, is the point where a supportive and yet challenging Student-Centered atmosphere plays a major role. If combined properly, synergistic results between experiential- and media supported learning should come quite naturally.

The role of the instructor in the particular setting

The following is a particular adaptation of the facilitator's role and grading procedure used in the case study. Pure Student-Centred teaching dismisses grading whenever possible and aims at vastly open curricula.

> The instructor takes on the role of a facilitator or coach . She supports the students in their search and supply of relevant material, coordinates the students' presentations of individual milestones of their projects, moderates discussions, consults in all kinds of problem-solving and seeking for solutions, lectures on topics that are selected in plenary discussions with the students and conform to the curriculum.
>
> The facilitator suggests topics for lecturing and discussion according to the curriculum, the goals she set for the course in agreement with the students, and according to students' interests. He also suggests various options and topics for laboratory work, among which each student can choose.
>
> The facilitator being responsible that the requirements prescribed by the curriculum be met, he takes over the final decision about a positive or negative grade. Otherwise, the criteria for evaluation are open to discussion at the beginning of the each course. In particular, the oral form of exam allows the facilitator to take into account the individual contribution and learning of each student.

SCIAT in software engineering - a Case-study

Concrete setting and motivation

In the academic year 2000/2001 the author taught a conventional 3-hour lecture and 2-hour lab course in the area of software engineering in the winter term. In these courses, the focus is on object-oriented concepts, the UML, testing and maintenance. The advanced courses in that area are foreseen to be taught in the summer term and consist of a 1-hour lecture and a 2-hour lab course. The latter was split into two parallel groups in order to accommodate for the limit of maximum 20 students per lab-course. Since software engineering falls in to the area of my active research I felt that there is a rich variety of material being essential. Rather than doing some arbitrary selection based on my personal view I decided to let the students choose from a list of about 15 topics from the area of requirements engineering and web-design, the topic I chose to offer in the advanced courses.

In the introductory session the concept of Student-Centred teaching was presented and the students were asked to fill out a questionnaire. It contained questions regarding their interests in the subject area, their expectations on the course, their current job, and a rating on in how far students were satisfied with conventional course formats versus their willingness to participate in the Student-Centred approach. This questionnaire served as an orientation aid for the facilitator and has proved to be indispensable throughout. One interesting result was that students tended to be significantly more interested in trying out the new approach than stick with old teaching habits. This can be seen from he fact that 29 of the 31 students who returned the questionnaire rated the option to stay with a conventional approach with 3.44 on a scale where 1 stands for best and 5 for worst, whereas the option to experiment with the Student-Centred approach was rated with 1.69 on the same scale. Two students did not respond to these two questions.

In the next session, the facilitator briefly presented about 10 topics out of which the students chose 5 to be presented in lecture form in a blocked mode, such as to be available for the accompanying lab classes. Each lecture was held such that at the beginning we had a discussion on the main issues of the previous lecture. The students were asked what they found most applicable or most interesting, how they think they could use the material in their work, etc.

In each of the two parallel lab courses, students were encouraged to build teams of 2-4 persons. This is because on the one hand it would be hard to individually handle 15 – 20 people, on the other hand students could experience working in small, self-managed teams and use the Internet for communication and cooperation. The students were presented with a list of about 15 freely formulated topics from which they could choose their project. One of the topics said "any other topic you like subject to being discussed with

the facilitator". In this way the students were given much of the freedom in the spirit of the Student-Centred approach, yet, by making suggestions, the facilitator took care not to let her students be lost in complete freedom that they were not used to from their previous learning experience. In order to get a view on the students' engagement with the course material and their work styles, each student was instructed to document the time and activities he/she spent with the project in the form of a project diary that had to be handed over to the facilitator in the course of the final exam. During the weekly lab sessions we initially applied some of the requirements engineering techniques to specific projects according to the students' choice. For example, we performed a goal analysis for a web-based system that was to manage further education of a company's employees, or we brainstormed about the Use-Cases for a web-application for a karate-club, or captured non-functional requirements for web-editors. Throughout the term, students volunteered in presenting intermediate milestones of their projects that were then discussed by the whole group. It should be emphasized that the last 15 minutes of each lab-session was scheduled for individual questions. This time was primarily spent for the exchange of material that was not available on the web or for the students' consulting on what to do next. Also, quite heavy email traffic took place between the students and the facilitator, mainly for reasons of the exchange of material.

