

# Expertise in accountancy : empirisch onderzoek naar de kennisontwikkeling van student tot ervaren accountant

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The first part of Chapter 1 describes the development of the auditing profession. At the beginning of the 20<sup>th</sup> century, an auditors main duties besides bookkeeping, were improving the updating of balance sheets and profit-and-loss accounts. Nowadays, one of the main duties of an auditor is to audit financial statements. He/she must determine whether the financial statements are stated in accordance with specified accounting principles (Arens & Loebbecke, 1994). In addition, auditors carry out audits regarding mergers and takeovers as well as giving advice on such matters as organisational structure, information supply, etc.

In this thesis, it is the main duty of auditors i.e. the audit of financial statements which is the object of study. It must, however, be noted that especially the first phase of the auditing process which forms the context upon which and in which the subjects in the current empirical studies acted.

The second part of Chapter 1 lists the various courses or curricula which can be followed in order to become a certified auditor (Registeraccountant). The HEAO (School of Higher Economic Administrative Education) course comprises, in fact, only a part of the necessary training or education. To become a certified auditor, these students must continue their training for further six years at the NIVRA-Nijenrode university or for at least a further three years at a 'regular' university. The NIVRA-Nijenrode university auditing course is a part-time course open to students already working in this field. These students attend the course one day a week for an average of eight years. Students attending the full-time auditing course at a 'regular' university need approximately six years to become a certified auditor. Only in the last two years of their course, will they gain practical experience.

In 1962 a Law of Auditors (Wet op de Registeraccountants) prescribed that the students attending the NIVRA-Nijenrode University (then NIVRA students) and those attending a 'regular' university sit the same national examination. The overview in Chapter 1 of the auditing courses i.e. curricula shows that the curricula of the NIVRA-Nijenrode University and the 'regular' universities are almost identical. One essential difference between the two types of universities is, however, the amount of practical experience gained. Students of the NIVRA-Nijenrode University have, on

average, seven to nine years of practical experience before receiving the title 'Registered accountant', whereas students attending a 'regular' university have, on average, one to two years of experience before receiving this title. As both groups use the same title, they must be regarded as equal. However, the question arises as to whether auditing students who acquire both theoretical knowledge and practical experience from the outset and students who gain practical experience only after four years of theoretical training really can be considered equal.

On the basis of literature and empirical studies, this thesis examines the role of practical experience i.e. expertise in the auditing field.

Chapter 2 looks at what is known in literature about the influence of expertise in the auditing field. Several mainstreams are presented: studies based on Brunswik's Lens model, heuristic studies, cognitive reasoning studies and studies which examines the relationship between the level of expertise and knowledge and the structure of knowledge.

Researchers who examined auditing expertise from the perspective of the Brunswik Lens model tried to discover if there was a positive relationship between the level of expertise and a certain number of aspects they believed to be important to an auditor's judgment, these being: consensus, stability, accuracy and self-insight. The findings of most studies based on the Lens model could, however, barely confirm the expected relationship between the level of expertise and consensus, stability and self-insight. A positive exception was the accuracy of the final judgment. This variable was found to be positively related to the level of expertise. However, how the final judgment was come to was difficult to establish on the basis of the Lens studies.

In the eighties the relationship between the level of expertise and the use of heuristics was examined. Frederick and Libby (1986) carried out a number of experiments which examined the relationship between the level of expertise and the use of heuristic 'representativeness'. This heuristic means that a judgment is formed based upon the correspondence of something or someone with a prototypical case. Results of these experiments confirmed Frederick's and Libby's expectations. Experts based their judgements about new information on similarities with prototypical cases, whereas inexperienced auditors did not.

