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"Measuring Learning Outcomes - Evolution of Cognitive Skills among Graduate Students in Auditing"

by

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1. **Introduction**

The ability to provide sensible measures for learning outcomes in accounting education is under increased scrutiny. Students taking accounting classes are often also provided with on-the-job training in accounting firms. Hence knowledge about learning outcomes for different groups of students is essential information for educators as well as the accounting profession. Sensible measures is needed by educators in order to (1) chose teaching methods matching prerequisite skills among a heterogeneous student body, (2) assess the need for de-learning existing knowledge (i.e., cleaning the slate), and (3) being able to set up challenging yet fair exams for the total student body. Assessing learning outcomes for the purpose of knowledge management plays a major role in accounting firms too. Knowledge transfer among auditors is a part of daily life within most accounting firms. Developing a sound on-the-job training environment is pivotal for recruiting and design of supervision, and in the end for the expected "succesrate" in retaining (valuable) employees.

Prior research suggests that scripts or schemas provide a useful manner to organize "data in memory" for accounting contexts. I.e., when faced with the knowledge provided in a graduate course the student learns from his prior experiences and stores the important aspects of each experience in memory in accordance with such schemas. The schemas available for students taking a graduate auditing course reflects prior accounting work experience for some students and undergraduate accounting coursework experience for all students.

This paper extends prior research on the role of declarative and procedural knowledge in performing auditing tasks. Measuring learning outcomes is a complex matter requiring sensible measures for both declarative knowledge (ability to verbalize pertinent facts or processes) and procedural knowledge (intellectual skills). The study uses a multitude of measures based on a hierarchical separation of intellectual skills originally suggested by Robert M. Gagné. An instrument was developed to measure differences regarding learning outcomes in the context of an auditing course by posing a broad set of questions testing declarative knowledge and the full range of intellectual skills from discrimination to the use of higher-order-rules. The paper presents data collected in September 1999 including 34 graduate students representing both type of schemas. The study provides evidence, which confirms an interrelationship between declarative and procedural knowledge in auditing. The findings suggest that the studentmass, to some extent, is able to manage procedural questions, as long as their declarative knowledge base is fairly accurate. Further, the findings suggest that there is no difference between students with or without auditing working experience regarding learning outcomes on declarative knowledge, while students with auditing experience perform better than students with a purely theoretical knowledge base when learning outcomes are measured as the extent of procedural knowledge.

2. Motivation and hypotheses

The ability to provide sensible measures for learning outcomes in accounting education is under increased scrutiny. The growing accounting education research literature suggests that accounting educators around the world share the challenge of preparing students for a working life in accounting firms. At business schools the students have a wide choice of programs, each with an intended specialization in mind. The learning objectives for these graduate students are common, in the sense that students are expected to acquire a certain amount of both theoretical and practice related knowledge during the education. In addition, the overall learning objectives for a specific graduate program must also reflect the nature of that program. Accounting programs will, presumably everywhere, reflect that accounting and auditing are fields generated from a practice-related history. The emphasis on facts, definitions and vocabulary in accounting education has always played a major role, e.g. Bonner and Walker (1994).

Desirable skills, such as the ability to recognize previous encountered situations, applying the appropriate analytical tools available to the domain and synthesize previous knowledge to come up with solutions to new or complex problems, are often mentioned as explicit learning outcomes of business degree programs. These skills are not less desirable in accounting programs, e.g. Stone and Shelley (1997). In addition to teaching the "facts of the trade", one of the educator´s primary tasks may then be described as assisting in the evolution of cognitive skills among graduate students. In accounting programs the intended specialization will, thus, have to reflect the potential challenges, which will face auditors and other accountants in their future work.

Prior research on student performance has often been initiated for control purposes. In effect, generic questions of the following nature are raised: what are the consequences for student performance under different programs, under different instructional approaches, under different instructors etc. The perspective guiding the research is that of the educational institution (or the individual educator), whereas the perspective of the students is seldom chosen. The work by Krausz et al. (1999) may be seen as one of the exceptions. Krausz et al. (1999) explores the relationship between performance in entry-level graduate accounting coursework and prior accounting work experience and undergraduate accounting coursework experience. As such, the performance is examined from the perspective of the student by taking the students background and prior knowledge into account. The present study may be seen as a contribution with this perspective too.

2.1 The importance of controllable and uncontrollable factors

It is possible to imagine a straightforward scenario where all students are obtaining a theoretical background in order to be prepared for a later practical working experience. Even in this scenario, the body of students may not be a homogeneous mass. From the students´ perspective, differences in performance may be caused by differences in the ability to acquire knowledge and/or differences in the ability to reproduce the required knowledge in a test situation. Behind these differences are an endless number of explanatory factors such as: the ability to learn given a particular teaching style, the ability to perform under stress, gender, culture, maturity, personal experiences or simply "having a bad day". From the educators´ perspective, it is impossible to be conscious about all these factors at the same time (and still

make sense) and by the very nature of the factors, it may be impossible to reconcile opposing differences/causes. Regardless of this, some kind of measurement of student learning is required in most accounting courses, e.g. "any assertion about (teaching) efficiency must include a measurement of a student´s learning achievements", Adler (1999, p. 241). In testing the student performance, the educator cannot control for all these factors, no matter what performance measure he choose. Accordingly, it is asserted that some differences in student performance (beside individual differences) would be expected for any accounting course. For example, the time spent on preparation by students will have an effect for some learning outcomes, but not necessarily for all. This assertion will be explored (tested) for a particular auditing course as described later. A null hypothesis is stated in the following form:

> **H1:** The learning outcomes of auditing students do not depend on their gender, age, entry GPA, type of admission exam, history of attendance, average amount of preparation for lectures.

2.2 The importance of prior knowledge

The distinction between knowledge acquired at school as opposed to knowledge acquired at the workplace is not as clearcut as indicated in the scenario in the section above. The opportunity to acquire a theoretical foundation in a given field has been the declared "raison d´etre" for many business programs. Most often, accompanied by the ideal behind the scenario described above, namely, that students will benefit from a theoretical background as the best preparation for a career in an everchanging business world. For a number of reasons, however, students do not always comply with this ideal. One of the things, that educators must acknowledge is, that students taking accounting classes often are provided with on-the-job training in accounting firms.