Evaluation

In one of the final sessions the courses were evaluated by employing two questionnaires. The standard, but extendible, questionnaire was supplied by the University of Vienna, a special questionnaire was developed by the author following the format suggested by David Aspy and Flora Roebuck in (Aspy 1972). The standard questionnaire has been extended by the author to include a question on whether the students found it worthwhile to use the Internet. Most interestingly, this question was unanimously answered highly positively by all students. The main goal of the special questionnaire was to assess the facilitator's attitudes along the dimensions of realness, acceptance, and understanding, and furthermore his/her general attitude towards question answering. As can be seen from Figure 1, these dimensions were ranked on a scale form 1 (worst) to 5 (best). According to (Rogers 1983), level three is the minimally effective threshold on interpersonal attitudes (the mean value from the three specific attitudes) for Student-Centred teaching to become effective. A survey among about 1200 teachers in various locations in the USA showed that teachers not trained in humanistic education ranged slightly below three. As a consequence, we conjecture that training in interpersonal attitudes is essential for Student-Centred, and in particular, for Student-Centred-Internet-Assisted teaching to become fully effective. The facilitator's (= author's) rating on interpersonal attitudes according to the questionnaire given in Figure 1 by students in two parallel groups, respectively, led to the results given in Figure 2

Grading

Regarding the grading of students it can be said that the lab courses were evaluated in a final 30-minute interview and presentation with each individual team. They presented their final results, described the way the team split its responsibilities, and handed over the project diary. The facilitator also asked the students about their personal learning. This point turned out to be particularly exciting, since it touched points that the facilitator would never foresee, such as setting up a web-server, interviewing an expert-user of a web-editor, working through a tutorial on the Unified Process in order to determine milestones etc.

The grading regarding the whole field of software engineering is done in two parts, a written and an oral one, in order to cover the full spectrum of a student's learning: Whereas the written part is designed to objectively address the basic material from the conventional 3-hour lecture, the oral part gives the facilitator the opportunity to enquire about the learning that occurred during the students' subjective, experiential learning as a result of the advanced course in SCIAT format. Since this combination is totally consistent with the conventional way of performing exams, it makes it easy to enrich conventional curricula with the SCIAT style.

Results from the case-study

Student's view.

Students feel they have learned much, definitely more than in conventional courses having the same length.

Students know what they would improve on what aspect of their work if it were continued.

Students find they enjoyed the course and even had some satisfaction and fun in doing their projects.

Students know to which areas they are going to apply the knowledge and skills they have learned.

Students tend to deliver the project diary as a whole team, occasionally mentioning some individual work.

Students unanimously are in favour of using the Internet, they wish to have more rights and opportunities to execute their programs and they wish better technical support in using the web.

Some students are interested in the psychological and didactic foundations of the Student-Centred approach.

Students in general wish to attend and enquire about further courses by the same facilitator.

