# Successful Learning Styles in Higher ERP Education

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**Abstract:** Individuals develop different techniques and abilities for learning. Kolb identifies four learning orientations that individuals emphasize: abstract conceptualization, concrete experience, active experimentation and reflective observation. If learning orientations affects the efficiency in which students learn ERP systems in higher education are examined in this study. This is examined through a hypothetical deductive approach where two hypotheses are derived and tested. Quantitative data are collected through a questionnaire survey that was distributed to students at Stockholm University. Kolb's Learning Style Inventory test is used to determine students learning orientation. The efficiency in which students learn ERP systems is measured by three variables: time spent, progress and problem frequency. In the findings correlations indicate that the learning orientation abstract conceptualization has a relation with the frequency that students encounter problems when working with exercises in ERP systems. Also the learning style active experimentation has a negative correlation with the number of hours students spend in the implementation of the exercises. It is suggested that all four learning orientations should be considered when designing learning environments for ERP systems and if the correlations found are to be used to change the learning environment it should be done with caution.

**Keywords**

Enterprise resource planning, learning styles, higher education.

## 1 Introduction

Today, ERP systems (Enterprise Resource Planning systems) have become an integral part of higher education in business as well as IT [Au08]. Higher education institutions are becoming increasingly troubled with how ERP systems will be incorporated into the curricula and this is based on the market demand for skilled ERP experts. To meet this demand different “frameworks and models” has been created. [AM03]. Education curricula range from single courses to full programs. ERP educations often emphasize hands on experience by including a large amount of computer based exercises. One example is SAP University Alliances education program offered to universities [SAP10]. It is based on several case studies with detailed exercises. Another example is ERP SIM developed by HEC in Montréal Canada. ERP SIM is a simulation game for business training in SAP ERP [Sr08]. These two examples represent two different views on how students’ best learn ERP systems. In the first example the students learn by following detailed step by step instructions to carry out tasks in the system. In the second example students work in groups and compete against each other in a fictitious business environment by running a business in the SAP system. The students learn the system while they are playing the game. However, despite the different views on how students’ best learn ERP systems, there is little research available on successful learning styles for ERP education.

Since 2000, the Stockholm University (SU) in Sweden offers a bachelor program in enterprise systems. The overall objective of the program is to train students in organizational development through the use and configuration of ERP software. The aim is that students gain knowledge of the concept of enterprise systems and learn to apply it in various organizations using different ERP software packages. At the beginning of each semester the teachers at SU faces a new group of students. The students constitute a mix of individuals with different backgrounds, cultures, ages, attitudes and beliefs. All students within the program have to implement a number of exercises in ERP systems. The students have access to a number of different resources that they can use when learning how an ERP system functions. The students use different techniques and methods to learn the ERP systems and to accomplish the exercises. How effectively the students learn ERP systems and thereby carries out the exercises varies. This article examines the efficiency in which students learn enterprise systems and its correlation with learning orientations.

During the last 10 years the teachers of the bachelor program at SU have developed the perception that students who are able to conceptualize models about organizations and enterprise systems learn more effectively. For example, students that understand process models and seek information about corresponding system functionality before carrying out exercises in an ERP system learn more and do better. The teachers’ perception has led to that the exercises have been designed after problem-based learning principles [Bj03] in which students solve a number of business related problems in enterprise systems. This assumption of learning more effectively through gaining knowledge before executing exercises corresponds Kolb’s [Kd84] learning mode abstract conceptualization. Two hypotheses have been derived from the teachers’ assumption and these two hypotheses are tested in this study.

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H1. Students that emphasize Abstract Conceptualization will learn to use enterprise systems more effectively.

H2. Students that emphasize Active Experimentation will learn to use enterprise systems less effectively

The hypotheses involve two of Kolb's learning modes, Abstract Conceptualization and Active Experimentation [Kd84]. Kolb has defined two more learning modes, Concrete Experience and Reflective Observation. These two learning modes are also included in the examination but hypotheses have not been formulated. The efficiency in which students learn enterprise systems is in this article determined by how much time the students have put into the exercises, how often the students have encountered problems when working with the exercises and how many exercises the students had completed at a specific time.