The ability to distinguish between learning outcomes for different groups of students may be seen as important for educators as well as the accounting profession. In their article "Educating for Accounting Expertise: A Field Study", Stone and Shelley (1997) compare the effectiveness of a new accounting program against a traditional program. The new program emphasizes acquiring intellectual skills and improving attitudes without losing traditional accounting declarative knowledge. The change toward the learning objectives in the new program may be seen as support for the notion, that evolution of cognitive skills among auditing students may lead to accounting expertise, see also Bonner (1999) and Choo and Tan (1995). Bonner (1999) has provided an elaborate framework in her recent article "Choosing Teaching Methods Based on Learning Objectives: An Integrative Framework". The premise for her framework is, that since teaching methods vary as to the conditions they can create and different types of learning objectives require different conditions for achievement, the choice of teaching methods should be based primarily on the type of learning objective, Bonner (1999, p.36). Hence, the choice of teaching style and learning objectives may contribute to the students´ opportunities for acquiring accounting expertise.

It has been stated that a single generally accepted definition of expertise does not exist, e.g. Holm (1995, p. 140). In their paper on "Expertise in Auditing", Bédard and Chi (1993) adopt the plausible idea that expertise is a relative rather than an absolute concept, thus expertise can be defined as an "ability, acquired by practice, to perform qualitatively well in a particular task domain", Bédard and Chi (1993, p.22). According to this concept, the expertise levels fall along a continuum. While accounting students cannot expect to become

experts merely by studying, acquiring accounting expertise may start by picking up a number of skills during the education too.

Sensible measures for learning outcomes are needed for several reasons. Sensible measures are needed by educators in order to (1) chose teaching methods matching prerequisite skills among a heterogeneous student body, (2) assess the need for de-learning existing knowledge (i.e., cleaning the slate), and (3) being able to set up challenging yet fair exams for the total student body. Assessing learning outcomes for the purpose of knowledge management plays a major role in accounting firms too. Knowledge transfer among auditors is a part of daily life within most accounting firms. Developing a sound on-the-job training environment is pivotal for recruiting and design of supervision, and in the end for the expected "success rate" in retaining (valuable) employees, see Heldbjerg (1995).

Prior research suggests that auditors are depending on procedural knowledge to master different tasks within auditing, e.g. Bonner and Walker (1994), Bonner (1990). Bédard and Chi (1993) present a theory of skill acquisition, which divides the learning process into two major stages: a declarative stage and a procedural stage, see also Anderson (1983). The declarative knowledge to be learned is knowledge of facts, theories and definitions (from textbooks and journals). Procedural knowledge consists of rules or steps needed for performing skilled tasks. In distinguishing between the two, declarative knowledge is similar to data, and procedural knowledge is similar to processes. As a consequence, declarative knowledge generally must be in place prior to the acquisition of procedural knowledge, so that procedural knowledge can be compiled through interpreting declarative knowledge, Bonner and Walker (1994, pp.158-159). Herz and Schultz (1999) describe the theoretical relationship between the to types of learning required:

> "Declarative learning takes place when descriptions of the steps of a new cognitive task are added to long term memory. As the cognitive task is repeatedly performed, two related processes (proceduralization and composition) convert declarative knowledge to procedural knowledge. Proceduralization builds declarative knowledge into productions, which underlie the ability to perform a task. Composition, the most striking step of the knowledge compilation model, collapses step-by-step production processes into a one-pass, all-at-once execution, Anderson (1987) and Bedard and Chi (1993). This theorized compression of knowledge is seen as responsible for timesavings that come with practice", Herz and Schultz (1999, p.3).

In auditing, basic declarative knowledge is commonly acquired through formal education, and procedural knowledge is predominately acquired later during the auditor's professional career. An example confirming the relevance of this distinction is the finding by Frederick and Libby (1986, p.289), who examined how the auditor's "memory store" interacts with current audit evidence to determine judgment. Thus, they found that experienced auditors had knowledge of the relations between control weaknesses and account errors and knowledge of relations among accounts, whereas inexperienced auditors had only the latter (declarative) knowledge. Nonetheless, a distinction between declarative knowledge acquired in school and procedural knowledge acquire in practice is very crude. First, teaching objectives in accounting courses aim to convey both the declarative and procedural knowledge. Second, students attending accounting classes may have obtained procedural knowledge from practice and in a sense bringing this knowledge into play in the classroom discussions during the semester.

As described above, declarative knowledge and procedural knowledge are neither mutually exclusive nor independent since intellectual skills often require declarative knowledge, see Stone and Shelley (1997, p.37). Despite this imprecision, these are the fundamental learning outcomes generally identified in psychological theories of expertise and expert knowledge, e.g., Anderson (1985), Gagne (1984) and Anderson (1976).

Prior research contributions suggest that auditors acquire knowledge through experience and develop a knowledge structure, e.g. Bonner et al. (1997), Bonner and Pennington (1991), Bonner and Walker (1994). Prior research also suggests that scripts or schemas provide a useful manner to organize "data in memory" for accounting contexts, e.g., Choo (1996), Choo and Trotman (1991), Birnberg and Shields (1984). I.e., when faced with the knowledge provided in a graduate course the student learns from his prior experiences and stores the important aspects of each experience in memory in accordance with such schemas. The schemas available for students taking a graduate auditing course reflects prior accounting work experience for some students and undergraduate accounting coursework experience for all students. Because prior research suggest that how knowledge is acquired and organized very much depend on prior knowledge, measuring learning outcomes have to take into account that such schemata play a major role. In the study by Krausz et al. (1999), the hypothesized relationship between performance in entry-level graduate accounting coursework and prior accounting work experience was supported, Krausz et al. (1999, p.7).

In the context of this paper two set of students are identified. One group of students has prior and/or current working experience within accounting firms and is identified as having an auditing experience (AE) schema. The other group of students has no working experience within accounting firms, but may have other related working experience. However, the students solely posses a theoretical background for organizing knowledge learned in the auditing course. As a residual, the second group of students is identified as having a no-auditing experience (NAE) schema. Even though both groups will share the content of the educational background, an experience effect may not only cause a difference in what they know, but also in how new knowledge is acquired and organized.

