Interactive Learning Environments
2003, Vol. 11, No. 2, pp. 147–165

1049-4820/03/1102-147$16.00

Simplified Return-on-Investment

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ABSTRACT

In this article a new approach to calculate the return-on-investment (ROI) when introducing technology in education or training is introduced. After an identification of major aspects that are of significance when talking about traditional ROI an alternative method called Simplified ROI is introduced. The main function of Simplified ROI is less to come up with an exact value to determine if a positive ROI is happening or not, but more to be a platform for explicit discussion among decision makers about the value of certain ROI aspects when considering technology in education or training.

INTRODUCTION

Return-on-investment is a well-known concept in the business world and is used for decision-making within industrial and corporate activities. In training situations ROI is also used as a criterion for decision making (Shepherd, 1999). In education, however, ROI is not common as an explicit concept, although there are some indications of a renewed interest (Gustafson & Watkins, 1998). Most people in education have little experience with concepts such as *cost-effectiveness methodology* or *return on investment* (ROI) or their associated algorithms. Just the same, decision makers, instructors, students, and other actors are in fact making implicit ROI judgments about technology and flexible learning as soon as they make a decision or have an opinion about change relating to more technology in their own situations. The most common question from instructors or those who work with instructors when introducing technology is: Yes, but how much time will it demand of the instructor? Will it

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be worth the time and effort? The implicit question is if the investment (of time) will be worth the return; thus a return-on-investment question.

In general, return-on-investment questions are of the following main types:

- Will the costs of committing to a new technology (in the current situation, often a Web-based course-management system) in an institution (financial costs, costs in terms of dealing with resistance or problems) pay off in terms of the hoped-for returns, short or long term? (technological costs vs. institutional return; asked by the decision maker).
- Will the costs on new ways of teaching or learning be balanced by gains in pedagogical payoff or other forms of payoff? (pedagogical-effort costs vs. institutional and/or pedagogical return; asked by the instructor or learner).

THE CONCEPT OF ROI

Conceptually, ROI is very simple. In order to measure the ROI of an activity one has to compute the benefits of the activity and compare them with the costs (by dividing or subtracting). In classic ROI both aspects have to be expressed in monetary terms. ROI can be defined as the ratio between 'Net program benefits' and 'Program costs' times 100 (Philips, 1997), via the formula:

$$\text{ROI}\,(\%) = \frac{\text{Net Program Benefits}}{\text{Program Costs}} \times 100$$

$$\text{with Net Program Benefits} = \text{Total benefits} - \text{Costs}$$

Another way to define the ROI is to simply deduct the costs from the benefits, which coincides better with an intuitive feeling about the impact of an investment (costs) on the outcomes (benefits) (Horngren, Foster, & Datar, 1997).

However, the simplicity of the concept immediately disappears as soon as one wants to calculate the items in the formula. Benefits or results in education are often not so easy to measure. Education is intended to result in benefits, but benefits will often be hidden, be implicit or only show up a long time after graduates have left the institution. Even when the benefits are explicit and overt, it is often difficult to transform them into a number, let alone covert that number into a monetary value.

A comparable problem arises when calculating the costs. Although there are many items for which the costs can immediately be expressed in monetary

terms, there also many other costs which have to be accounted for which are hidden or not explicitly available, such as the frustration costs of an instructor when working with malfunctioning technology or the extra time an instructor has to put into continuously answering incoming e-mail from students.

In addition, arguments about the calculation of a ROI are only relevant after a change has been introduced and data about how the change is evolving become available. Using costs and benefits as criteria at the start of the decision-making process, when no reliable data are available at all, is a much more difficult issue.

When a complete set of data for comparable situations is not available, another way to address the ROI-in-education problem is to abandon the idea of a ROI calculation in a absolute way, and concentrate on a more-simplified calculation that emphasizes the relative comparison of ROI in one situation with another situation. In this article we suggest such a *simplified return on investment strategy* related to technology investments incorporating economic, qualitative (subjective), and efficiency emphases. We call this *Simplified ROI*.