In the eighties, auditing researchers also became interested in the reasoning process. The founders of this research paradigm were Newell and Simon (1972). Einhorn and Hogarth (1981) developed a model, based

upon the problem solving model of Newell and Simon, wherein the reasoning process was subdivided in four phases: information acquisition, evaluation, action and feedback. Several studies have been carried out examining the relationship between the level of auditing expertise and the reasoning process. Bouwman (1978, 1984), for instance, examined the differences in reasoning between experienced and inexperienced auditors when making financial analyses. Biggs, Mock and Watkins (1988) researched if there were differences in the reasoning process during the pre-planning phase of the audit. Also, Libby and Frederick (1990) and Bedard and Biggs (1991) carried out studies examining the relationship between the level of expertise and the reasoning process. The results indicated that experienced and inexperienced auditors differed in the way they reason. However, the results obtained were not unequivocal. Bouwman's results indicated that the groups differed qualitatively in the reasoning phase whereas Biggs et al. (1988) found qualitative differences in the information acquisition phase but not in the reasoning phase.

Since the beginning of the eighties, studies have also been carried out in several domains examining the relationship between the level of expertise and knowledge and knowledge structures. These studies provided some consistent results. Findings indicated that experts had more domain knowledge than non-experts. Moreover, an expert's domain knowledge appeared to be structured differently than that of novices. Furthermore, the processing time was found to be related to the level of expertise. A model which might explain the results obtained is the model wherein knowledge is represented as a conceptual knowledge network. In the former, concepts represent the features of an idea or a fact. The links between the concepts represent the relationship between ideas or facts. In addition, it is assumed that there is not just one conceptual network but many. It is claimed that each (sub)domain of knowledge has its own conceptual knowledge network (Boshuizen, 1995; Feltovich & Barrows, 1984). Just as there are links between concepts, there are links between the different knowledge networks. The assumption is, now, that the more experience someone has, the more concepts a person will have and the larger the number of links there will be *within* a conceptual network and *between* the different conceptual networks.

The relationship between the level of expertise and differences in knowledge and knowledge structures has been researched in the auditing field since the middle of the eighties. The amount of knowledge and structure of knowledge has been researched by Choo and Trotman (1991),

Christ (1993), Frederick (1991), Frederick, Heiman-Hoffman and Libby (1994), Moeckel (1990), Rennie (1991), Tubbs (1992), amongst others. The amount of knowledge and structure of knowledge has mostly been examined by means of the 'recall method'. This method assumes that subjects with an extensive knowledge network have more possibilities to relate new information to existing concepts in the network and are, therefore, better able to recall new relevant information than subjects who have a less extensive knowledge network. Experts of whom it is expected that they have more domain knowledge should, therefore, be able to recall more new relevant information than novices. Results indicated that expert auditors indeed had a more extensive recall than novice auditors. In addition, expert auditors also produced more meaningful clusters in their recall than novice auditors. A study by Christ (1993) showed that expert auditors did not only recall more information, but they also recalled different types of information. Experts recalled, for instance, significantly more financial information than novices whereas with regard to the information concerning the internal control procedures there was no difference in recall.

The expertise studies in the auditing domain thus far presented have produced some quite interesting results. The relationship between auditing expertise and the amount and organization of recall have, for instance, been consistently positive. Another interesting finding was the relationship between auditing expertise and the type of knowledge. However, there has been only one study which has examined this thus far. Furthermore, there has been little or no research as to the way this knowledge develops between the stages inexperienced students to experienced students. Also, the registration of processing time has been neglected in the auditing field. In addition, there have only been two studies which have examined the relationship between auditing expertise and the *application* of knowledge. A final criticism concerns the reticence in making practical suggestions to auditing education and auditing practice.

In response to these shortcomings, three studies were carried out in this thesis using diverse research methods as recall, thinking aloud and knowledge assessment. These empirical studies were carried out so as to find answers to the following research questions. first, what is the influence of practical experience on the development of a conceptual knowledge network? Second, do expert auditors have more domain

knowledge than less experienced auditors? Third, are expert auditors better able to apply their domain knowledge than less experienced auditors? Is there a relationship between auditing expertise and type of knowledge? Finally, does expertise affect the speed of information processing?