Hence, an instrument was constructed to measure learning outcomes on the two groups of students testing a range of declarative and procedural knowledge. It may be asserted, that the available knowledge schema for students with or without auditing experience will not make a difference for learning outcomes on declarative knowledge. The educator's perspective would be that the students are faced with the same curriculum and attend the same lectures, so no difference in performance is expected. However, prior knowledge may inhibit students with working experience in reproducing declarative knowledge. As stated by Herz and Schultz (1999, p.1): 'Gauging declarative knowledge relies on one’s ability to verbalize pertinent facts or processes; measuring procedural knowledge is more subtle as it relies on “automatic” linkages to performance that gradually deny access to declarative knowledge. This distinction limits experienced auditors’ ability to demonstrate their knowledge via ordinary recall or recognition measures commonly used in accounting studies".

Therefore, the assertion that there is no difference on learning outcomes for declarative knowledge between students with or without auditing experience a hypothesis is stated in the null-form:

> **H2**: There is no difference between students with or without auditing working experience regarding learning outcomes on declarative knowledge.

The importance of prior knowledge when performing auditing tasks suggests, that students with auditing experience would be expected to have an advantage when answering questions on procedural knowledge. The null hypothesis is stated in the following form:

> **H3**: There is no difference between students with or without auditing working experience regarding learning outcomes on procedural knowledge.

Hypotheses 2 and 3 will be explored (tested) for a particular auditing course as described later.

2.3 The importance of intellectual skills

Within accounting, intellectual skills include the ability to differentiate and integrate alternative problem perspectives, the ability too identify accounting-related information resources, the ability to structure problem solutions, and written communication skills, Stone and Shelley (1997, p. 38). In the work initiated by R.M. Gagné, the conceptual understanding of intellectual skills may be equated with procedural knowledge. "Intellectual skills" is seen as separate from motor skills, and verbal (declarative) knowledge, see Gagné (1984), and Gagné and Medsker (1996). In his work, Gagné advocates the use of categorical approach in understanding and measuring learning outcomes. When it comes to a subdivision of intellectual skills, Gagné offers a conceptual hierarchy of increasing complexity. Hence, a need for more sophisticated measures when dealing with learning outcomes in regard to procedural knowledge is identified. In the context of this paper, the conceptualization of different intellectual skills is used as a foundation for developing an instrument, see the later section. The intention is to develop an instrument with the capability of testing whether it makes sense to subdivide learning outcomes in regard to procedural knowledge.

Because of the need for prerequisite skills in performing well on procedural knowledge, a difference is expected between the two groups of students, i.e., the assertion behind Hypothesis 3. However, since a certain amount of intellectual skills is expected to translate into the answers in both groups, it is difficult to predict at what level of complexity this change will take place. In dealing with the framework of teaching methods, Bonner (1999) states that: " To acquire intellectual skills, students should have some framework before practicing with (experiencing) examples. This idea is consistent with previous arguments describing the benefits of providing a framework through lecturing", Bonner (1999, p. 23).

The importance of prior knowledge when performing auditing tasks suggests, that students with auditing experience would be expected to have an advantage when answering questions on procedural knowledge, however, some extent of procedural knowledge is expected to be acquired by the NAE students. The following hypothesis will be explored (tested) for a particular auditing course:

> **H4**: The higher degree of intellectual skill required for learning outcomes, students with auditing working experience will perform relatively better than students without auditing working experience.

3. Method, subjects and the instrument

3.1 Study design

As mentioned earlier, the aim of the study is ultimately to explore over time the development of the student´s knowledge. This paper reports on part one of a series of 3 questionnaires/ tasks [1]. The questionnaires were done of 34 students at the 14th of September 1999, two weeks after starting the 3rd semester (the 2nd in auditing). The questionnaire contained 21 questions with different levels of complexity, ranging from multiple-choice to open-ended questions.

The questionnaires were distributed without any notice in the last hour of three consecutive teaching hours in auditing. Hence the students were unprepared for the task and the test is consequently approaching active knowledge. Before handing the questionnaires out the students were shortly motivated and instructed (3- 4 minutes). It was voluntarily to participate and xx made the choice not to participate. The time allowed to answer the questionnaire was 40 minutes.

The population is approx. 50-60 students attending a 2 years full time[2] graduate study in "accounting and auditing", CMA. The graduate exam is the theoretical part of the auditors' qualification as state authorized public accountant (certified public accountants). In order to become state authorized public accountant, the graduates will further need at least 3 years of auditing experience after graduation before they can attempt the final practical exam to bee a state authorized public accountant, which is a very demanding and difficult exam to pass.

The CMA study consists of the following courses: Accounting in the 1st and 2nd semester. Auditing in the 2nd and 3rd semester. Tax in the 1st, 2nd, and 3rd semester. Judicial course, in the 1st semester. Attendance in classrooms is not compulsory in any of the courses. All courses are completed with an exam following shortly after the last semester of the individual courses. The course in auditing is completed with both an oral and written exam like the most of the other courses. The written exam is prescribed to 6 hours.

3.2 The subjects

The graduate students have essentially two different educational backgrounds as an entering requirement to the graduate auditing and accounting study:

HA (BSc in Economics and Business Administration): The education is a three years full time study and is a more general and broad economic education than the HD study.
HD (Higher Diploma) is a part time study with two years of general economics and two years in accounting, tax and other disciplines related to accounting. The study almost correspond to a 3 years full time study, but is more interrelated with accounting than the HA study. The

[1] The second questionnaire was completed of 21 students at the 29th November 1999, which were two weeks before ending the auditing course and approximately 4 and 5 weeks before the final written and oral exam in auditing. Like in September the questionnaire contains 21 questions with different levels of complexity, ranging from multiple-choice to open-ended questions.
The third task include the written examination materials from 50 students from the final written exam in auditing held on the 8th of January 2000.

[2] A part time study takes between 3 and 5 years

students with a HD background will typically be working for accounting firms when they attend the CMA graduate study on part time.

The graduate auditing students could be divided in the following two subgroups:
1. Students without any auditing experience, i.e. essentially students with a HA bachelor degree (more than two thirds of the students).
2. Students with auditing experience and who are working at the same time as attending the graduate CMA study, mostly HD's, but a few HA's also (3), including students with auditing experience prior to entering the CMA study (only a few).

As mentioned earlier Krausz et al. (1999) explored the relationship among others the effect of prior accounting work experience and undergraduate accounting course work experience. We extended the descriptive information even more.