SIMPLIFIED ROI

A Simplified ROI approach replaces the absolute ROI calculation with a more relative or simplified comparison (Moonen, 2000). To reduce the complexity of the data gathering and calculation, a simplified ROI takes only those (positive and negative) items into account that are likely to be substantially different in the new situation compared to current practice. The results of the calculation gives an indication of the 'gain' or 'loss' in ROI if a situation is changed from A to B. A first and major task, however, is to identify these 'substantially different' items, from the perspectives of different actors. The following sections give the basic principles of Simplified ROI and expand on the methodology for its calculation.

Principles

Following are six basic principles of Simplified ROI with discussion.

Use Absolute Data When Possible; Relative Estimates Otherwise

ROI can be calculated in an *absolute* way, or in a relative way. In the absolute approach, the calculations are based upon a new situation, not available

before. In such a case all of the relevant aspects with respect to inputs and outputs have to be taken into account. Many costing models based on the assumption that absolute data are available have been developed (Ash, Heginbotham, & Bacsich, 2001; Bacsich, Ash, Boniwell, & Kaplan, 1999; Open Learning Technology Corporation, 1997; Western Interstate Commission for Higher Education, 2001). However, models to measure the outputs, especially with respect to the effects on quality and efficiency issues, are difficult to interpret in the ROI context (Robinson & Robinson, 1989; Rossi & Freeman, 1993). There is always a general problem about the availability, validity, and reliability of such data, in particular when the situation for which a ROI is calculated is complex and with many actors involved.

In light of these problems, another approach is to calculate a ROI in a *relative* way whenever absolute data are not available. In such an approach the *change* of the ROI when moving from one situation to another is what is calculated. In practice, this situation will often occur. In most cases an activity is already organized and will now be changed, for instance because of the introduction of certain technologies. The advantage of calculating the ROI in a relative way is that it is not necessary to know the values of all the constituent input and output variables needed to calculate the absolute ROI, thereby avoiding the problems of collecting (some of the) difficult-to-get data.

Express Qualitative Data in Terms of Numerical Data on an Assumed Interval Scale

Many categorizations are possible in terms of identifying important items to include in either absolute or relative ROI approaches. Typical in this respect are the four evaluation levels of Kirkpatrick (1983), using participants' reactions, learning-related outcomes, changes in behavior, and business impact indicators. In order to broaden and at the same time, simplify this procedure to the three categories: (a) economic issues (aspects relating to strict economic issues expressible in quantifiable terms often in terms of 'costs' and 'benefits' and expressed in money value); (b) quality issues (competencies, behavioral issues and quality of service often expressed in comparative terms of 'better' or 'worse'); and (c) efficiency issues (in terms of time or effort to do a given task and often expressed in comparative terms of 'more' or 'less'). These categories have been chosen as major focus aspects for Simplified ROIs analyses. The main reason is that these are three categories decisions makers like to think of when reflecting on ROI (Collis & Moonen, 2001). Referring to Kirkpatrick's categories: Participant's reactions', learning-related outcomes,

Table 1. Kinds of Data and Aspect Categories in ROI Calculations.

Aspect category/type of data	Financial data	Numerical data (non-financial)	Qualitative data
Economic aspects	X		
Quality aspects		X	X
Efficiency aspects		X	X

and changes in behavior can be categorized as quality aspects; the impact on the business relates to economic and efficiency aspects.

The kinds of data that could be expected when conducting ROI calculations can be classified according to data types and to purposes for the data. Three types of data that are relevant are: (a) financial data, (b) numerical data on an interval scale (example: test scores), and (c) numerical data based upon a qualitative measurement (example: attitude scores). Table 1 shows the relationship between these data types and the three categories for ROI focus.

For instance, if new hardware will be needed in the changed situation, the extra amount (in money terms) necessary for that expenditure can be obtained. This involves financial data. If in a new situation test results of a quiz are available and can be compared with the test results in a previous situation, (non-financial) numerical data will be available. But in many other instances exact numerical measurements will not be possible. If the work satisfaction of instructors in the new situation is different from before, a measurement instrument (for an attitude questionnaire with responses using 5-point Likert scales) can be used to transform their subjective impressions of change in work satisfaction to numerical data, treated as if they are interval. If no measurement instrument is available, the investigator or is associates will have to estimate the value of the change in work satisfaction and express this on a scale from, for example, -10 to $+10$. A score of $+5$ then can be interpreted as a raise of 50% in work satisfaction in comparison with the previous situation. This approach also leads to numerical data associated with qualitative data based on subjective impressions.