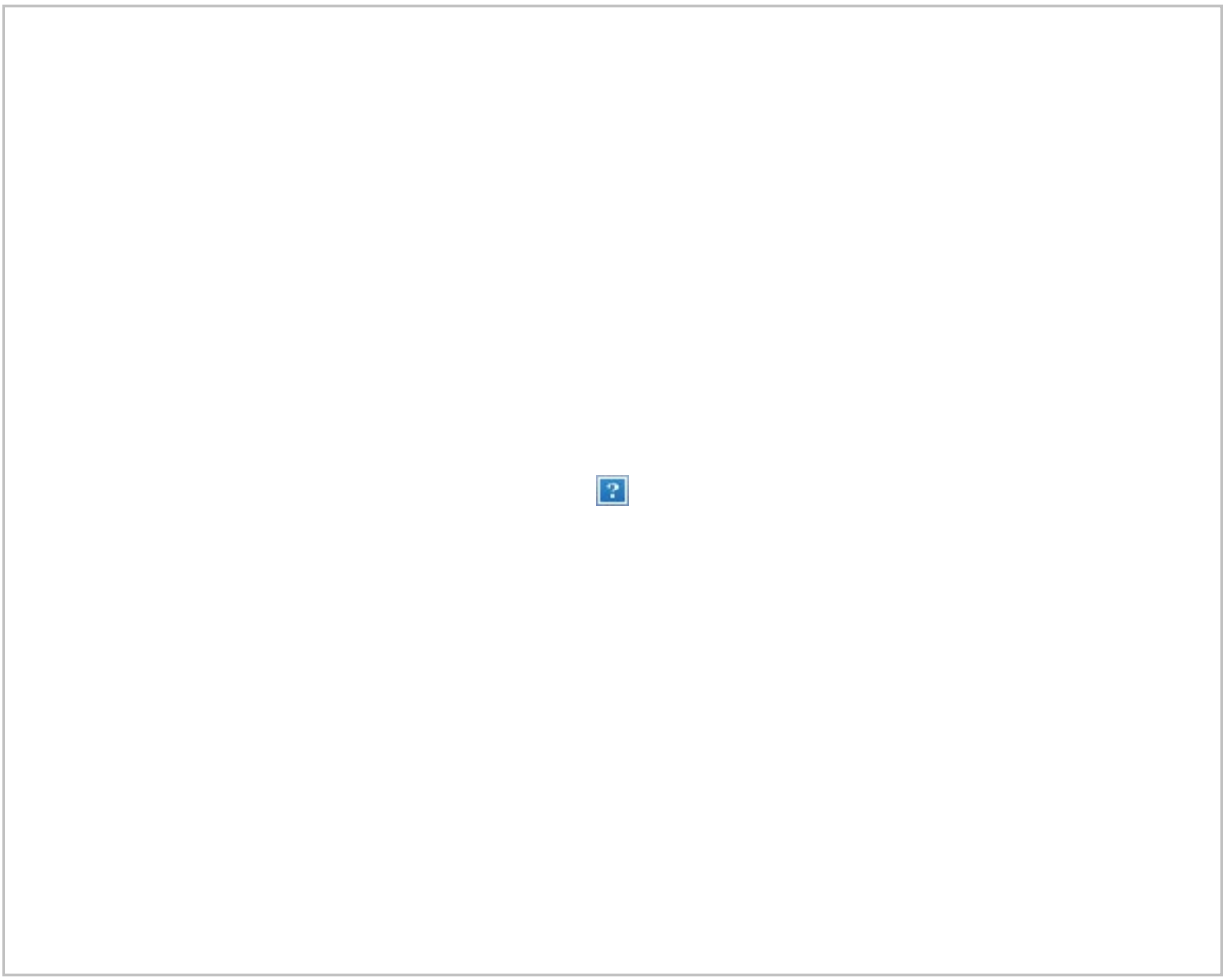

Figure 1: Questionnaire for assessing a facilitator's attitudinal conditions in the Student-Centred approach.

Course	General	Realness	Acceptance	Understanding
SWENG 1, N = 12	4.5	4.66	4.9	4.5
SWENG 2, N = 9	4.5	4.77	4.66	4.5

Figure 2**:** Results from assessing the facilitator's attitudinal conditions in two parallel software courses.

Facilitator's view.

Students tend to spend significantly more time for their projects that in comparable, conventional courses.

Students solve several problems, primarily technical ones, on their owns.

The majority of the results are better than in conventional courses, some are about the same. The latter tends to be the case if students have too tight schedules and they explicitly take an initiative in mentioning this as an excuse.

Students tend to drop out at the very beginning, but constantly stay assigned after the initial period of about three weeks.

More students attend the lectures and less students stay absent from the lab course than with conventional teaching.

Students moderately engage in discussion with other teams, the vast majority succeeds in managing and distributing their work in their own small team, based on individual skills and knowledge.

Students tend to underestimate rather than overestimate their achievements when asked to suggest a grade for themselves. They are very surprised by that question and find it particularly hard to respond.

The SCIAT approach is more time consuming than a conventional course also from the facilitator's point of view and it requires more communication throughout the term. Special lecture notes need to be prepared and made available on the Internet.

The SCIAT approach leads to good interpersonal relationships with the students.

Real sharing of ideas is possible. It allows for a more extensional perception of questions of interest.

Facilitators need a variety of skills beyond those of lecturers and also beyond those of facilitators of encounter groups! They need to be able to lead a group to some goal, to activate students, to facilitate discussions, to visualize results from problem-solving processes of any kind and to know the basic media-technology from a user point of view. They also need to "know" when and how to shift between their multiple roles transparently. Consequently, a new term seems to be needed to distinguish their role-responsibilities. Recently, the term "*coach*" has been introduced in a similar context and seems to be well suited to express a function that is both accompanying and orientation-providing.

The SCIAT approach, by its very nature, is unique in each course, even in parallel groups of the same course. It is experienced as personally highly enriching by the facilitator. The fact to be with the students and participate in their striving for solutions adds much to the personal values of the facilitator as well as to his/her inspirations for further (research) work.