The teachers' assumption is tested through evaluation of the formulated hypotheses. The hypotheses are tested through correlation analysis of quantitative data; if causality exists between the variables used in the correlation analysis is not examined.

The purpose of this study is to construct an understanding of what learning orientation is most effective when learning ERP systems based on the conditions created by the education curricula design at SU. By examining the effectiveness in which different students learn ERP systems and the learning style that the students emphasizes, an understanding of the learning style that is most effective can be created. This knowledge can be useful for teachers at SU to verify that the design of the teaching environment is designed for the right learning preferences or if the environment needs to be reoriented to provide a higher educational quality. This includes the design of exercises and the composition of information and tutoring resources.

In this article next section a theoretical background is presented. The theoretical background starts out with a definition and explanation of enterprise resource planning system and a description of enterprise system education at the Stockholm University, Sweden. [Kd84] structural model of the learning process and four different learning styles defined by [Kd84] are also explained. This is followed by a presentation of the methodology used. The empirical work of this research consists of a survey that has been executed among students at SU. How the survey has been carried out is explained and the variables used in the inquiries are described. After that the results from the survey and the correlation analysis are presented. Finally conclusions from the research are presented followed by recommendations and suggestions for future research.

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## 2 Theoretical Background

### 2.1 Enterprise Resource Planning Systems

Enterprise Resource Planning (ERP) systems are software that have been standardized and are intended to meet a variety of customer requirements [Na01]. ERP systems solve the problem that information is scattered across multiple systems in an organization. These systems replace a number of separate systems used for specific purposes with one large system. [Dt98]. ERP systems support basic business functionality as financial management, manufacturing, sales, purchase and human resource. ERP systems are based upon “best practices”, which is the most efficient way to execute a process [Sm04]. A common database is used to interconnect modules and functionality in an ERP system [Dt98]. The use of a central database enables information to be distributed throughout the enterprise in real time [Sm04]. ERP has advanced from providing basic functionality to span over a vast diversity of business areas [Sm04]. ERP offer support for geographical dispersed organizations by organizing activities and work through business processes [AM02]. ERPII, or extended ERP, are constructed by the core functionality from ERP and with additional functions for customer relationship management and supply chain management and use of the connectivity potential that the Internet provides [DW07], [Es09].

EPR systems are complicated compound systems with its built-in business logic. When a company is about to implement an ERP system they must understand the impact that the system will have on the company. The benefit of an ERP system can be great but the risks are also high. [Dt98]. Implementations of ERP packages are difficult, venturous and complicated projects that often exceed budgets and time frames [NLW08]. A common challenge that businesses encounter when implementing an ERP system is whether to adapt their business processes to the ERP system, or to customize the ERP system to the business processes [Sm04]. A company whose competitive benefits are due to customized processes can lose their advantages if they reengineer their processes after the ERP system but to carry out major modifications of an ERP system are almost impossible to realize [Dt98]. Large implementation projects can cost hundreds of million dollars and span over numerous of years. The life cycle of an ERP system incorporates selection, installation, implementation, deployment, operation and maintenance and can vary from a few years up to 10-15 years [Sm04].

### 2.2 ERP Education

Since enterprise systems have become a natural part of any business environment, they have also been integrated into higher education. Today, companies demand that business and IT students gain an understanding of enterprise systems during their education. In addition, enterprise systems can be used as “vehicles of pedagogic innovation” [Au08] to illustrate organizations and business processes in many different subjects.

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A review of literature [WS99], [WR99], [BMS00], [HM00], [RSW01], [HFB02], [Nr02], [HMS04] suggests that enterprise systems have been incorporated into higher education in two, maybe three, waves.

The first wave was a response to a high demand for ERP skills in the late 90's. Enterprise systems were used as transactional systems and students were offered hands-on experience through computer exercises. ERP vendors, such as SAP, established support organizations for universities, such as SAP University Alliance. The challenges faced by universities included availability of faculty resources and support from vendor organizations.

