

Master Thesis Organizational Design and Development  
Radboud Universiteit Nijmegen – Nijmegen School of Management

**AMO (ability, motivation, and opportunity)  
and the development and/or acquisition of the  
key qualifications carpentry students need during  
their period of work experience**

Date: 25-01-2017

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## Abstract

Since the 80's, changes in the labor market led to a shift in demand for the type of qualifications an employee needs. There is a growing demand for employees that possess generic qualifications such as the ability to work together or the ability to identify and solve problems. These generic qualifications (for example key qualifications) are broadly applicable and enable an employee to adapt to changes. Generic qualifications, together with specific qualifications (skills that can only be used in a limited number of tasks), make up an individual's work performance. The study of this master thesis focuses solely on the development and/or acquisition of generic qualifications as it uses key qualifications to express work performance. Vocational education plays an important role in the development and/or acquisition of student's key qualifications. However, during the period of work experience, carpentry students of the ROC Nijmegen seem not always to perform according to the demands of their future employers. There seems to be a gap between the key qualifications that the carpentry students have and the key qualifications demanded by their future employers. Therefore, the research of this master thesis gives insight into the key qualifications carpentry students need to develop and/or acquire in order to perform well during their period of work experience. Furthermore, the research of this master thesis uses the AMO-framework (Hughes, 2007) to indicate which factors such as ability, motivation, and opportunity form a barrier or facilitate the development and/or acquisition of the carpentry student's key qualifications. The research question of this master thesis is: do carpentry students develop and/or acquire the key qualifications they need during their period of work experience and what is the influence of ability, motivation, and opportunity?

Ten semi-structured interviews with four second year and six third year carpentry students, and six semi-structured interviews with representatives of the organizations the carpentry students work in were conducted. Results showed that carpentry students need to develop and/or acquire a wide variety of key qualifications (see table 4.1, p. 61) from the general-instrumental dimension (for example, basic occupational knowledge), the cognitive dimension (for example, learning to learn), the personal dimension (for example, self-confidence), the socio-communicative dimension (for example, the ability to work together), the socio-normative dimension (for example, complying with safety measures), and the strategic dimension (emancipatory behavior), during their period of work experience. The most interesting finding is that, according to the representatives of the organizations, the carpentry students do not display and are unaware of the importance to develop and/or acquire the key qualifications of the socio-normative dimension and the key qualification learning to learn (table 4.1 p. 61). Furthermore, results regarding the AMO-framework showed which factors form a barrier or facilitate the development and/or acquisition of the carpentry student's key qualifications (see table 4.2, p. 62).

# Content

<b>List of abbreviations</b> .....	4
<b>Preface</b> .....	5
<b>1. Introduction</b> .....	6
1.1 Goal and research question .....	8
1.2 Theoretical and practical relevance .....	10
1.3 Research design .....	10
1.4 Outline .....	11
<b>2. Theory</b> .....	12
2.1 Developments in the labor market and the transition from school to work .....	12
2.1.2 Key qualifications for vocational education .....	16
2.1.3 Components of professional competence for vocational education .....	20
2.1.4 21 <sup>st</sup> Century skills.....	23
2.1.5 Key qualifications as a measure of work performance.....	26
2.2 AMO-framework .....	26
2.2.1 Ability .....	27
2.2.2 Motivation .....	28
2.2.3 Opportunity .....	30
2.3 Research framework .....	31
<b>3. Methodology</b> .....	33
3.1 Research approach .....	33
3.2 Operationalization.....	34
3.3 Selecting interviewees .....	34
3.4 Data collection .....	38
3.5 Data analysis.....	38
3.6 Reliability & Validity .....	39
3.7 Research ethics .....	40
<b>4. Results</b> .....	41
4.1 Key qualifications.....	41
4.2 AMO-framework .....	50
4.2.1 Ability .....	51
4.2.2 Motivation.....	54
4.2.3 Opportunity .....	55
4.3 Summary of results.....	59
<b>5. Conclusion and discussion</b> .....	64
5.1 Conclusion .....	64
5.2 Limitations and strong points of the research .....	74
5.3 Implications for further research.....	76
5.4 Recommendations.....	77
<b>References</b> .....	80
<b>Appendix 1:</b> Organizational structure: partnership De Technische and ROC Nijmegen .....	84
<b>Appendix 2:</b> Operationalization of key concepts .....	85
<b>Appendix 3:</b> Interviewvragen voor de studenten (in Dutch) .....	92
<b>Appendix 4:</b> Interviewvragen voor de vertegenwoordigers van de bedrijven (in Dutch).....	96
<b>Appendix 5:</b> Code trees and list of codes .....	99