The data included information about 1) Working experience: Current or previous auditing experience or other work experience, including job title and domain and task-specific information -job description. 2) Academic qualification to inter the graduate study CMA, including the type of study HA, HD or alike, the average grade, the year graduated and the place where studied. 3) Study related information covered whether they are full time or part time students, number of semesters followed in auditing, previously failed exam in auditing, preparation time relatively to class hours and attendance in class (percentage).
4) General data: Time used to complete the questionnaire, gender, address in form of current zip code, birthday and year, and if the students were willing to their student-ID (voluntarily)[3].

Like Krautsz (1999), we determined the work experience in auditing by examining the students' descriptive information. One student whose job title suggested current auditing experience were dropped from the experience subsample as it was revealed that he only had one month of auditing experience. Of the 34 participants 24 were men and 10 were women. The age differed between 23 years and 32 years, with an average of 25 years. 10 had current or prior auditing experience, most with a HD exam. The experience ranged between 9 and 95 month with an average of 5 years (59 month). 24 persons, all with HA exam, are without auditing experience [4].

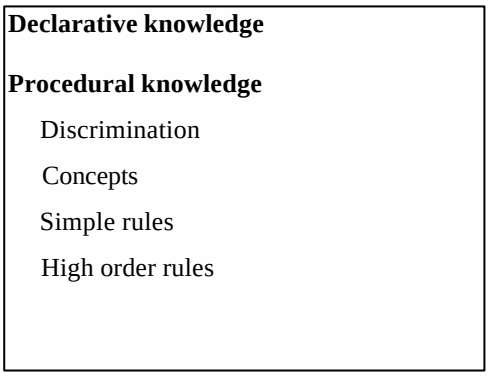
3.3 The instrument

The need for a more elaborate measurement (instrument) of both declarative and procedural knowledge was identified in the earlier section. We fully acknowledge the challenge of develop an instrument, e.g.: "Classifying learning objectives into types is not a trivial task" (Bonner, 1999, p.18). Despite of difficulties we strived nevertheless to design the questionnaire based on Gagné et al´s classification of knowledge and learning i.e. verbal knowledge also named declarative knowledge and intellectual knowledge also named procedural knowledge, see figure 1. The hierarchy of the procedural knowledge according to Gagné et al is discrimination, concepts, simple rules and high order rules (Gagné et al, 1996, p. 31-33).

[3] The student-ID is necessary in order to match with the later written examination materials.
[4] Four of them have prior working experience.

Figure 1

Hierarchy of Gagné



The questions were composed of the examination requirements/ curriculum and the subjects were lectured through the 2nd semester (1st semester in auditing). The themes were lectured in the middle or in the end of that semester, and a few in the beginning of the following semester and close to the date of answering the questionnaire. The themes were lectured of two different persons. The questions were composed in order to include themes from lectures made by both persons. Some of the basic themes were incorporated in more than one lecture and were presented at different times by both persons.

We constructed one question related to **discrimination**, but the question was excluded from the analyses, because we afterwards recognized that the question could be answered fully based on common knowledge. Besides a discrimination among physical phenomena, is not very often used in a classroom learning in auditing (Bonner p.16)

The instrument included 21 main questions with different levels of complexity, and many with supplementary questions. The questions are ranging from multiple-choice to open-ended questions. 10 of the 21 main questions are supposed to be of a declarative nature, the remaining 11 procedural: Of the 11 procedural questions, 3 are supposed to be related to concepts, 4 to simple rules, and 4 are supposed to be related to high order rules.

In order to classify the questions we used some rather rigid rules. For **declarative knowledge** we mainly based our composition of the questions on the following:

> The outcome of declarative knowledge is that a person is capable of stating or telling the name, fact, or idea - usually in the form of a proposition and does not require that the information be applied or transferred to novel situations. The primary challenge for verbal information learning is retention and retrieval - recognition or recall - not transfer. (Gagné et al, 1996, p. 82-83).

In other words the questions should be asked in such a way that it is possible to answer only by recall or recognition maybe aided by other facts. In order to illustrate what we have done we provide two examples from the questionnaire:
Question 4. Who has the responsibility for the financial statements, 1. The president (director/ management) 2. The board of directors / executive committee, 3. Both the president and the board of directors, 4. The auditor, 5. Both the president and the auditor, 6. Both the auditor and the board of directors, 7. Both the president, and the board of directors and the auditor, 8. Don't know.

Question 8. The auditor, collect audit evidence during his audit, among others he make inquiries and collect internal documentation. Please state the rest of the audit evidence types. Following this you are asked to state the persuasiveness of the evidence, in three categories.

Question 4 is a multiple choice question, and requires the student to recognize facts, given several choices of wrong, partly wrong or correct answers. It is not necessarily easier than a recall, because when the learner is asked to recognize a particular fact, the more paths there are leading to other facts, the slower the response will be (Gagné et al, 1996, p. 87).
Question 8 requires that the person should recall the remaining types of audit evidence. They are aided by two examples of evidence. In doing so we enhance the possibility to recall the facts, because when the learner must recall facts, rather than simply recognize them, a greater number of paths to other facts appears to have the effect of enhancing retention (Gagné et al, 1996, p. 87).

In determining the **concepts** we mainly based the construct of the questions on the following:

> Concepts must be learned by use of language and require a verbal definition. Definitions are statements that express rules for classifying, and *contain essential features and functions* of the object or relation being defined and are abstract rules for classifying objects and events. The outcome when acquired defined concepts the persons should be able *to use the definition to classify* objects or relations. (Gagné et al, 1996, p. 61-62).

There are three questions related to concepts. The following example is provided: Question 12. Please classify the following into audit evidence and/ or an audit procedure: 1) reconciliation, 2) scanning, 3) confirmation, 4) trace, 5) compare and 6) inquiries.

In contrast to the declarative questions this question does not require the students to recall or recognize facts. It requires that they understand what audit evidence and audit procedures are, a knowledge they have acquired declaratively. What is required, is that they are able to make a distinction between them, and are able use the definitions in deciding the choice, in stead of just stating the facts.

In determining the **simple rules** questions we primarily based the device of the questions on the following:

> A rule may bee a particular kind of a defined concept and typically, a rule is composed of several concepts. Learning a rule becomes a matter of learning the correct relationships among them.
> The outcome is the ability to *demonstrate* or *apply* the rules, not to state them (Gagné et al, 1996, p. 64 and 67).

