USING DYNAMIC ADAPTIVE CASES TO BRING PRACTICAL EXPERIENCE INTO THE CLASSROOM

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ABSTRACT

This paper is based on the author's teaching experience in the field of international logistics and supply chain management and his success with two types of dynamic adaptive cases. The first consists of decision-making scenarios in the field of road haulage, inland-navigation and/or logistics service provision based on effective cost calculation. The second is an assessment of a country environment or the customs treatment and packaging requirements of commodities being exported or imported in the context of the European Community. In both cases, publicly available resources are used to create ever new problem statements using current information for the students while remaining relatively easy for the teacher to administrate as well as preventing cheating to a large extent. The paper provides concrete examples and outlines key components of scenario design and their success factors.

INTRODUCTION

In higher education, teachers are increasingly bringing practical experience into the classroom in order to motivate students and boost their skills in acquiring and reproducing theoretical knowledge as well as applying it to solve real-world problems. One way to achieve this is experiential learning (Gentry, 1990) and, more specifically, the use of case studies in the classroom (e.g. Barnes et al., 1994 or Erskine et al., 2003), with the students’ performance as part of their assessment. However, traditional case studies become rapidly outdated and particularly good ones tend to be used too often, running the risk that students will reuse knowledge from their predecessors. Consequently, there is a constant struggle for teachers to find new or rewrite existing cases. This in turn results in spending considerable time on the preparation of teaching material at the cost of research activities, etc. One way to overcome this challenge is to use dynamic adaptive cases, where a fixed scenario with a real-world problem can be kept up-to-date relatively easily while still minimizing the danger of students cheating.

The present paper starts by discussing the foundation, extensions and further development of the traditional case study method. The focus then moves to student cheating in this context and suggests several remedies against this. Finally, the dynamic adaptive case approach is outlined using the experiential learning task structure of Design, Conduct, Evaluation and Feedback by Wolfe and Byrne (1975), and the key components of its design and its success factors are described.
THE CASE STUDY METHOD

The case study method facilitates experiential learning, particularly if it is well designed using a problem-solving cycle (e.g. Knoop, 1984, Gross Davis, 1993 or Taylor, 1997). This addresses all four of the fields first outlined by Kolb (1984) and further developed by Svinicki and Dixon (1987) and Kolb and Kolb (2005) for classroom activities, namely, concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE). Kreber (2001) shows that, in the context of traditional case study teaching, (1) CE is fostered by reading the case, (2) AC by identifying and analyzing the problem, (3) RO (together with CE or AE) by generating, evaluating and selecting alternative problem-solving strategies, and (4) AE (in conjunction with AC) by developing an implementation plan. Of course, some group work is always recommended given that students have different learning styles, strengths and weaknesses (Kolb and Kolb, 2005).

Extensions and further development

In Table 1, typical case study variants are compared across the four phases of Wolfe and Byrne’s experiential learning task structure (1975; see also Gentry, 1990). This list is far from complete but shows clearly how the traditional case study method, as outlined by Barnes et al. (1994) and Erskine et al. (2003) – among others – can be extended to enhance in-class practical experience. For example, Siciliano and McAleer (1997) suggest using approaches such as the McAleer interactive case analysis (MICA) to increase student involvement. In this form of analysis, student teams manage assigned case studies by finding and taking action steps and monitoring in-class discussion themselves, allowing the instructor to have a more passive role.