The second wave [HMS04] included the emergence of extended ERP (ERPII) and e-business. Enterprise systems became strategic rather than transactional. Universities started to co-operate to develop joint courses and exchange teachers who had specialized in particular areas of ERP training. One example is the Swedish academic network of SANTE.

In the third wave, suggested by [Au08], enterprise systems are becoming used as vehicles of pedagogic innovation to make students more employable. The Bologna process emphasizes employability and enterprise systems are being used as means to make academic education more practical and applied.

The last decade, the department of Computer and Systems Sciences at Stockholm University offer a full bachelor program in enterprise systems. The aim is to create an applied engineering education for business architects with the ability to design competitive business processes by the use of enterprise systems. The curriculum combines the field of industrial engineering with hands-on training in installing and using ERP packages. The core courses include use, configuration and integration of enterprise systems. The core ERP courses are also offered to students enrolled in the department's other bachelor programs: Market Communication and IT, Economy and IT as well as Computer and System Sciences.

### 2.3 Enterprise Systems, Selection and Use (6B2352)

The Department of Systems Sciences at Stockholm University offers the course enterprise systems, selection and use. In this article empirical data are collected from students that are taking this course. The purpose of the course is to build general knowledge about enterprise systems and ERP packages. The students learn to apply methods for mapping processes and specifying selection requirements. They investigate, through exercises, how the business transactions along the order fulfilment process are realized in an ERP package. They learn to create and manage master data and examine how the purchasing process is handled by an ERP system. The final exercise is to set up a new company and to carry out simple design modifications. The students configure the system and carries out tests to verify that the system behaves as expected.

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The exercises in the course include descriptions of what to do but with little or no information on how it should be executed in the system. Students are expected to seek the information needed to accomplish the exercises and to solve problems arising in connection with the exercises. In order to search information and to implement the exercises the students has access to various information resources such as system manuals, video demonstrations, enterprise systems built-in help function, forums and websites on the Internet. Course teachers encourage students to search information in these resources prior and while working with the exercises. Course administration also offers tutoring twice a week in which students can get help to solve problems and get questions answered. In addition to tutoring session's tutors also responds to questions asked by students in a web-based tutorial forum.

### 2.4 Kolb's learning style theory

David Kolb describes experiential learning as a continuous process where the individual gains and assess knowledge from his or her experiences [Kd84]. Kolb presents a structural model of the learning process. The model involves four basic orientations for learning or adaptive learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation, [Kd84]. Kolb explains that we create new knowledge through the encounter of the four learning modes and to be a successful learner skills in all these learning modes are required. To be effective learners we start out our learning with new experiences and these experiences are then observed and reflected upon. From our reflection we construct abstract concepts and the concepts are then used in active experimentation.

Individuals develop different preferences for the four learning modes. The four learning modes lie on two continuums. [Kd84] explains that concrete experience and abstract conceptualization are "two dialectically opposed modes" and active experimentation and reflective observation are each other's opposite. A person who has a preference towards abstract conceptualization is scientifically oriented and likes to use a rational approach to solve problems. They think about creating theories and conceptual models and are good at methodical planning and careful examine of ideas. At the other end of the continuum lies concrete experience as in contrast with abstract conceptualization people are not concerned with theories they prefer experiences. People who have a preference towards active experimentation are practical oriented and they like to do things and to get things done. They are not afraid to take risks and they enjoy seeing results. Reflective observation prefers to evaluate and comprehend situations by observing before practical execution.

[Kd84] describes that people develop different methods and skills for learning. What learning styles we develop are, according to [Kd84], "a result of our hereditary equipment, our particular past life experience, and the demands of our present environment" [Kd84]. By combining individuals learning preferences a person's learning style can be determined. [Kd84] identifies four different learning styles: accommodators, divergers, assimilators, and convergers.