Think of Simplified ROI as Predominately NOT a Financial Calculation

Most often in ROI calculations data that are originally not measured in financial values are transformed in certain ways to reflect a monetary value. When only considering data with a financial value a traditional ROI approach is being applied. However, limiting the data to monetary values reduces the

ROI result because other issues such as quality (competencies, behavior, subjective impressions) and efficiency (particularly subjective impressions) have a substantial impact on return-on-investment decisions. Setaro (2001) mentions for instance 'hard benefits' and 'soft benefits', indicating that soft benefits such as improved communication and enhanced corporate image are at least of even importance as hard benefits. His suggestion, however, further follows the traditional ROI calculation approach as he proposes interviewing experts, exployees, and managers in order to allocate a financial value to the soft benefits (or soft costs). Such a transformation, however, is often superficial and subjective. Therefore, in the Simplified ROI approach data that are not initially in financial form are not transformed into monetary values. On the contrary, when there is a necessity to combine ROI results over categories, financial data can be better transformed into relative numerical data (for example on a scale from -10 to $+10$). By choosing this approach the subjective nature of the ROI approach is emphasized, which is much closer to reality than the other way around.

Focus on a Minimal Number of Variables Related to Change in the Local Context

Keep the focus on a specific local situation. Consider only those aspects for which the difference in impact before and after the change process is expected to be not only noticeable but also substantial. For this, an investigator familiar with the local context is desirable; in any case, initial interviews should take place to help identify these most-important change aspects. Describe such aspects in specific items. Keep this list focused and as short as possible. For instance, when introducing a new form of technology in a company and calculating the relative ROI of that activity, it is not necessary to include the salary of the director, as that will most probably be the same as before. Also, from the meaningful point of view: it is probably not necessary to take into account the fact that after introducing the new form of technology there may be an extra cost for new storage media (for example, floppy discs). When there would only be a limited amount of money or other form of impact involved the variable should be left out of the Simplified ROI calculation.

Expect to Find Many Different ROIs, Depending on the Actors Involved and the Phase of Introduction

The ROI calculation is likely to deliver different results when calculated for different actors. For example, the ROI of a change process will be different

when taken a manager's point of view or taken an instructor's point of view. It is very important therefore to include separate ROI calculations for each category of relevant actors involved in the change process. Often these actors can be labeled as a group with an institutional interest (the management of an institution), or as instructors, or as students. In principle, however, there could be many more actors for whom an ROI perspective is meaningful for the decision process. Examples are parents (in the case of a change process in schools), national authorities (in the case of a national reform), or commercial partners such as educational publisher or hard- and software manufacturers. For each item/actor calculate of make an estimate (when money values are available), give a judgment on a scale, or give an opinion on a scale, about how the change that is introduced will impact the new situation in comparison with the earlier situation. In order to substantiate the items in the quality and efficiency category as much as possible, a relative weight should be allocated to each item in order to indicate how important the item in that category is to the actor being considered. For each of the actors a ROI calculation relating to the same change process will most probably indicate different results.

Another important difference in ROI results will relate to the evolution of the change process itself. It can be expected that the ROI as a result of a change process will be small in the starting phase of that process. Potentially the ROI can become very significant after the change process has been finished and the implementation of the change activities has been integrated in daily practice. In order to maximize the reliability and validity of comparative data, ROI should only be calculated when the change process is over. However, on many occasions, decision makers want to know, during or even before a change process, what the ROI is likely to be. When given ROI results, it is therefore important to mention for what phase of the change process that ROI was calculated, as well as for which actors.

Use the Results of Simplified ROIs to Improve Systematic Thinking for the Decision Making Process, not for Decision Themselves

Making a tally of all or a partial list of the ROI results, per actor, can contribute to a better insight in the ROI related to a specific change process. However, maybe the most important contribution of the Simplified ROI procedure is the systematic analysis and thinking approach associated with it, creating a basis for discussion among interested parties. Therefore, the purpose of the Simplified ROI calculation is not precision (unless all of the data are based

upon valid and reliable measurements), but to be a guide to systematic thinking about intuitive feelings and expectations.