Another common problem of traditional case studies is that they become outdated easily (Gallagher, 2007). Consequently, students question their relevance and tend to become bored quickly. One remedy against this is to ask students for reflective reports afterwards, as proposed by Rosier (2003). This not only encourages the students’ reflective learning but also helps to detect deficits in the case itself. Another approach is to avoid the specific dates usually stated in cases, but this is only a viable approach if the story can be left untouched. Instead of updating existing cases on a permanent basis, Reeves (2011) suggests an extended case study approach, where a written case study is used as a starting point for further inquiry and students are encouraged to update their knowledge about its context and protagonists with secondary desk-based research. He claims this works particularly well if the case is backed by theory which is general in scope and updated information is publicly available.
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<tr>
<th>Method</th>
<th>Design</th>
<th>Conduct</th>
<th>Evaluation</th>
<th>Feedback</th>
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<tbody>
<tr>
<td>Traditional case study: Barnes et al. (1994), Erskine et al. (2003)</td>
<td>Cases selected or written by the instructor</td>
<td>Case distributed to all or some of the students; coaching upon request</td>
<td>Submission of written analysis, in-class presentation and discussion</td>
<td>In-class debriefing after presentation and discussion</td>
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<tr>
<td>McAleer interactive case analysis (MICA); Siciliano and McAleer (1997)</td>
<td>Cases selected or written by the instructor</td>
<td>Case distributed to all or some of the students; further administration carried out by students; coaching upon request</td>
<td>Submission of written analysis, in-class presentation and discussion based on defined scoring criteria</td>
<td>In-class debriefing after presentation and discussion led by students</td>
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<tr>
<td>Traditional case study with reflective report: Rosier (2003)</td>
<td>Cases selected or written by the instructor</td>
<td>Case distributed to all or some of the students; coaching upon request</td>
<td>Submission of written analysis, in-class presentation, discussion (and reflective report)</td>
<td>In-class debriefing, etc., followed by a reflective report by students about lessons learned</td>
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<tr>
<td>Extended case study: Reeves (2011)</td>
<td>Cases selected or written by the instructor; further inquiry for updated information is encouraged</td>
<td>Case distributed to all or some of the students; secondary desk research needed to update information; coaching upon request</td>
<td>Submission of written analysis, in-class presentation and discussion</td>
<td>In-class debriefing after presentation and discussion</td>
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<td>Current case study: Chapman (1995)</td>
<td>Students research, develop and present a short live case based on their own work experience</td>
<td>Teacher and students negotiate specific issues to write about</td>
<td>Submission of written analysis, in-class presentation, and discussion</td>
<td>In-class discussion, followed by individual debriefing afterwards</td>
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<td>Student-written, instructor-facilitated (SWIF) case study: Bailey et al. (1997), Swiercz (1998), Vega (2013)</td>
<td>Students develop, analyze and present case study based on an amalgam of team members’ collective experiences</td>
<td>Interactive process between instructor and students of analyzing case studies developed in a team environment</td>
<td>Submission of case study and analysis, in-class presentation and discussion</td>
<td>Several feedback loops commenting on work-in-progress and final case studies</td>
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<td>Web-based case study: Henson et al. (2003)</td>
<td>Students analyze the problem of a company or brand based on secondary desk research</td>
<td>Students find, analyze and present a current problem of a company or brand using publicly available information from the internet</td>
<td>Submission of written case analysis and in-class presentation; evaluation by both instructor and students</td>
<td>Feedback from both instructor and students</td>
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<td>Student authored cases: Lincoln (2006)</td>
<td>Students research, develop and present a short live case based on field research and initial interviews with business clients who explain their problem</td>
<td>Case study and solution is developed by students strictly along a problem-solving cycle; can ask business clients for further information</td>
<td>Submission of case study and solution; in-class presentation and discussion</td>
<td>In-class debriefing after presentation and discussion</td>
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<td>Live case study with local company in-class participation: e.g. Markulis (1985)</td>
<td>Cases written by the instructor in collaboration with a local company</td>
<td>Case distributed to all or some of the students; with local company in-class participation; further inquiry and coaching upon request</td>
<td>Submission of written analysis, in-class presentation and discussion (with or without the participation of a local company)</td>
<td>In-class debriefing after presentation and discussion (with or without the participation of a local company)</td>
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<td>Live case study as a student’s project for a company client: e.g. Gentry (1990)</td>
<td>Team-based experiential project centered on a real company problem</td>
<td>Students work in real-time with the client to help solve problems or seize opportunities</td>
<td>Submission of written analysis and recommendations for the company client and in-class presentation</td>
<td>Feedback both by the instructor and company client</td>
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Table 1: Design, Conduct, Evaluation and Feedback for different types of case studies
Another criticism often mentioned in connection with traditional case studies is that students want to work “with real problems, real information, and real people in real time” (Lincoln, 2006), whereas traditional case studies merely reflect past, second-hand experience. To alleviate such a lack of realism, live case studies (sometimes also called “living cases”) have been recommended, which range across diverse settings from instructor-authored traditional case studies with local company in-class participation (e.g. Markulis, 1985; Fawcett and Fawcett, 2011) to small-scale student-consultancy projects in real-life interaction with a client organization (e.g. Gentry, 1990; Richardson and Ginter, 1998; LeClair and Stöttinger, 1998; Elam and Spotts, 2004, Roth and Smith, 2009). However, the preparation of such live case studies is a very demanding, time-consuming task and needs a high level of commitment from the corporate clients, who have to spend considerable time with students in class, in field work or as interview partners.