There are four questions related to simple rules. The following example is provided: Question 15. Please explain which audit evidence is the best to satisfy the auditor of the existence of the inventory. You should not consider the audit cost.

It is a necessity in order to answer the question that the students are able to recall the (declarative) knowledge about audit evidence, audit objectives and has a basic knowledge of inventory. Besides it requires that they are able to choose, not only audit evidence, but also the most reliable evidence related to a specific audit objective, i.e. the correct relationship among them (concepts). Further more they must relate them to a specific item in the financial statements in order to decide a proper audit solution to the problem.

The plot of the **high order rules** questions were primarily based on the following:

> The outcome of learning high order rules is that one can generate a new rule by combining old rules and use the new rule to perform a task (Bonner p. 17)

There are four questions related to high order rules. The following example is provided: Question 19. Can it be relevant for the auditor to use positive confirmations to accounts payable/ creditors, yes or no. Please explain your reasons shortly.

It is very common and almost a must to confirm the existence of receivables by use of positive confirmations. It is not that common to use the same procedure for accounts payable. The problem solving requires that the student knows the accommodation of confirmations - the rules - and are able to make an abstraction to accounts payable and explain under which conditions it will be desirable to use confirmations as instrument in auditing accounts payable.

4. Analyses and Results

4.1. The interrelationship between declarative and procedural knowledge

The first issue we examine is the possible relationship between declarative and procedural knowledge. As stated in the section above, the subjects were prompted for answers in a number of questions in both categories. In effect, the classification allowed up to 36 correct answers on declarative knowledge and 31 correct answers on procedural knowledge. The latter may again be decomposed according to the hierarchy proposed by Gagné, see the previous section.

In this paper, the analyses are based on operational measures for knowledge in terms of two relative measures. For each subject, the two measures are available for each sublevel of the questions. In the following, the relative measures termed "accuracy" and "extent" respectively.

An example of the measures for an individual subject is provided here. For the part gauging declarative knowledge, subject no. 7 had 22 correct answers, answered 30 questions out of 36, i.e., giving a *measure for knowledge accuracy* of 0,73 (22/30) and a *measure for knowledge extent* of 0,61 (22/36). For the other part gauging procedural knowledge, subject no. 7 had 26 correct answers, answered 30 question out of 31. That is, a measure for knowledge accuracy of 0,87 (26/30) and knowledge extent of 0,84 (26/31).

> *Insert "Table 1. The Relationship between Declarative and Procedural Knowledge" approximately here>*

The relationship between declarative and procedural knowledge is examined by looking at Pearson correlation coefficients calculated on the basis of the answers from the 34 students. In table 1, the correlation coefficients are presented for knowledge accuracy and knowledge extent for both types of knowledge. The evidence suggests a positive relationship between all four measures.

First, it is evident that a positive relationship between declarative and procedural knowledge does exist. The correlation coefficient between the accuracy measure of declarative and procedural is 0,382 (significant at the 5% level) and between the knowledge extent measure of declarative and procedural, the coefficient is 0,670 (significant at the 1% level).

Second, the evidence suggests that only one of the two measures for each type of knowledge is necessary in order to gauge the knowledge of the students in this task. In effect, when the measures for declarative knowledge are compared, it is clear that the accuracy and extent measures are correlated (0,682, which is significant at the 1% level). Comparing the measures for procedural knowledge gives a correlation between the accuracy and extent measures on 0,520 (significant at the 1% level).

Third, even the cross-correlations suggest a positive relationship. In effect, if students provide accurate answers regarding procedural knowledge, the chance is that they will also know much about declarative matters (i.e., score high on the extent measure). The corresponding correlation is 0,359 (which is significant at the 5% level). The lowest level of correlation is 0,263 (not significant at the 5% level). This is the other cross-correlation coefficient, which, non the less, suggests a positive relationship between accuracy for declarative knowledge and extent of procedural knowledge.

These initial results suggest that the student mass, taken as a hole, do possess both declarative and procedural knowledge. Hence, it makes sense to continue the analyses below. The evidence also suggests that the strict distinction between declarative and procedural knowledge seen in a number of studies should be handled carefully. As noted in several studies), a positive relationship between the two types of knowledge should be expected, e.g. Herz and Schultz (1999), Stone and Shelley (1997), Bonner and Walker (1994). In effect, this may have considerable implications, and should be taken into account when interpreting the findings of knowledge differences as a result of different teaching styles, experience levels, familiarity with specific audit domains etc.

4.2. Examination of differences in learning outcomes

In this section, we provide evidence on the first hypothesis, which is exploratory in nature. In section 2.1, the importance of controllable and uncontrollable factors was discussed in terms of possible implications for knowledge acquisition and retention. In the context of this paper, we examine whether the learning outcomes of the 34 auditing students depend on such factors as their gender, age, entry GPA, type of admission exam, history of attendance, or average amount of preparation for lectures.

T-tests for independent samples have been run to test for possible factors able to explain differences in measured learning outcomes. In the context of this paper, the results are presented in terms of two regression analyses with the extent of declarative knowledge and the extent of procedural knowledge as the respective dependent variables. The results for the six factors identified above are presented in table 2 and 3.

> *Insert "Table 2. Explaining Learning Outcomes for Declarative Knowledge" approximately here>*

Insert "Table 3. Explaining Learning Outcomes for Procedural Knowledge" approximately here>

According to the results presented in table 2, the combination of predictors are not able to explain the learning outcomes for declarative knowledge (R=0,394). None of the six factors have significant coefficients as an indication of causal relationships. I.e., the evidence suggests that neither gender, age, entry GPA, type of admission exam, history of attendance during the semester (!), or the average amount of preparation for lectures (!!) have any effect on the students ability to reproduce learning outcomes regarding the part of the questionnaire requiring declarative knowledge.