Procedures

The procedure to calculate Simplified ROI consists of six activities. The first activity (finding consensus) leads to the identification of the main items for which measurements are going to be conducted and the main categories of actors. The second activity (organizing) leads to decisions about which of the three categories (economic, quality, and efficiency) the items will be stored in (storing in more than one category is allowed). The third activity (measuring) leads to the data for each of the items per actor and per category. The fourth activity (calculating) leads to the calculation of a ROI for separate categories and for separate actors. The fifth activity (transformation) (= optional) leads to the transformation of interval values into scale values, and the normalization of the scale values towards each other. The sixth activity (combining) leads to the combination of all of the ROI results into one or a limited number of ROI results. In the following sections, each of these activities will be further described in detail.

Finding Consensus

In order to find the relevant items that should be incorporated in the simplified ROI calculation and in order to identify them as objective as possible, take the following steps; (a) decide on the categories of actors that will be targeted in the Simplified ROI analyses and select a representative sample of respondents in these actor groups; (b) use specific techniques, for instance concept mapping technique (Stoyanov, 2001), to elicit and extract their opinions about what items will most substantially and most meaningfully differ as a result of a change process.

Organizing

Use the same representative sample to decide in which of three categories the chosen items will fit: economic, quality and/or efficiency. As precision is of course a permanent goal of the exercise, put as many items as possible in the economic category, as in this category exact values or realistic estimates of money value can be used. Realize that some items often do not seem to have a financial value at first hand. However, the monetary value, although not explicit available, could be estimated. Also decide which items could be placed in more than one category (an item can have, for instance, an economic impact as well as a quality impact). Finally determine the relative weight of

each item per actor within the quality and efficiency categories. Use a number between 0 and 1 to express the relative weights according to a scale such as 'not important = 0', 'little importance = .3', 'important = .6', 'very important = .8' and most 'important = 1.0'.

Measuring

Use the same representative sample to get a first idea about the data for each of the items per actor category. Be as precise as possible. With respect to the items in the economic category, check data within a realistic context. Some conceptual issues can cause problems during this exercise. As a principle, apply the Ingredients Method of Levin (1983). The Ingredients Method is based upon the principle that every intervention uses ingredients required to produce the outcomes. The costs of those ingredients have to be taken into account. With respect to the items in the quality category, two different strategies can be followed. Items for which measurements exist on an interval scale (Column 2 of Table 1) can be judged by their results (for instance: difference in test results before and after the introduction of the change process). For combining different results, each of these differences can be further expressed in terms of a common scale, for example, a scale from -10 to $+10$ (for instance: change in test performance before and after the introduction of the change process – a score of $+5$ means that there is a 50% positive change). Items for which interval results do not directly exist (Column 3 of Table 1), also can be expressed on a scale for example from -10 to $+10$ (for instance: change in motivation before and after the introduction of the change process – a score of $+5$ means that there is a 50% positive change).

Calculating

For the economic category, the results can now be represented in a table or spreadsheet. Per actor a Simplified ROI can be easily calculated as the difference of the sum of the benefits minus the sum of the costs. These separate results also can be combined to represent the Simplified ROI value for the economic perspective. The same can be done for the quality category, and for the efficiency category, this time multiplying each scale value by the relative weight per item.

Transforming

The result of the previous activity is expressed in terms of different units: money, results on an interval scale related to particular test scores, and results

on an ordinal or interval scales generated to reflect impressions of change. In order to be able to compare these results and combine them, they have to be transformed to the same unit. In traditional ROI calculations, each result would be transformed into a financial value. However, too much subjectivity enters such transformation, so this approach is not used in the simplified ROI calculation. The best solution is to keep the economic category separate from the others and interpret the ROI calculation for the economic category in a traditional way. Another way to proceed is to transform the money values into scale values on a scale of -10 to $+10$, the same scale used for the quality and efficiency data. Such a transformation could be done by (a) determining the highest absolute value of the cost and benefit results (say X), (b) transform that number to the absolute value of 10 (multiplying by 10/X), and (c) use the same transformation to all the other values (also rounding off figures). With respect to the Quality category, the actual scores can be transformed into scale scores by indicating the percentage of change of the interval result on an ordinal scale from -10 to $+10$. For example, if the impact of the change process on test scores is an improvement of 7 points on a total of 100 points ($=7\%$), the transformed value on the ordinal scale would initially be $+0.70$. This number should be further refined to reflect the meaningfulness of this amount of change.