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The convergent learning style has a preference for the learning modes abstract conceptualization and active experimentation, [Kd84]. People with a convergent learning style are oriented towards technical tasks, and they think of new ideas and like to solve problems. They are practical and prefer to work with simulations and laboratory experiments. Convergers are also good at applying theories in practice. [KK05]. Divergers are concrete experience and reflective observation oriented [Kd84]. They prefer to observe when others work and they learn by working in groups. They collect information and sees things from multiple perspectives. They prefer situations where they can use their imagination and discuss with others in order to come up with ideas. [KK05]. Assimilators have abstract conceptualization and reflective observation as their central learning skills [Kd84]. Characteristics for assimilators are that they are logically oriented and prefer theory and abstract concepts. Assimilators learn by reading and listening to lectures. They can handle a broad variety of information, organize and summarize information. Assimilators are interested in theoretical models and prefer to analyse and reflect over things rather than to try in practice. [KK05]. In an accommodative learning style the dominant learning abilities are concrete experience and active experimentation [Kd84]. "People with an accommodative orientation tend to solve problems in an intuitive trial and error manner" [Kd84]. They learn through a practical approach where they can be active and action oriented. Accommodators rely on their instinct and prefer to do things rather than to reflect and analyse. [KK05].

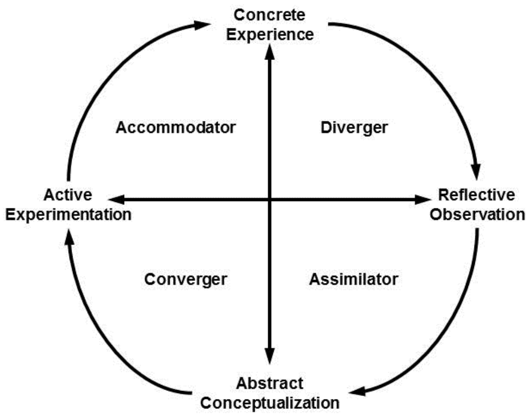


Figure 1.Adapted figure of Kolb's experimental learning process and learning styles [Kd84].

Figure 1 demonstrates Kolb's structural model of the experimental learning process with the four learning modes: concrete experience, reflective observation, abstract conceptualization and active experimentation. As mentioned, to be an effective learner [Kd84] proposes that an individual moves through the cycles all modes, clockwise, starting with concrete experience. The figure also displays the learning styles that are given as a result of combining the abstract conceptualization with concrete experience and active experimentation with reflective observation.

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[FS78] remarks the theory that learning styles can be divided into two continuums and they criticise the reliability of the learning style inventory. [MBP92] factor analysis on the validity of the learning style inventory proves that there are two learning continuums but two dissimilar opposite modes than the two that has been theorized by [Kd84]. They propose that abstract conceptualization opposed mode is active experimentation and concrete experience is the polar opposite of reflective observation. There are other learning styles theories such as the Felder - Silverman model, [FS98]. Kolb's learning style theory model in its original form is used in this study. It is debatable if modifications of the model could lead to a model that better reflects learning orientations in connection with ERP systems learning. It was chosen to use the model and to use it without any modifications because the model is frequently cited and widely accepted. Modifications of the model would also affect its validity. The model was also recommended by the Royal Institute of Technology (KTH) Learning Lab. They are responsible for the development of educational activities at KTH, [KTH10].

## 3 Methodology

In this study a hypothetical deductive approach has been used. The approach starts out with a theory formed by the SU teachers' assumption that students who are able to conceptualize models about organizations and enterprise systems learn more effectively. From this assumption two hypotheses has been derived and formulated. The hypotheses were then tested trough a correlation analysis. Quantitative empirical data was collected by a survey that has been created and distributed among students at the Stockholm University. Data was then compiled and a correlation analysis was performed. Based on the results the hypotheses are accepted or rejected, which in turn weakens or strengthens the original assumption.