## List of abbreviations

<b>Abbreviation</b>	<b>Explanation</b>
AMO	Ability, motivation, opportunity framework
ATCS	Assessment and Teaching of 21 <sup>st</sup> Century Skills
BBL	Basic vocational program (in Dutch: Beroeps Begeleidende Leerweg) in which students spend four days a week at work and one day a week at school
MBO	Intermediate vocational education (in Dutch: middelbaar beroepsonderwijs)
NAEP	Technological Literacy Framework for 2012 National Assessment of Educational Process
NETS	National Education Technology Standards
P21	Partnership for 21 <sup>st</sup> Century Learning
ROC	Regional education center

## Preface

In September 2015 I started with my Master Organizational Design and Development at the Radboud University. Now, approximately one year later, my master thesis ‘AMO (ability, motivation, and opportunity) and the development and/or acquisition of the key qualifications carpentry students need during their period of work experience’ lies before you. I would like to use this space to express my gratitude to the persons who have helped me to realize this master thesis.

First of all, I would like to say a special thanks to my supervisor, Dr. S.J. van Zolingen, who has helped me through the process of writing my master thesis. With her sharp feedback and patience throughout the whole process she has helped me with her expertise to reflect on my own writings and ideas. I have enjoyed our meetings; in which she has been a great discussion partner. She was always there when I needed advice. Without her guidance I would not have been able to write this master thesis.

Secondly, I would like to thank my family and friends who have helped me through the ups and downs that came with writing this master thesis. Thank you all for being there when I needed your support.

Thirdly, I would like to thank the ROC Nijmegen for the opportunity to do the research of this master thesis within their organization. A special thanks to the carpentry students and the representatives of the organizations who have participated in the interviews. I have learned a lot from all of them and I enjoyed conducting the interviews.

A year of hard work and dedication resulted in the text you are now about to read. I hope you will enjoy reading my master thesis.

Kind regards,

Claudia Meeuwsen

## 1. Introduction

Since the 80's the type of qualifications an employee needs according to employers is continuously changing due to developments in the labor market such as globalization, the internationalization of economy and business, and changing customer demands. Customers, for example, want higher quality products (Hövels, Visser & Schuit, 2006, Van Zolingen, 1995). These developments cause more competition between organizations. Further, organizations faced innovation, automation and restructuring of jobs consequent on technological developments. Also organizational structures became more flat. In these flatter organizations, jobs became more complex which made it difficult for employers to indicate what qualifications employees need in the future (Van Zolingen, 2002). Before these changes, a job often demanded an employee with specific qualifications. A specific qualification is a skill that can only be used in a limited number of tasks (Van der Velden, 2011). Since organizations changed and jobs became more complex, employees needed broad generic qualifications. Generic qualifications are skills that are applicable in a broad range of contexts (Van der Velden, 2011, Van Zolingen, 1995). An employee for example has to be able to work together, to solve problems, to show a critical attitude, and to possess general technical knowledge. These generic qualifications are applicable in different situations, which allows the employee to adapt quickly to changes (Van der Velden, 2011). It is, however, difficult for employers to find employees who possess these generic qualifications. Due to this, there is a risk that problems regarding the transition between school and work keep getting worse. In order to reduce these problems, there is a growing consensus about the necessity for vocational students to acquire generic qualifications (Van Hoof, 1998, Hövels et al., 2006, Kyndt et al., 2014). Throughout their whole career, employees need these generic qualifications to respond flexibly and effectively to changes (Van Zolingen, 2002). The role of vocational education therefore, is to provide their students with broad expertise and the generic qualifications they need to perform well in their occupation (Hövels et al., 2006). Opinions, however, are strongly divided about what these generic qualifications are. According to Clayton et al. (2003, in Kyndt et al. 2014) "across countries the terminology used to refer to such generic competencies differs: from 'key competencies' or 'employability skills' in Australia to 'core skills' in the United Kingdom or 'employability skills' or 'workplace know-how' in the United States" (p. 366). In the Netherlands there is also a range of concepts to refer to these generic qualifications such as 'key qualifications' (Van Zolingen, 1995), 'competences' (Onstenk, 1997), or '21<sup>st</sup> century skills' (Thijs, Fisser & van der

Hoeven, 2014). Even though all these different terminologies are used all over the world, there is consensus about the growing demand for these generic qualifications (Hövels et al., 2006, Kyndt et al, 2014).