Combining

The separate Simplified ROI results can be combined in different ways. As the units of measurement per category are the same, it is easy to combine the results of the items in one category over the different actors. Combining the results of one type of actor for different categories is more problematic. This can only be done when the units of measurement are made the same. This result can then be used in combination with the ROI calculated for the quality and efficiency categories (See ''Transforming''). Another way is to combine the ROI results over the categories and over the actors and end up with an overall ROI result.

AN APPLICATION IN PRACTICE

A Simplified ROI approach (Mombarg, 2000) was applied to one of the courses using a specific Web-based course-management system (called *TeleTOP*) to support flexible learning in the Telematics Department of the

University of Twente. The Simplified ROI approach was also used in relation to the introduction of another course-management system (Blackboard) at one of the Dutch institutions for higher vocational education (Koet, 2001). In the following sections adaptations of the original tables used in the study of Mombarg and Koet study will be presented here to illustrate the Simplified ROI approach.

Economic Perspective

Table 2 presents a Simplified ROI calculation on the basis of the economic perspective as used in the Mombarg study. Many items, which are typically included, such as number of computers and communication costs, are not included here because additional facilities were not required above those already available. Also, the TeleTOP software itself was made freely available for this course.

The results of the calculation in Table 2 show that the ROI from the economic perspective when introducing the course-management system for this particular course to be highly negative. However, many of the costs are related to the start-up costs in the first year. The table would be much different when the start-up costs are removed. And, clearly, the long-time benefits do not show up during the first year. Calculating the ROI for the second, third, and subsequent years will probably result in a more positive conclusion, which illustrates the relation between a ROI calculation and the phase of a change process. ROI should be calculated not only or exclusively for the start-up phase, but for a representative situation in the start-up phase, the implementation phase, and the institutionalization phase. If necessary, a weighted average could be made afterwards. It could also be a discussion point as to how relevant it is to calculate a ROI for the start-up phase of a project.

Another discussion point is if all the relevant items were used in the example calculation. It is remarkable that according to Table 2, almost no financial benefits were perceived when introducing TeleTOP in the particular course. That raises the question why TeleTOP was introduced in the first place. Probably, a number of reasons (items) were not mentioned because they were not measurable with directly available financial data, such as the feeling of an urgency of the institution to start with Web-based courses because of the marketing value for the university or/and the potential growth in enrollment in student population, or other important but difficult-to-measure issues, could provide reasonable arguments. If such reasons seem valid, why then were they not included in the ROI calculation? Probably because it is difficult to put a

Table 2. ROI Table for Items in the Economy Category (Costs in Dutch Guilders [f]).

Items	Number of items	Cost per item	Benefit per item	Actors					
				Institute/ manager		Instructor		Student (costs per student)	
				Cost	Benefit	Cost	Benefit	Cost	Benefit
Hardware: server	0,1[1]	4.000		400					
Hardware: personal computers for students	60	12,5[2]						750	
Initial support by vendor	1[3]	2.050		2.050					
Support by project leader (in hours)	40[3]	140		5.600					
Preparation time for instructor (in hours)	200[4]	150		30.000[7]					
Extra time during course for instructor (in hours)	60[5]	150		9.000[7]					
Less time needed for repeat students	34[6]		150		5.100[7]				
Total				47.050		0	0[7]	750	0
ROI (financial data: benefits-costs)				−42.950		0		−750	

Note. [1]At the time of the study, 10 courses were being supported. (As of 2001, there are more than 600, showing the importance of revising ROIs at different points in time).
[2]Based on a calculation of the cost of a personal computer and the proportion of computer-use time a student spends on TeleTOP (Winnips, 2001, p. 160).
[3]Initial support offered by software vendor and department. One-time expenses.
[4]Estimated by instructor as 200 hr at 150 per hr over 3 months. Includes workshops, familiarization with system, and preparation of course. This time will reduce in subsequent cycles (Collis & Gervedink Nijhuis, 2001).
[5]Based on an analysis of 61 instructors with experience using TeleTOP (Collis & Gervedink Nyhuis, 2001). Includes feedback, monitoring students, communication with students via the site, news items, and adjustments in assignments.
[6]Previously 60% of the students passed the final test. Using TeleTOP (and a new pedagogical approach) 90% of the students finished successfully. At a rate of 2 hr per student doing a repeat examination, the instructor gained a benefit of (40 hr − 6 hr) = 34 hr of time at 150 per hour instructor time.
[7]Financial aspects of the instructor's time are related to the institution, not the instructor directly, as his fixed pay did not vary.