Bridging traditional and live case studies, the literature also proposes some hybrid approaches such as current case studies (Chapman, 1995), student-written, instructor-facilitated (SWIF) case studies (Bailey et al., 1997, Swiercz, 1998, Vega, 2013), web-based case studies (Henson et al., 2003), or student-authored cases (Lincoln, 2006), which try to find a balance between the two extremes. These hybrid approaches included in Table 1 share a common feature, namely, that students are not only given a written case to analyze but must also develop and/or solve their own case study based on secondary desk research, field research, and/or personal interviews.

Cheating issues

In addition to addressing issues such as motivating students, enhancing reflective learning, remaining up-to-date and offering more realism, teachers using the case study method are increasingly having to deal with cheating (Zobel and Hamilton, 2002; Park, 2003). First and foremost, there is always a danger of plagiarism and/or patch writing (Howard, 1995, Park, 2003; Zobel and Hamilton 2002; Li and Casanave, 2012). Both forms are unacceptable as the resulting submissions are not original work but either (1) partly or fully copied exactly from the work of someone else (plagiarism) or (2) the work of someone else paraphrased with minor changes such as deleting words, altering the text’s grammatical structure and/or using substitute synonyms (patch writing). Whereas plagiarism is a clear incident of cheating, patch writing may indicate that the student has struggled with the case or assignment. This is often the case in classes where the language of instruction is not their mother tongue and students cannot fully follow the words and ideas used (Park, 2003, Li and Casanave, 2012, Stapleton, 2012). Another aspect is social loafing (the so-called free rider problem) which occurs when individual group members do not contribute as much as expected to the team effort (Bailey et al., 2005).
Some remedies

There are several remedies against cheating (e.g. Zobel and Hamilton, 2002) which can be briefly summarized as follows:

1. *Plagiarism checks* should be used to test students’ submissions against internet sources (global plagiarism) as well as any available work by former students (local plagiarism). Many detection tools are available for checking digital text submissions against plagiarism, some of them are also tested on a regular basis (Gollub et al., 2013). Although not all of these tools allow the detection of local plagiarism and patch writing to the same extent as global plagiarism, recent studies show that their use has a deterrent effect on plagiarism activity generally (Stapleton, 2012). For assignments including spreadsheets, Singh et al. (2012) suggest taking measures such as hiding unique content manually. This can be done by using a digital watermark or by automatically logging file name changes, thus making it possible to track a spreadsheet’s path before submission. These measures can be implemented easily by integrating functionalities into standard spreadsheet software.

2. *Individualizing case design* is another approach. It is possible to generate individual assignments automatically, as shown in an interesting approach by Goldwater and Fogarty (2007). Nevertheless, it usually requires substantial manual work (Goldwater and Fogarty, 2007; Singh et al., 2012), even if only a few figures or names are changed and each student or work group receives a different but identifiable version.

3. *Using a signatory code*, where each group member has to sign the final submission after gaining approval by the others, can help to prevent social loafing in group work to a large extent (Bailey et al., 2005). Of course, the instructor can rely on known group dynamics and/or balance individual and group work contributions in the overall course evaluation. However, implementing a signatory code seems to be more effective, as it gives real evidence that each group member contributed enough to the group work for all other group members to allow him/her to sign and obtain credits for that submission. This in turn allows a team to punish a group member if they feel he/she has been a free rider.