In the first study (Chapter 3), the relationship between the level of expertise and the application of knowledge was examined. In other words, it was expected that expert auditors were better at indicating initial audit issues i.e. certain points of particular interest for a company in light of a possible audit than less experienced auditors. In addition, the relationship between the level of expertise and size and content of the knowledge representation was examined using the 'recall method'. It was expected that experts and non-experts would differ in the type of knowledge they use. The final research question in this particular study was about the relationship between the level of expertise and processing time. Forty subjects of five levels of expertise participated: first year economy students; fourth year auditing students; postgraduate students who had followed the auditing curriculum at a 'regular' university with 2,5 years of experience (postgraduate university students); postgraduate NIVRA<sup>30</sup> students who had followed the part-time NIVRA program with seven years experience. The fourth group consisted of expert auditors with twelve years of experience. The subjects were presented three auditing case studies in which two types of information were given i.e. information about the internal control procedures and a summary of a financial statement. After having studied a case, they first had to indicate initial audit issues i.e. which points could be of particular interest in light of a possible audit. A second task was to write down everything they could recall of the case. Results showed that the four groups did not differ in their application of knowledge about the internal control procedures. On the other hand, groups differed considerably in their application of financial knowledge. Fourth-year students with no experience and postgraduate students with two and a half years' experience only applied knowledge about the internal control procedures. The intermediate NIVRA students with seven years' experience and the expert auditors, on the other hand, applied not only knowledge about the internal control

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<sup>30</sup> NIVRA stands for the Netherlands Institute of Registeraccountants (Certified Public Accountants). Students who follow this educational program work four days a week and spend one day a week at school for five to ten years.

procedures but also financial knowledge. The NIVRA students tried to integrate knowledge about internal control procedures with financial knowledge. The experts integrated knowledge about internal control procedures with financial knowledge and typical business knowledge. However, these differences in application of knowledge did not lead to differences in literal recall of the information presented. Nonetheless, the groups differed significantly in the amount of inferred recall. The NIVRA students and the experts, in particular, made significantly more inferences<sup>31</sup> in their recall than the less experienced groups. The time subjects took to process the case information was inversely U-related with the level of expertise. That is to say, fourth year students and experts were faster in reading the case information than the two intermediate groups.

A subsequent study (Chapter 4) was conducted to find out whether the relationship observed between the level of expertise and the use of *financial* knowledge could be confirmed with another method: the thinking aloud method. We, also, expected to find the level of expertise and the size of the knowledge representation to be positively related. A further expectation concerned the relationship between the level of expertise and the complexity of the representation. In this second study, 16 subjects participated: fourth year auditing students with no experience; postgraduate university students with an average of eight months' experience; postgraduate NIVRA students with five years' experience and expert auditors who had twelve years' experience. Subjects had to think aloud whilst going through a financial statement of a contracting firm. All subjects received two different cases. Afterwards, they had to indicate the initial audit issues i.e. which points could be of particular interest in light of a possible audit. Results indicated that with regard to the audit issues, there were large differences between the two rather inexperienced groups and the more experienced NIVRA students and the experts. For example, the fourth year students with no experience indicated two issues, on average, whereas experts indicated five. Also, the size and complexity of the representation seemed to be positively related to the level of expertise. The fourth-year students and the postgraduate university students hardly tried to link financial figures to each other whereas experts linked at least six. Furthermore, results indicated that

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<sup>31</sup> Inferences stand for correct conclusions and interpretations

the inexperienced students linked only financial figures together if listed closely together, while the more experienced groups also linked financial figures listed further apart. Moreover, the experts linked not only financial figures to each other but also to the characteristics of the specific type of company. The relationship between the level of expertise and time to process the case information was found to be inversely U-shaped, as in the first study .

Thus, despite fourth year and postgraduate students completing all the relevant financial courses such as Bookkeeping, Financial Accounting and Financial Information Systems, they do not use this prior knowledge in an auditing task. The question that then arises is, have these students lost their financial knowledge or is it a matter of 'inert' knowledge i.e. knowledge that is applied only to situations similar to those used in the curricula. In the first and second empirical study described in this thesis, 'inert' knowledge could have been caused by a difference in context of the audit task given to students with that of the courses in the auditing curricula. The failure of students attending the auditing curricula at a 'regular' university to apply financial knowledge to an auditing task could lie in the fact that they are especially trained to apply knowledge about internal control procedures to an auditing task and there is no specific course which integrates financial knowledge with auditing tasks.