money value on them. This illustrates why in the Simplified ROI approach, items relating to quality and efficiency also have to be included. On the other hand, if the course chosen as an example had been delivered in a distance or mixed mode, where students had to travel to attend the course and even pay for accommodation, then of course the financial benefits of having a course online would have been much more substantial, in particular for the student or the agency or organization that covers the costs. At least, that is what would be expected.

Quality Perspective

Table 3 is an adaptation of a table used in the study by Koet (2001) and applies the principles as indicated earlier. In this Table 3 a number of relevant items with respect to quality are mentioned in the first column. Those items are further categorized according to the three subcategories mentioned before: competency, behavior, and quality of service. The following columns represent the points of view of the institution, the instructor, and the students. Furthermore, a weight factor is mentioned in order to represent the importance of each item per actor as reliable as possible. The data in the cells (on a scale from -10 to $+10$) represent the relative amount of loss or gain that was perceived by the respective actors in the new situation when using Blackboard and an e-learning environment in comparison with the original traditional situation.

Each of the cells in the matrix can be interpreted in a comparable way after being filled out based upon a discussion between the relevant actors. The result of the calculation in Table 3 indicates that students in particular get a relative good ROI on quality from the investment in Blackboard and e-learning. Of course this result is highly influenced by the choice of the items that were selected in the first column, the weights and the percentage of change chosen in the table. But again, selecting those items of which the expectation is that they will make a difference is an essential part of the discussion about ROI. The method of the simplified ROI leads to more explicit thinking and should lead to more valid decisions.

Efficiency Perspective

Table 4, also based on the study by Mombarg (2000), shows how Simplified ROI was calculated to relate to efficiency issues. Interview data were obtained, with representative quotes shown in the cells of Table 4. Interviewees were asked to convert their impressions to a point on a scale of -5 to $+5$ (instead of a scale of -10 to $+10$) to represent the relative amount of loss or gain that

Table 3. Simplified ROI with Respect to Quality.

Items	Actors					
	Institution		Instructor		Students	
	Weight	Score	Weight	Score	Weight	Score
Competency change:						
Improved training for students	.8[1]	+1	1.0	+2	.8	+1
Improved market position for students	.6	+1	.6	+1	1.0	+2[2]
Improved potential for job rotation and learning to learn in the organization	.6	+3	.8	+1	1.0	+1
Behavioral items:						
Improved attitude towards the training	.8	+1	1.0	+2	.8	+2
Improved motivation towards training	1.0	+1	1.0	+1	1.0	+2
Quality of Educational Service (QES):						
Development, testing and evaluation of instructional programs	1.0	−2[3]	1.0	−2	.3	−2
Development and implementation of new procedures	.8	−1	.8	−1	.6	−1
Improved communication possibilities	.8	+1	1.0	+2[4]	1.0	+2
Improved potential for exchange of content between organizations	.6	+1	.8	+2	.3	+1
Improved potential for exchange of content between users	.6	+1	.8	+1	1.0	+5
ROI: quality		4.2		6.0		8.0

Note. Meant to be an illustration, only a limited number of the values in this table receive some comments.

[1]For the institution the possibility Blackboard and e-learning offers to improve the training for the students is considered 'very important' and therefore gets a weight of .8.

[2]Using Blackboard and e-learning during their studies improves the market position of the students. This cell indicates an estimate of this improvement from the student perspective. In comparison with the situation where no e-learning environment was used, the +2 in the table indicates an expected improvement of 20%. Asking current students but in particular previous students how they value this situation can optimize the reliability of this estimate. If there are research data available coping with this situation, such data should of course be used.

[3]When using Blackboard and e-learning it can be expected that the development, testing and evaluation of instructional programs will take not only more time but also as a consequence, and certainly in the beginning of the change process, the quality of service will get worse than before. The reduction in QES from the perspective of the institution is estimated as being 20%.