THE APPROACH OF DYNAMIC ADAPTIVE CASES

Taking all the problems associated with the traditional case study method into account, it becomes clear that (1) cases require more realistic and up-to-date information; (2) tasks should be essentially individual for each student or group; and (3) case design should discourage cheating, while (4) remaining relatively easy for the teacher to administrate. The following section proposes the use of dynamic adaptive cases as a means to address all four issues.
Firstly, it should be noted that there is a general lack of well-written traditional case studies in the fields of international logistics and supply chain management, particularly from a more operational perspective (i.e., focusing more on trade facilitation and transport management than on high-level strategic management issues) and in transport, logistics and supply chain accounting and controlling. In addition, those available in textbooks such as Taylor (1997), Dornier et al. (1998), Arlbjørn et al. (2006), Mangan et al. (2011) or from repositories run by CSCMP or The Case Centre rapidly become outdated. This observation led to the author’s development of his own material, which was designed to foster experiential learning and could also be used for student assessment. This resulted in two types of dynamic adaptive cases (see Table 2):

(1) **Calculative cases** Group assignments with decision-making scenarios in road haulage, inland navigation and/or logistics service provision based on effective cost calculation (see Appendix A1/A2 for a case sample and corresponding teaching note). The main learning outcomes for this sort of case are the demonstration of cost calculation skills and gaining experience in fact-based decision-making as part of a team.

(2) **Structured reports** Individual working assignments assessing country environments or the customs treatment and packaging requirements of commodities being exported or imported in the context of the European Community (see Appendix B1/B2 for an assignment sample and corresponding teaching note). Learning outcomes center on training information acquisition, analysis and accurate reporting.

In all cases, publicly available resources are exploited to create problem statements which are always new but require little effort to keep them up-to-date. In addition, the case design impedes cheating to a large extent as plagiarism, patch writing and social loafing can be detected relatively easily. The author has already used all three variants in various environments from bachelor to master level with full-time as well as part-time students at WU Vienna University of Economics and Business, the University of Applied Sciences bfi Vienna and Sup De Co, Amiens, Picardie. In all cases/institutions, the feedback at the end of the course was always very positive with students greatly appreciating the cases’ realism and practicality. Indeed, some even adopted the template spreadsheets from the calculative cases for their own work, while others drew on the sources provided in the assignments for subsequent seminar papers or theses.

**Calculative cases**

Here, students receive a short case study of about three pages describing a well-defined decision-making scenario such as (re)investment in vehicles, calculation of freight costs, submission of a proposal for logistics service provision, etc. The case ends with a couple of specific questions which
ask for a calculation of effective costs for the provision of the vehicle, transport or logistics service in question, followed by slight adaptations or revisions of the initial scenario (e.g., the impact of different truck-trailer combinations or countries of registration for trucks or water levels in inland navigation) as well as some follow-up questions to foster deeper understanding (e.g., suggestions for improving their solution). To ease the necessary calculation tasks and limit the variety of possible outcomes, a generic Excel spreadsheet is always attached to the case. For calculations in road haulage and logistics service provision, it is pre-programmed in such a way that the personnel costs of drivers and dispatchers are derived from current collective agreements from the goods transportation and freight forwarding sector (including diverse rules about working hours, monthly payments, social benefits, etc.). It also includes road charges and vehicle tax for trucks and trailers so that students can click through and fill in the Excel sheet using the information outlined in the decision-making scenario. In the inland navigation case, a similar effective cost calculation from via donau (2007) is adopted, which explicitly includes vessel-operating costs and loading characteristics of different types of inland navigation vessels (and combinations thereof). Usually, all cells are non-protected, as part of the students’ task is to adapt this generic Excel spreadsheet to the specific situation given in their decision-making scenario.