However, the combination of predictors do manage to explain the learning outcomes for procedural knowledge (R=0,620). The ANOVA for the model, with the extent of procedural knowledge as the dependent variable, has a F-value of 2,803 (significant at the 5% level). This result is mainly carried by a few variables. The entry GPA is a significant predictor at the 1% level and the type of admission exam (HA or HD) is a significant predictor at the 5% level. The master degree in auditing only accepts students with a grade GPA above average. Still, the first predictor suggest that differences in entry GPA, for the students accepted at the study, do make a difference in the ability to reproduce procedural knowledge. In effect, students who previously have produces high scores on exams, perform better on the procedural tasks in the questionnaire. Keeping in mind that the HD-students typically have working experience, the second predictor may point to an experience effect (see the next section). None of the other factors are significant at the 10% significance level. Hence, the evidence does not suggest that the educators are enforcing any measurable sex- or age-discrimination through particular teaching styles!

It is evident, that the students class attendance during the semester and the average time they use for preparation before lectures are none-important factors. An explanatory effect for these factors are implied in the traditional way of teaching a course, i.e., students need to be well prepared and attend the lectures in order to learn. However, the lacking effects probably could be explained by homogeneity among the students on these factors in combination with the nature of the instrument, which aim at measuring available knowledge in a unprepared situation.

4.3. Examination of the importance of prior knowledge

In this section, the importance of the availability of an auditing experience schema is examined. It may be asserted, that the available knowledge schema for students with or without auditing experience will not make a difference for learning outcomes on declarative knowledge. Often, the educator's perspective would be that the students are faced with the same curriculum and attend the same lectures, so no difference in performance is expected. This was the basis for H2 identified in section 2, i.e., the hypothesis that "there is no difference between students with or without auditing working experience regarding learning outcomes on declarative knowledge".

Insert 'Table 4. Explaining Learning Outcomes by Auditing Experience Schema" approximately here>

The 34 students are divided in two groups, namely 24 students without auditing experience and 10 students with such experience. The result of an ANOVA based on these groups is

presented in table 4. The descriptive measures indicate that students with auditing experience perform slightly better than students without auditing experience. This is true for both the accuracy and the extent measure in relation to declarative knowledge. The average score for extent of declarative knowledge is 55% for students with auditing experience compared to 47% for students without. The average measure for all the students was close to 50%, probably reflecting that the test was unprepared. However, the students did acknowledge their own limitations evidenced by a considerable difference between the measures for extent and accuracy. The average score for accuracy of declarative knowledge is 70,47% for students with auditing experience compared to 70,12% for students without. Hence, the students do not engage in guessing games when they do not know the answer to a question regarding declarative knowledge. It is noteworthy, that this is true for the students with the auditing experience schema too. Furthermore, the possibility that prior knowledge may inhibit students with working experience in reproducing declarative knowledge is not confirmed in the context of this study.

Even though the students with auditing experience schema perform slightly better than the students without experience, *H2 is not rejected* at the 20% significance level. This suggests that the declarative knowledge conveyed in the auditing course is adopted by all students, no matter of the available schema for acquiring knowledge is purely theoretical based or mixed with prior experience from practice.

In section 2, it was stressed that a difference would be more likely for procedural knowledge. That is, the importance of prior knowledge when performing auditing tasks suggests, that students with auditing experience would be expected to have an advantage when answering questions on procedural knowledge. Table 4 also presents evidence about this contention tested in the null-hypothesis form. In effect, testing H3: "there is no difference between students with or without auditing working experience regarding learning outcomes on procedural knowledge".

In contrary to the similar scores for accuracy of declarative knowledge between the two groups, a distinct difference is indicated by the average score for accuracy of procedural of 73% for students with auditing experience compared to 68% for students without. The result of an ANOVA, however, does not suggest that this difference is significant at the 10% significance level (i.e., *not rejecting H3 for accuracy of procedural knowledge*), see table 3. As suggested by other studies, we do find a significant difference for the extent of procedural knowledge (at the 1% significance level). That is, when faced with the questions regarding procedural knowledge, students with the auditing experience schema perform better than students with a purely theoretical schema. *Rejecting H3 for the extent measure* suggests that the procedural knowledge conveyed in the auditing course is adopted better by students with prior experience from practice than those without. As a consequence, the educators have to make sure that the examination based on the auditing coursework is "fair". In effect, a fair exam should reflect this difference in order to provide an equal opportunity to perform well for all students.

4.4. Hierarchy of procedural knowledge

The evidence presented in the section above confirms that students with auditing experience would be expected to have an advantage when answering questions on procedural knowledge. However, some amount of procedural knowledge is expected to be acquired by the students without auditing experience. The questions regarding procedural knowledge is

subdivided according to the hierarchy of intellectual skills suggested by Gagné. In effect, the 31 questions related to procedural knowledge are classified accordingly with 15 questions on "concepts", 6 on "simple order rules" and 10 on "higher order rules". As in the previous sections, the relative measures for accuracy and extent of knowledge are calculated and compared for the two groups of students. This subdivision allows us to address H4, namely "the higher degree of intellectual skill required for learning outcomes, students with auditing working experience will perform relatively better than students without auditing working experience".

Insert "Table 5. The Effect of Auditing Experience on Accuracy of Learning Outcomes for Increasing Intellectual Skills" approximately here>

Insert "Table 6. The Effect of Auditing Experience on Extent of Learning Outcomes for Increasing Intellectual Skills" approximately here>

The evidence presented in tables 5 and 6 reflect the hierarchical view of the difficulty of the questions. The ANOVA results in table 5 only examine the effect of auditing experience on the *accuracy* of learning outcomes. An indication of the increasing intellectual skills is available by comparing the average accuracy of knowledge for each of the three categories. For all students, the accuracy for the "concept" questions is 75%, for "simple order rules" 69% and for "higher order rules" 55%. The same decreasing percentage of accuracy is seen for both groups of students. In effect, *H4 is not rejected in relation to the accuracy of knowledge for the different categories of intellectual skills*. In addition, table 5 provides evidence on the differences between the two groups of students on each category of intellectual skill. While none of the differences for these accuracy measures are significant at the 5% level, both the difference for simple order rules and the difference for higher order rules are significant at the 10% level.