In the survey students were asked to optionally respond to a questionnaire. The survey was distributed to the students at the end of a lecture that were held in December 2009. The students were informed that participation and anonymity of the survey was voluntary and that the survey was a part of a research project. The students had at the time the survey was distributed read 4 out of 5 weeks of an introductory course in ERP systems. Questions of demographic nature were not included in the questionnaire because that could jeopardize the anonymity among the respondents of the survey, which could affect the honesty in the respondents' answers. It would be easy for anyone reading the answered questionnaires to use demographic variables to figure out who had answered a specific questionnaire. All students that were taking the course consisted of a cultural mix of individuals. The ages in the class varied between 20 and 40 years, in which 75% were male and 25% women.

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As described earlier [Kd84] defines four learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. To determine individuals learning mode [Kd84] has constructed an instrument called the Learning Style Inventory (LSI). The LSI is a test that consists of a four columns questionnaire with nine words in each column. Respondents rank the words according to how they perceive that the words best describe their learning style. From the ranking four scores are then calculated and the result then describes the person's "relative emphasis on each of the four learning modes" [Kd84]. The students began the questionnaire with conducting the Learning Style Inventory test.

Criticism has been directed at Kolb's theory about learning continuums [FS78], [MBP92]. The theory suggests that opposite learning modes can be used to determine individuals learning style [Kd84]. Because of the criticism and the risk that it could affect the validity this article uses Kolb's learning modes to describe individuals learning styles. Although, [FS78] criticize the reliability of the learning style inventory the learning style inventory test were used. [HJ00] explain the experimental learning theory as "one of the best known educational theories in higher education". [KY04] describes Kolb's learning style inventory as the most extensively used tool for evaluating learning styles that is founded on the experimental learning theory.

A causal relationship implies that one variable depends on one or more other variables. Relationship exists between a dependent variable (effect variable), and an independent variable (causal variable) if changes in value of an independent variable leads to changes of the dependent variable's value. In the teachers' assumption, it is supposed that a specific learning style has an influence on how effectively students learn ERP systems. The assumption is the basis for the hypotheses that were formulated. In order to measure and test the two hypotheses the learning styles and their effects has been broken down into independent and dependent variables. Independent variables in the survey are [Kd84] four learning modes. To measure the efficiency in which students learn ERP systems the dependent variables problem frequency, time spent and progress were selected. Problem frequency relates to how often the students have encountered problems when working with the exercises in the ERP systems. To determine the students' problem frequency rate the respondents were asked to rate how often they have encountered problems on a 9-point scale. At the endpoints of the scale a one corresponds too infrequently and a nine corresponds too frequently. Time spent relates to the number of hours that students put into the implementation of the exercises. The respondents were asked to specify in the questionnaire how many hours they had totally spent on working with the exercises, on a 5 level scale. Level one corresponds to 1-20 hours, level two corresponds to 21-40 hours, level three corresponds to 41-60 hours, level four corresponds to 61-80 hours and level five corresponds to more than 81 hours. Progress relates to how many exercises that the students had completed at the time the survey was filled in. Students were asked to mark the exercises that they had completed. In the course the students work with up to 8 exercises, the number of choices in the questionnaire were therefore eight.

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All results from the submitted surveys were summarized and mean with corresponding standard deviation was calculated. To examine whether there is a correlation between learning modes and the variables progress, time spent and problem frequency Pearson's product moment correlation coefficient was used. Correlation is used to examine whether there is a connection between one or more variables. If a variable's value range and the second variable vary in the same direction as the first variable it is said that the correlation is positive. [KW98]. The coefficients were calculated through the help of the statistical software OpenStat. The software also determined the P-value for the correlations. P-value is used to determine the probability that a hypothesis is true. If the probability value (P-value) is less than 0.05 the chance that the null-hypothesis is true is less than 5 per cent. This is considered a strong support for the alternative hypothesis to be true and it is said that a statistical significance exists. [KW98].

## 4 Results

A total of 100 students were asked to participate in the survey. 70 students involved themselves in the survey by carrying out the Learning Style Inventory test and by answering the questions.