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<tbody>
<tr>
<td>Calculative cases</td>
<td>Decision-making scenarios must be solved with the help of a generic Excel spreadsheet for calculations, accompanied by specific questions</td>
<td>Case is distributed with a generic Excel spreadsheet as the basis for calculations; FAQ upon request</td>
<td>Electronic submission of calculation sheet and written answers as group work</td>
<td>In-class discussion, commenting on/ranking solutions in general Individual feedback given on marked and commented paper copies</td>
</tr>
<tr>
<td>Country assessment report</td>
<td>Structured report containing facts and figures as well as brief commentaries about a country environment of choice</td>
<td>Assignment distributed with a template document serving as an example; FAQ upon request</td>
<td>Electronic submission of written report; in-class discussion</td>
<td>In-class discussion showing exemplary country differences Individual feedback given on marked and commented paper copies or comments via learning platform</td>
</tr>
<tr>
<td>Commodity assessment report</td>
<td>Structured report containing commodity- and country-specific data about export/import flows, trade restrictions, duty levels, preference rules, as well as packaging needs and transportation requirements</td>
<td>Assignment distributed with an introduction explaining how to access secondary data from publicly available databases; FAQ upon request</td>
<td>Electronic submission of written report; in-class discussion</td>
<td>In-class discussion, giving an overview of findings about different duty levels, trade restrictions and preference rules Individual feedback given on marked and commented paper copies or comments via learning platform</td>
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Table 2: Design, conduct, evaluation and feedback for dynamic adaptive cases
The case is then implemented in the course structure as follows. In the first session, spreadsheet functionalities are illustrated using a simple case of effective cost calculation and the class must choose one of several different scenarios to prepare as group work for the next session. The selected scenario is then briefly outlined and distributed electronically with the same generic Excel spreadsheet shown in class. The students are then asked to team up in groups, work on the case and submit their results electronically. In the session following the deadline for submission, their results are compared and common mistakes are discussed in class. Finally, each group receives a marked paper copy of its submission with further feedback. Usually, results differ considerably between the groups due to their individual approaches to problem-solving. Furthermore, given the overall complexity of the decision-making scenarios, the debriefing and discussion in this second session can be highly interactive. At the same time, cheating is prevented to a large extent. The combination of different scenarios and the generic Excel spreadsheet makes it very difficult to use other students’ solutions since they will always differ due to updates in collective agreements, road charges, vehicle taxes etc. Furthermore, if the scenario asks for the calculation of freight costs or the submission of an offer, a competitive environment usually evolves among the groups, which further discourages local plagiarism.

Structured reports

The second type of dynamic adaptive cases is a highly individual working assignment mainly focusing on information acquisition and analysis as the first steps of a decision-making process. This design somewhat lacks the story-telling component which is usually part of a case study. However, as there are many real-world situations where such desk research is required, this is generally not regarded as problematic and so far has not been greatly missed by the students.

Country assessment report

In the case of a country assessment report, a country’s environment should be described using Ghemawat’s (2001) CAGE framework analyzing the cultural, administrative, geographic and economic distances between countries considering/engaged in foreign trade. Accordingly, students’ submissions should consist of about 5 pages structured along sections titled (1) general overview, (2) culture and people, (3) infrastructure, (4) economic activity and trade flows, and (5) business environment. In each section, a couple of key figures for the country of choice must be collected, explicated (if necessary) and compared to the averages of all European Union Member States, all countries worldwide, and/or other countries stated in the template document. To complete this assignment, students need to access publicly available reports and statistical resources from Eurostat, the World Bank, the CIA Factbook, etc., all of which can be retrieved easily by using the search functions of their web browsers and PDF viewers. Due to the richness of information and some
overlaps in country choice, it is not recommended that students present their results individually. Instead, it is better to hold in-class discussions showing exemplary country differences. Finally, more detailed feedback can be given by returning the marked and commented paper copies or by distributing comments via an e-learning platform.

Commodity assessment report

In the commodity assessment report, students are asked to choose a commodity with a specific Combined Nomenclature (CN8) classification used for both customs and external trade statistics purposes. They are then asked to research its export/import flows, customs treatment, or packaging and transportation requirements in the context of the European Union. More specifically, this should result in a written report of about five pages containing information about (1) the quantity and value of exports (imports) from (to) a country as stated in the assignment, according to country of destination (origin) from the statistics section of the EC Market Access Database; (2) duties / restrictions / preference rules for imports of this commodity originating from major third countries outside of the European Union from the TARIC Database; and (3) special requirements in terms of packaging and transportation as listed in the TIS-GDV cargo information system. The individual working assignment includes a step-by-step introduction with screenshots showing how to access and interpret data from these publicly available sources, using the example of bananas. In rare cases, additional resources can be employed upon request. During an in-class discussion after the submission of the written reports, each student briefly reports on his or her main findings orally and the instructor puts them together to provide an overview of the different trade restrictions, duty levels and preference rules in the context of the European Union. It is also highly recommended to include a rough classification (1) by third country duty level (e.g., nil, up to 6% and more than 6%) as well as reductions granted based on preferential origin or specific use and (2) whether special rules like restrictive quotas, quality criteria and/or import unit price systems are established and to map them on a flipchart or whiteboard. Afterwards, individual feedback is given using the marked and commented paper copies or comments posted via an e-learning platform.