More importantly, the ANOVA results in table 6 provide evidence on the effect of auditing experience on the *extent* measure for learning outcomes. As in table 5, an indication of the increasing intellectual skills is available by comparing the average extent of knowledge for each of the three categories in table 6. For the students without auditing experience, the extent of knowledge decreases from 73% on the "concept" questions to 49% on the "simple order rules" and further to 26% for "higher order rules". The same decreasing percentages are seen for students with auditing experience, however, at somewhat higher levels (i.e., 74% on concepts, 62% on "simple rules" and 59% on "higher order rules"). As a consequence, *H4 is not rejected in relation to the extent of knowledge for the different categories of intellectual skills.*

Table 6 also provides evidence, which explains why H3 could be rejected for the extent measure. The three ANOVA-tests for the categories of procedural knowledge suggest a more complex picture than indicated in the previous section. In effect, the evidence suggest that there is absolutely no difference between the two groups of students in relation to the simplest form of intellectual skills, namely the "concept" category. Further, the difference between the groups is only marginally, or non-existing, for "simple rules" knowledge. Hence, the rejection of H3 was determined by the highly significant difference between the groups in relation to the "higher order rules" knowledge. These findings suggest that it is possible to acquire procedural knowledge to a certain degree by attending auditing courses without prerequisite knowledge from auditing practice. In addition, the findings suggest that when the

complexity of the procedural knowledge is increased, there is no substitute for knowledge acquired through working experience in auditing in order to increase the performance.

5. Conclusions - limitations and implications

In assessing our conclusions care must be taken regarding some important limitations of the study. Firstly, the data set is fairly small. Secondly, the instrument with its classifications into Gagné´s learning hierarchy is ambiguous. It is difficult and may always be questionable to construct questions with a clear-cut distinction into classes of learning hierarchy, because classification errors may have impact on the results.

The main conclusion is that the studentmass to some extent are able to manage procedural questions, as long as their declarative knowledge base to some degree is accurate. From a teaching point of view, it may be encouraging, as this also includes the students without auditing experience. A mitigating result may be that the students with audit experience are doing better on the extent 1) of procedural knowledge and 2) along the continuum of Gagné´s hierarchy, i.e. the students without auditing experience are facing growing problems the higher in the hierarchy of intellectual skills they come. Never the less, the results are distinct, as the test was taken without any notice, which means that the knowledge they demonstrate is active. Likewise the test was taken halfway through the course and not by the end of it, i.e. the students are without knowledge of the complete auditing curriculum. This lack of a possible overview could inhibit further progress of the procedural questions, especially for the student without auditing experience. A study of the development of the student´s knowledge over time may therefore lead to other results, which we are planning to do. In fact we have collected the data set in November 1999 and in January 2000.

In section 4.1 we found evidence that there were a positive relationship between declarative and procedural knowledge (significant at the 5% level) and the results also suggest that the student mass, taken as a hole, do possess both declarative and procedural knowledge.

In section 4.2 it was revealed that only two of six "uncontrollable factors" (i.e., gender, age, entry GPA, type of admission exam, history of attendance, average amount of preparation for lectures) contribute to explain differences in learning outcomes, and solely for the extent of procedural knowledge. Only the entry GPA is a significant predictor at the 1% level and the type of admission exam (HA or HD) is a significant predictor at the 5% level. The second predictor may point to an experience effect as the students with auditing experience typically have a HD exam.

In section 4.3 we found that there is no difference between students with or without auditing working experience regarding learning outcomes on declarative knowledge. The descriptive measures, though indicate that students with auditing experience perform slightly better than students without auditing experience. This could - despite the descriptive measures - suggest that prior knowledge do not inhibit students with working experience in reproducing declarative knowledge. Furthermore it suggests that declarative knowledge conveyed in the auditing course is adopted by all students, no matter of the available schema for acquiring knowledge is purely theoretical based or mixed with prior experience from practice. In contrast to the findings regarding declarative knowledge, we found that students with auditing experience perform better than students with a purely theoretical schema on the extent of procedural knowledge (at the 1% significance level), but not on the accuracy.

Considering the mentioned limitations, the implications of the study must be tentative in nature. The implications for education may be that the educators must be concerned with the “fairness” of the examination based on the auditing course work. Consequently, a fair exam should reflect the difference between the student in order to provide an equal opportunity to perform well for all students.

The implications for the auditing practice seem to relate to recruiting and design of the on job training, in order to increase the "success rate" in retaining recruited employees who has a pure “theoretical” background.

Our study has extended prior studies of the importance on the student´s prior experience. We find that there are much more to do in respect of that issue in future research. Also the pitfalls of constructing a reliable instrument and the relationship between specific procedural skills and performance given different levels of task-complexity is an important issues. As such, our findings provide support for the idea of using multiple measures in measuring the evolution of cognitive skills among graduate students in auditing.

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Table 1. The Relationship between Declarative and Procedural Knowledge

Correlations

		Accuracy, declarative knowledge	Extent, declarative knowledge	Accuracy, procedural knowledge	Extent, procedural knowledge
Accuracy, declarative knowledge	Pearson Correlation	1,000	,682**	,382*	,263
	Sig. (2-tailed)	,	,000	,026	,133
	N	34	34	34	34
Extent, declarative knowledge	Pearson Correlation	,682**	1,000	,359*	,670**
	Sig. (2-tailed)	,000	,	,037	,000
	N	34	34	34	34
Accuracy, procedural knowledge	Pearson Correlation	,382*	,359*	1,000	,520**
	Sig. (2-tailed)	,026	,037	,	,002
	N	34	34	34	34
Extent, procedural knowledge	Pearson Correlation	,263	,670**	,520**	1,000
	Sig. (2-tailed)	,133	,000	,002	,
	N	34	34	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2. Explaining Learning Outcomes for Declarative Knowledge (H1)

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Average preparation, Sex, Entry GPA, AGE, Class attendance, Exam[a]	,	Enter

a. All requested variables entered.

b. Dependent Variable: Extent, declarative knowledge

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,394[a]	,155	-,032	,1655

a. Predictors: (Constant), Average preparation, Sex, Entry GPA, AGE, Class attendance, Exam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,136	6	2,266E-02	,828	,559[a]
	Residual	,739	27	2,738E-02		
	Total	,875	33			

a. Predictors: (Constant), Average preparation, Sex, Entry GPA, AGE, Class attendance, Exam

b. Dependent Variable: Extent, declarative knowledge

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,272	,546		-,498	,623
	Sex	2,559E-02	,071	,073	,363	,720
	AGE	6,275E-03	,017	,073	,380	,707
	Entry GPA	7,175E-02	,048	,282	1,501	,145
	Exam	,103	,077	,272	1,341	,191
	Class attendance	3,846E-02	,037	,209	1,047	,304
	Average preparation	3,201E-02	,034	,196	,947	,352

a. Dependent Variable: Extent, declarative knowledge

Table 3. Explaining Learning Outcomes for Procedural Knowledge (H1)