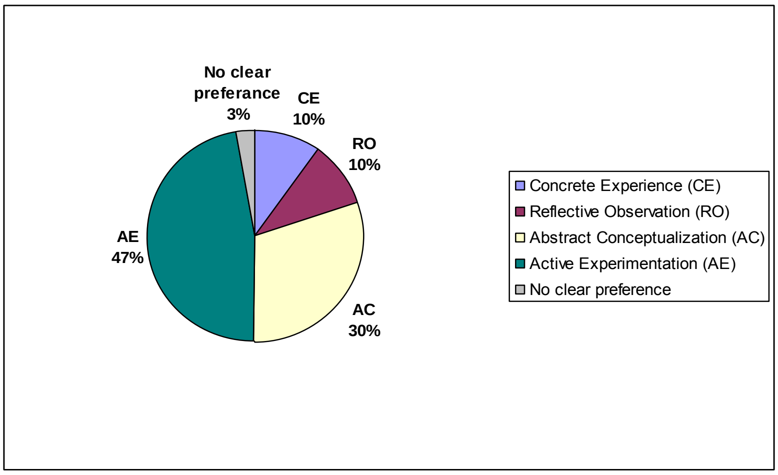


Figure 2. Student's emphasis for learning modes.

Figure 2 demonstrates the percentage distribution of the student's most dominant learning mode among the students that completed the survey. A student's most dominant learning mode is determined by the learning mode a student scored highest in the learning style inventory test. The most widespread learning mode among the students is active experimentation. 47 % of the students are most oriented towards an active experimentation learning mode. Abstract conceptualization is the second most common learning mode, 30 % of the students had their highest score on the abstract conceptualization mode. 10% of the students emphasize reflective observation mode the most and 10 % of the students emphasize concrete experience mode the most. Three per cent of the students had the same highest score for two learning modes, a single most dominant learning mode could therefore not be determined.

| *Variables* | *Mean* | *Standard deviation* | *No. of valid cases* |
|---|---|---|---|
| **Progress** | **5.843** | **1.163** | **70** |
| **Time spent** | **3.400** | **1.109** | **70** |
| **Problem** | **7.214** | **1.918** | **70** |
| **CE** | **13.571** | **3.299** | **70** |
| **RO** | **13.400** | **3.150** | **70** |
| **AC** | **16.871** | **3.451** | **70** |
| **AE** | **17.443** | **3.063** | **70** |

***CE = Concrete Experience; RO = Reflective Observation; AC = Abstract Conceptualization; AE = Active Experimentation***

Table 1. Mean and standard deviation.

In table 1 mean value, standard deviation and number of cases are displayed for the dependent variables progress, time spent and problem frequency. It also displays mean value, standard deviation and number of cases for the four learning modes, concrete experience, reflective observation, abstract conceptualization and active experimentation.

| *Variables* | *Progress* | *Time Spent* | *Problem frequency* |
|---|---|---|---|
| **CE** | **-0.101** | **0.016** | **0.203** |
| **RO** | **-0.216** | **-0.076** | **0.010** |
| **AC** | **0.179** | **0.108** | **-0.377*** |
| **AE** | **0.036** | **0.246**** | **0.109** |

***** $P = 0.001$***

***** $P \leq 0.05$***

***CE = Concrete Experience; RO = Reflective Observation; AC = Abstract Conceptualization; AE = Active Experimentation***

Table 2. Correlation matrix


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Table 2 reveals the correlation between all three dependent variables and the four learning modes. The correlation between abstract conceptualization and problem frequency are -0.337 and the correlation are significant at a level equal to 0.001. For the variables progress and time spent there is a weak correlation with abstract conceptualisation but the correlation is not statistically significant. The correlation between active experimentation and time spent are 0.246 and the correlation is significant at a level less than 0.05. For the variable problem frequency there is a weak correlation with active experience but the correlation is not statistically significant.

## 5 Analysis

Results of the correlation analysis show that, for both hypotheses, only one of the three contributing dependent variables supported the hypotheses. None of the hypotheses can therefore be fully accepted. The teachers' assumption that students who emphasize abstract conceptualization will learn to use enterprise systems more effectively is supported by the dependent variable problem frequency. The negative correlation between abstract conceptualization and problem frequency indicates that a greater preference for the learning mode abstract conceptualization the fewer numbers of problems the students will encounter. The week correlation and the lack of statistical significant for the variables progress and time spent indicate that abstract conceptualization has no impact on these two variables.