[4]A strong characteristic of an e-learning environment is of course its potential for communication between its users. Being on-line will certainly create many opportunities for the instructors to consult and communicate with each other. The estimate of the gain is put on 20%.

Table 4. Simplified ROI with Respect to Efficiency (Collis & Moonen, 2001, pp. 185–186).

Items	Actors					
	Institution (Education Dean)		Instructor		Students (n = 60)	
	Weight	Score	Weight	Score	Weight	Score
Flexibility	1.0	+5 (“Can serve students at a distance”)	0.6	+2 (“Can work on the course at home or when traveling”)	1.0	+3 (“Time can be used more efficiently, don’t have to come to lectures, but you need to work at a computer”)
Studying course content via TeleTOP					0.6	−2 (“What’s there is not important, only the textbook”)
Efficiency in terms of student results	1.0	+5 (“Students stay on tempo, finish the course on time”)	1.0	−4 (“Costs much more time to look at & give feedback on all the extra assignments, handle e-mail, etc”)		
Finding information & literature on line	0.8	+2 (“Useful for final projects”)	0.8	+2 (“Information, also via WWW, always available, but students can waste time and find irrelevant info on the WWW”)	0.6	+2 (“Glad to have the lecture notes, but don’t make much use of extra information”)

Table 4. (*continued*).

Items	Actors					
	Institution (Education Dean)		Instructor		Students (n = 60)	
	Weight	Score	Weight	Score	Weight	Score
Doing and submitting assignments					1.0	+1 (“Saves time and is handy, but there are more assignments now, and you have to use a computer”)
Assessing assignments and giving feedback			0.8	−3 (“Easier & faster to give feedback with a red pen, directly on paper”)	1.0	
Feedback on assignments via TeleTOP			1.0	+1 (“Despite above, it is handy to give feedback directly onto the WWW site”)	0.8	+1 (“Good that you can read feedback, even at home, as soon as the instructor puts it there, but the instructor is slow at entering the feedback”)
Communication	0.8	−3 (“Not flowing as expected”)	0.8	−1 (“Good possibilities for streamlining communication but students don’t use them”)	0.8	−2 (“Options (i.e., Q&A, are sensible, but we just don’t use them”)

Support of group work			0.8	−2 (“Much better if students do it face to face”)	0.6	−2 (“Easier to get together face to face”)
General information about the course available via TeleTOP	0.8	+1 (“Handy, also handy that integrated with the university news”)	0.8	+1 (“The News is handy, but students don’t look at other information”)	0.8	+2 (“Always up to date and handy”)
Technology skills and competencies	0.8	+2 (“Everyone will benefit from having more technology experience”)	0.8	+2 (“Has gotten much more handy with the computer since using TeleTOP”)	0.8	+2 (“Improves your skills at using the Internet, stimulates you to get your own computer”)
ROI: efficiency		$+11.6 \cong +12$		$-2.6 \cong -3$		$+5.2 \cong +5$

was perceived by themselves in the new situation using TeleTOP in comparison with the original situation, and to indicate the relative weight or importance of an item to themselves. Mombarg retained only items with a relative weight of at least 0.6 for each of the actor categories, in order to have the minimal number of maximally meaningful items.

The last row of Table 4 gives the weighted sum of the data in the respective columns and can be interpreted as the Simplified ROI with respect to the efficiency category from each of the actors' perspectives. Again the importance of this simple calculation is not to get absolute results, but to come to comparative results between the main actors. In this example, it became clear that the institution and the students perceived that they obtained a relatively good ROI from the TeleTOP investment in terms of efficiency, while the instructors were not that lucky.

CONCLUSION

In this article, another approach was explored and explained with respect to the calculation of return-on-investment. This new approach, Simplified ROI, explicitly takes into account the traditional economic and financially based arguments, but also other more intangible issues related to quality (competencies, behavior and quality of service) and efficiency. From the example given to illustrate the approach, it was shown that in making such a calculation more explicit many issues can be raised and form the basis for a thorough discussion. Stimulating and guiding a discussion about ROI in a specific situation is one of the major objectives of the proposed approach. The Simplified ROI leads to more explicit thinking about return-on-investment that should take place in order to come to valid decisions.

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