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Average preparation, Sex, Entry GPA, AGE, Class attendance, Exam[a]	,	Enter

a. All requested variables entered.

b. Dependent Variable: Extent, procedural knowledge

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,620[a]	,384	,247	,1169

a. Predictors: (Constant), Average preparation, Sex, Entry GPA, AGE, Class attendance, Exam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,230	6	3,827E-02	2,803	,030[a]
	Residual	,369	27	1,365E-02		
	Total	,598	33			

a. Predictors: (Constant), Average preparation, Sex, Entry GPA, AGE, Class attendance, Exam

b. Dependent Variable: Extent, procedural knowledge

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,576	,386		-1,494	,147
	Sex	1,632E-03	,050	,006	,033	,974
	AGE	1,952E-02	,012	,275	1,673	,106
	Entry GPA	9,704E-02	,034	,462	2,875	,008
	Exam	,115	,054	,368	2,126	,043
	Class attendance	4,251E-02	,026	,279	1,639	,113
	Average preparation	2,457E-02	,024	,182	1,030	,312

a. Dependent Variable: Extent, procedural knowledge

Table 4. Explaining Learning Outcomes by Auditing Experience Schema (H2 and H3)

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Accuracy, declarative knowledge	No experience	24	,7012	,1347	2,750E-02	,6443	,7581	,43	,90
	Experience	10	,7047	,1190	3,765E-02	,6195	,7898	,44	,83
	Total	34	,7022	,1285	2,204E-02	,6574	,7471	,43	,90
Extent, declarative knowledge	No experience	24	,4745	,1654	3,377E-02	,4047	,5444	,14	,75
	Experience	10	,5472	,1522	4,812E-02	,4384	,6561	,19	,75
	Total	34	,4959	,1629	2,793E-02	,4391	,5527	,14	,75
Accuracy, procedural knowledge	No experience	24	,6809	,1018	2,077E-02	,6379	,7238	,41	,83
	Experience	10	,7368	5,819E-02	1,840E-02	,6952	,7784	,65	,87
	Total	34	,6973	9,387E-02	1,610E-02	,6646	,7301	,41	,87
Extent, procedural knowledge	No experience	24	,5363	,1149	2,345E-02	,4878	,5848	,29	,71
	Experience	10	,6677	,1386	4,382E-02	,5686	,7669	,35	,84
	Total	34	,5750	,1346	2,309E-02	,5280	,6219	,29	,84

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Accuracy, declarative knowledge	Between Groups	8,432E-05	1	8,432E-05	,005	,944
	Within Groups	,545	32	1,703E-02		
	Total	,545	33			
Extent, declarative knowledge	Between Groups	3,729E-02	1	3,729E-02	1,424	,241
	Within Groups	,838	32	2,618E-02		
	Total	,875	33			
Accuracy, procedural knowledge	Between Groups	2,209E-02	1	2,209E-02	2,631	,115
	Within Groups	,269	32	8,396E-03		
	Total	,291	33			
Extent, procedural knowledge	Between Groups	,122	1	,122	8,195	,007
	Within Groups	,476	32	1,488E-02		
	Total	,598	33			

Table 5. The Effect of Auditing Experience on Accuracy of Learning Outcomes for Increasing Intellectual Skills (H4)

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Accuracy, Concepts	No experience	24	,7487	7,627E-02	1,557E-02	,7165	,7809	,60	,87
	Experience	10	,7781	6,507E-02	2,058E-02	,7315	,8246	,67	,87
	Total	34	,7574	7,344E-02	1,259E-02	,7317	,7830	,60	,87
Accuracy, simple rules	No experience	23	,6478	,2485	5,183E-02	,5403	,7553	,00	1,00
	Experience	10	,7933	,1522	4,813E-02	,6845	,9022	,50	1,00
	Total	33	,6919	,2315	4,030E-02	,6098	,7740	,00	1,00
Accuracy, high order rules	No experience	21	,5072	,2325	5,073E-02	,4014	,6130	,00	1,00
	Experience	9	,6593	,1730	5,768E-02	,5263	,7923	,33	,90
	Total	30	,5528	,2249	4,105E-02	,4688	,6368	,00	1,00

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Accuracy, Concepts	Between Groups	6,095E-03	1	6,095E-03	1,135	,295
	Within Groups	,172	32	5,372E-03		
	Total	,178	33			
Accuracy, simple rules	Between Groups	,148	1	,148	2,918	,098
	Within Groups	1,568	31	5,056E-02		
	Total	1,715	32			
Accuracy, high order rules	Between Groups	,146	1	,146	3,090	,090
	Within Groups	1,321	28	4,716E-02		
	Total	1,466	29			

Table 6. The Effect of Auditing Experience on Extent of Learning Outcomes for Increasing Intellectual Skills (H4)

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Extent, Concepts	No experience	24	,7361	8,219E-02	1,678E-02	,7014	,7708	,60	87
	Experience	10	,7400	,1554	4,914E-02	,6288	,8512	,33	87
	Total	34	,7373	,1063	1,823E-02	,7002	,7743	,33	87
Extent, simple rules	No experience	24	,4931	,2713	5,539E-02	,3785	,6076	,00	83
	Experience	10	,6167	,2229	7,049E-02	,4572	,7761	,17	83
	Total	34	,5294	,2610	4,476E-02	,4383	,6205	,00	83
Extent, high order rules	No experience	24	,2625	,1740	3,552E-02	,1890	,3360	,00	60
	Experience	10	,5900	,2685	8,492E-02	,3979	,7821	,00	90
	Total	34	,3588	,2524	4,329E-02	,2708	,4469	,00	90

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Extent, Concepts	Between Groups	1,068E-04	1	1,068E-04	,009	,924
	Within Groups	,373	32	1,165E-02		
	Total	,373	33			
Extent, simple rules	Between Groups	,108	1	,108	1,612	,213
	Within Groups	2,141	32	6,689E-02		
	Total	2,248	33			
Extent, high order rules	Between Groups	,757	1	,757	18,010	,000
	Within Groups	1,345	32	4,204E-02		
	Total	2,102	33			