The third and final study (Chapter 5) examines if the results obtained in the previous two studies is caused by a lack of financial knowledge or by a difficulty in using financial knowledge in a specific context. In addition, this study examines if the level of expertise and the number of references to characteristics of the type of business is positively related. Finally, the relationship between the level of expertise and the processing time is examined. Again, subjects of four levels of expertise participated in this study: fourth year auditing students, postgraduate university students, postgraduate NIVRA students and expert auditors. In total, 106 subjects participated. Subjects received a financial statement and had to answer ten questions about specific relationships between the financial figures in this statement. Results indicated that, in correspondence with the previous studies, inexperienced fourth year students have difficulties in applying financial knowledge. Yet, when these fourth year students followed a course in which they learned how to apply their financial knowledge in an auditing context, they performed much better on the assessment than when they



had not attended such a course. The postgraduate university students performed better on the assessment than both the fourth year groups. However, the performance was only slightly better than the fourth year group which had followed the specific financial auditing course. The NIVRA students had the highest score on the assessment. The expert auditors answered less extensive than expected. They gave terse answers and often referred to answers on corresponding questions. Taking into account the processing time, it seemed that a number of experts completed the test in a very short period of time which could explain the rather low score on the assessment. A final result indicated that expert auditors mentioned much more specific business facts in their answers than the less experienced groups.

In the last chapter (Chapter 6) the previous chapters are summarised. After this summary, several conclusions are drawn. The first conclusion concerns the research question of the influence of practical experience on the development of a conceptual knowledge network. Results suggested that fourth year students without specific training in the application of financial knowledge do have a rather extensive and complex knowledge network of internal control procedures, but that their financial knowledge network is much less extensive and complex. However, when these fourth year students attend specific training in financial skills, it appears that their financial network becomes larger with more links between the concepts than the students who did not follow training in financial skills. The knowledge networks of the postgraduate university students seem to be more extensive and more complex than the networks of the fourth year students. These intermediate students seem to have only some links between the financial network and the internal control network. Results indicate furthermore that the postgraduate NIVRA students not only have a more extensive and complex internal control network than the less experienced groups but also their financial network is more extensive and complex than the networks of the less experienced groups. Moreover, these NIVRA students seem to have many more links *between* the networks than the less experienced students. The expert auditors appear to have the largest number of links between the knowledge networks. It seems that experts not only have a large number of links between the financial network and the internal control network, but that they also have links to a knowledge

network in which characteristics of different types of businesses are represented.

Thus, the results from the current studies indicated that level of expertise is positively related to the size of the knowledge networks. Secondly, expertise was positively related to the complexity of the networks. That is, the level of expertise was positively related to the number of links within and especially between the different networks. A third finding was that the expert auditors indicated more and better audit issues than the less experienced auditors. Yet, in the assessment study, expert auditors did not perform better than the less experienced groups, although their answers were more specific than the answers of the less experienced groups. Another finding was that level of expertise was significantly related to knowledge of types of businesses. A final result showed that expert auditors and fourth year students were faster in information processing than the two intermediate groups.

Also, for the studies in this thesis some shortcomings can be pointed out. For example, the ecological validity is somewhat limited: in real life an auditor's job is more than just preplanning an audit. Furthermore, subjects in the current studies were acting alone, while in practice they work in teams.

The last chapter ends with a paragraph about implications for practice and education. Although the auditing curricula are being innovated considerably at the moment, some recommendations might still be appropriate. The first recommendation is, give graduate students the opportunity to apply theoretical knowledge to realistic cases from the beginning of the course. A second recommendation concerns the application of financial knowledge. The advice is to integrate financial knowledge with auditing problems. For instance, teachers can integrate courses like Financial Bookkeeping or Financial Management with a course like Theory of Auditing. The recommendation for teachers in the postgraduate course is: try to match auditing theories with practical situations students are confronted with at that moment.