The teachers' hypothesis that students who emphasize active experimentation will learn to use enterprise systems less effectively is only supported by one of the three dependent variables, time spent. The correlation between active experimentation and time spent indicates that the greater preference for the learning mode active experimentation the more numbers of hours the students have to put into the implementation of the exercises. In addition, there is no significant correlation found between active experimentation and problem frequency and progress. No significant correlation can be observed between the learning modes concrete experience and reflective observation and the dependent variables, that is the learning modes concrete experience and reflective observation has no impact on the efficiency in which students learn enterprise systems measured by the variables progress, time spent and problem frequency. Learning modes had no significant effect on progress in this study. That is, the number of exercises that students had completed is independent of students learning mode emphasis.

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## 6 Conclusions and recommendations

This article examines the efficiency in which students learn enterprise systems and its correlation with learning orientations. This was done by testing two hypotheses. The hypotheses testing were carried out to test if independent variables have an effect on dependent variables which assumes that no other causes affect the relationship. That there is a correlation between abstract conceptualization and problem frequency and between active experimentation and time spent was determined by the correlation analysis. The existence of a relationship between independent and dependent variables and if effect variables is a consequence of causal variables has not been analysed. The correlation between variables proves that there is a covariance between the variables. That is, a change in one variable are associated with a change in the corresponding variable [Gs06]. The correlation between variables does not prove causality between them; it only indicates that there is a relationship between variables [Gs06]. There is a possibility of other underlying factors affecting the variables and the relationship between them.

The fact that the number of exercises that students had completed is not correlated with any of the learning modes can be interpreted as the learning environment being functional and flexible. The students have access to a diversity of learning resources and the support needed to complete the exercises regardless of the learning mode that they prefer. Still abstract conceptualization and active experimentation have a partial impact on the efficiency in which students learn ERP systems. Teachers could encourage an abstract conceptualization approach in which students use the course resources available to create conceptual models and to plan their work to reduce the number of problems that they encounter. If the results of the study will be used to make changes in the learning environment in order to tailor it after one or more learning modes to guide students into the usage of a specific learning mode it should be undertaken with caution. Consideration should be given to causality. That is, if any external factors possibly have an effect on the dependent variables.

The lack of statistical evidence for the learning modes reflective observation and concrete experience influence on learning effectiveness should not lead to that the two modes are discharged. To create a learning environment that reflects Kolb’s [Kd84] view on how individuals learn effectively all four learning modes should be taken into consideration when designing exercises and course resources. That is, different forms of educational resources and material that matches learning methods used by all learning styles should be available to the students in order to not force any student into a another learning style then the one the student prefer.

It is debatable if the independent variables used are fully measuring the efficiency in which students learn enterprise systems. An effect variable that can help to further explain how effective students learn ERP systems are the understanding of the uses and purposes of the functions that the students encountered when they work in the system.

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## 7 Future work

In this research it has not been taken into account if and how different composition of levels of emphasis on two or more of Kolb's learning modes have an effect on the variables progression, time spent and frequency problems. [Kd84] explains that to be an effective learner a person needs to possess capabilities in all four learning modes. Future research should examine if and how different levels of emphasis for all four learning modes affect the efficiency in which students learn ERP systems. This could be done by the use of the learning styles defined by [Kd84]: accommodators, divergers, assimilators, and convergers.

Further research should examine whether the relationships between the dependent and independent variables are causal and if any other underlying factors are affecting the dependent variables. It could also be of interest for the teachers' at SU to investigate how the learning environment should or can be influenced by the different learning modes. This can be done by examining what teaching methods correspond to the different learning modes. The correlation between learning preferences and students understanding of the use and purpose of the functions that they have encountered when working with the ERP system are also of interest of being examined. This is important because the aim in ERP education at SU is that students learn the concept of ERP systems and not specific software.

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