Key components of design and success factors

With regard to the aims outlined above, the design of these two types of dynamic adaptive cases allows:

(1) More realistic and up-to-date information: In the case of the scenario-driven calculative cases, the accompanying generic Excel spreadsheet is constantly updated as a result of changes in personnel costs and the regulatory environment. Furthermore, publicly available resources which have to be used
in the structured reports such as the TARIC Database deliver real, current information and are usually updated on a daily basis.

(2) **Individual tasks for each student or group:** Both types of structured reports require students to choose their object of investigation themselves, which strengthens their identification with and interest in retrieving the online resources suggested. In the case of the calculative cases, not everything is predefined in detail so group discussions regularly result in different approaches to problem-solving as well as differing outcomes.

(3) **Prevention of cheating:** In the calculative cases, changing the scenarios slightly and always using up-to-date generic Excel spreadsheets has proved to be a highly/largely successful counter-measure against the reuse of past submissions. In addition, the measures proposed by Singh et al. (2012) or Bailey et al. (2005) to solve the remaining issues of patch writing as well as social loafing are generally effective. In the structured reports, having a choice of country or commodity (in connection with its CN8 classification) makes it possible to specify the object of investigation in such an exact way that reusing former submissions or patch writing from other resources can be easily detected by the instructor with or even without using special anti-plagiarism tools.

(4) **Easy administration:** The updating effort in particular is minimized as both case designs regularly generate different situations. Of course, it is important to check generic Excel spreadsheets for calculative cases, step-by-step introductions, and links to resources for structured reports before being distributed to minimize coaching needs. However, this is certainly much less work than writing or looking for completely new case studies or rewriting old ones.

In addition, this dynamic adaptive case approach not only addresses practicality issues in daily teaching activities, but extends the traditional case study method at least in two ways:

(1) **Its dynamic design component** always confronts students with realistic and up-to-date information. As these publicly available sources are always current and change over time, they simply cannot become outdated. With the calculative cases, a combination of decision-making scenarios and generic Excel spreadsheets create a multiplicity of ever new problems. Furthermore, the sources which have to be used for the structured reports, such as the TARIC Database, collect all necessary information on a specific commodity level used by customs authorities and declarants doing their daily work. In fact, two students can write a structured report about the same commodity with deviating results for the customs treatment because they were on the TARIC Database on different days in the same week.

(2) **Its adaptive component** makes it possible to create essentially individual tasks for each student or group. This is especially the case for the structured reports as students are pushed to select, for
example, a commodity of their choice based on CN8. Individual choices always lead to a wide variety of commodities being written about, with some like certain fruits, vegetables, coffee, tea, cocoa or spices being quite popular. Group members’ professional background or prior job experience has very often turned out to make a notable difference while dealing with the decision-making scenarios in the calculative cases. However, this variety also contributes to making the cases more interesting and more individual for the students. Moreover, as some information, such as the inflation rate or revenue margin, is deliberately missing, the students must build on existing knowledge or make a guess, which again fuels individuality.

CONCLUSIONS

This contribution discussed common problems of teaching the case study method and outlined an approach using dynamic adaptive cases which makes it possible to offer (1) more realistic und up-to-date information; (2) tasks which are essentially individual for each student or group; and (3) a case design which discourages cheating. So far, both the (1) calculative cases and (2) structured reports have proved to be an excellent way of motivating students and giving them practical experience through experiential learning while remaining relatively easy for the teacher to administrate and renew them each semester.

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