Discussion and conclusions

Despite the generally enriching experience the author made in conducting the case study in a term with intense teaching activities (volunteered by the author for one semester), some words of caution are in place. These stem from the very personal experience by the author and are not necessarily shared by the promoters of student centred teaching. This is primarily because the latter promote and build on preconditions that would require vast changes of university curricula that the author, in her current thinking and position, does not consider realistic in the short run. Furthermore, she prefers an incremental, evolutionary, experiential process to assess the merits of the new paradigm. In this context let us return to the question under what circumstances we conjecture SCT to be most effective. The discussion will be organized such that first we deal with SCT in general and then consider arguments concerning its combination with New Media.

We have observed that SCT requires much interactive communication between students and facilitators. Thus, in the form presented here, it can be suggested only for rather small groups, say up to 15-20. Experiments with larger groups would be required to test this criterion.

Students should already have some background on the subject upon which they can build, in order not to get lost in a new area. In this respect, good background knowledge, say from some more traditional introductory course, helps to broaden and deepen experiential findings in a focused way, as is required by our conventional curricula.

From my experience, it is essential that facilitators, better coaches, have broad and deep knowledge in the courses' subject area in order to provide really effective support and to gain personally. It is an open and, in my view practically and theoretically interesting question what would be the result if SCT were used in facilitating courses not precisely meeting this criterion.

Before discussing the contribution of New Media to SCT it should not remain unsaid that Carl Rogers himself is well known as a pioneer in using most recent technology as a tool for learning as well as research. His recorded interviews and sessions have become world-famous. Hence, the adaptation of SCT to employ new technology can be seen to follow the spirit of C. Rogers and thus appears particularly worthwhile and legitimate from a cultural viewpoint.

Due to the fact that relatively much time, both from students as well as the facilitator is spent on the search and exchange of material, the Student-Centered approach significantly benefits in terms of efficiency and effectiveness, if all or most of the relevant material (even better a superset of the material required for a course) is

- available electronically, and
- well structured, such as to be found and examined for relevance easily [Motschnig-Pitrik 90].

Since eLearning environments and authoring tools strive to meet these requirements, they seem to be primary candidates to be combined with the SC approach for improving its effectiveness.

Needless to say, using New Media effectively requires some basic skills that should be owned by facilitators, better coaches, and students.

Given that in SCT it are the students who shall stay in the control of their learning processes (within the limits of a curriculum), New Media provide more facilities to support individuality and initiative or active control than conventional ones. Active searches, interactive environments, student initiated electronic dialogues are just a few means to accomplish this.

To close the discussion of criteria on SCT, perhaps most important is that the facilitator or coach hold and communicate the three attitudinal conditions, namely realness, acceptance, and understanding (Rogers 1961, 1983). In that respect, a particular personality structure is required that needs to mach the personal attitudes and values of the coach. For persons who feel comfortable with the attitudinal conditions required by the approach, reading material complemented by training in the form of encounter groups and workshops can be provided to develop higher levels of these interpersonal values and thereby make the approach more effective. Personally, I believe that the attitudinal conditions or interpersonal values [Aspy 72] should constitute the congruent, stable foundation on top of which social and communication skills be built. In particular, a good coach needs skills to pose good questions, activate students, mediate discussions, visualize the results of group processes, act according to the group's feeling or thinking about a situation, and transparently shift between his/her multiple roles.

Summarizing, the case study has shown that the emerging style requires qualifications and social skills being very different from those needed for conventional teaching. Interestingly, it appeared that New Media could extremely well be employed to support the coach of facilitator in numerous ways being particularly relevant to the Student-Centered approach. This is because new media have the potential of reducing the overhead required for the provision of a broad choice of resources as wel as for the organisation of communication and collaboration. Acknowledging that New Media open up vast knowledge sources, allow students to explore and follow their particular interests, provide means for focused communication, and are available around the clock, leads us to hypothesize that they optimally support learning processes that are directed by the students and just initiated and channelled by coaches. Vice versa, if the delivery of information can be supported by the use of advanced information and communication technology, social and personal learning gain in importance. In this respect, Person-Centered principles already have proven to be most effective. Consequently, in the author's view, the current period is optimally suited to employ New Media to reduce the higher effort required for Student-Centered Teaching while fully retaining the benefits known to enrich teaching and learning with more personal meaning.

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