Schools have an important role in the development of vocational students' generic qualifications that contribute to how these students perform in their future occupation (Van Zolingen, 2002). Vocational education provides students with the opportunity to develop their generic qualifications in practice as their education includes a period of work experience. This period of work experience contributes to the development of how a vocational student performs and learns in his<sup>1</sup> occupation (Billet, 2001). Work performance can be seen as behavior associated with the accomplishment of expected, specified, or formal role requirements of individual organizational members (Campbell, 1990). Both specific and generic qualifications constitute an individual's work performance (Van der Velden, 2011). During the period of work experience, the vocational student has to improve his work performance by developing his specific and generic qualifications. The degree to which he is able to improve his work performance relies on his abilities (A), his motivation (M) and the opportunities he receives (O) (Hughes, 2007). The influence of these three factors is captured in the AMO-framework, which explains that the work performance of an individual can be influenced by his abilities, his willingness to do something, and by the opportunities he receives (Siemsen, Roth, Balasubramanian, 2008). Figure 1.1 shows a preliminary framework which uses the concepts of the AMO-framework that is further developed in the research of this master thesis (Chapter 2).

The ROC Nijmegen is a vocational school in the Netherlands with more than 200 study options in the region of Nijmegen and Boxmeer. Due to changes in the labor market discussed before, the school noticed a growing demand for broadly educated and motivated employees in the technical sector and faces challenges regarding the contacts between school and work. In order for the school to be able to better communicate with the technical industry, it initiated a partnership with the local industry. A reason for that was that the school believed that no one knows the demands of the industry better than the organizations themselves. Therefore, the ROC Nijmegen started a partnership with 'De Technische', which is a business school for craftsmanship that consists of several training companies in the industry namely Bouwmensen Nijmegen, Schilder'sCOOL, and InstallatieWerk. By organizing education together, the ROC Nijmegen and the local industry hope to reduce the problems concerning

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<sup>1</sup> The research of this master thesis does not exclude the possibility of a vocational student being female, however, in the case of this master thesis all vocational students were male.

the interface between school and work. This is necessary according to the local industry, as they are concerned that the number of adequately qualified employees will not be sufficient in the future. The organizational structure of the partnership between the ROC Nijmegen and ‘De Technische’ is displayed in Appendix 1.

The partnership is responsible for organizing education for the carpentry education, the painting education, the electrical installation education and the mechanic installation education. Carpentry is one of these four educations in which the ROC Nijmegen and ‘De Technische’ face the challenge to reduce the problems regarding the transition from school to work as mentioned before. The main goal of the partnership therefore, is to educate broadly qualified students who can meet the demands of the current industry. Within the period of work experience, the future employers and the carpentry students try to develop the generic qualifications of the students in such a way that they can easily make the transition to the labor market.



*Figure 1.1 Preliminary framework based on the AMO-framework*

## 1.1 Goal and research question

The aim of this master thesis is to provide insight into the key qualifications that carpentry students need to develop and/or acquire during their period of work experience and how this process is influenced by ability, motivation, and opportunity, in order to improve the

transition from school to work for carpentry students. The research question of this master thesis is:

*Do carpentry students develop and/or acquire the key qualifications they need during their period of work experience and what is the influence of ability, motivation, and opportunity?*

The sub questions of the research of this master thesis are:

1. Which key qualifications do the carpentry students mention they need to perform well during their period of work experience?
2. Which key qualifications do the representatives of the organizations mention the carpentry students need to perform well during their period of work experience?
3. What are the differences and similarities between the key qualifications that the carpentry students and the representatives of the organizations mentioned that the carpentry students need to perform well during their period of work experience?
4. Which key qualifications do the carpentry students mention they have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
5. Which key qualifications do the representatives of the organizations mention the carpentry students have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
6. What are the differences and similarities between the key qualifications the carpentry students and the representatives of the organizations mentioned that the carpentry students have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
7. Do the abilities of the carpentry students act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?
8. Does the motivation of the carpentry students act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?
9. Do the opportunities the carpentry students have act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?

## 1.2 Theoretical and practical relevance

The theoretical relevance for the research of this master thesis can be found in the knowledge that is gained by expressing work performance in the AMO-framework in terms of key qualifications (Van Zolingen, 1995). Also, the research of this master thesis gives insights into which key qualifications are important in the occupation of a carpenter.

The practical relevance for the research of this master thesis can be found in new knowledge for the transition from school to work. As mentioned before, there is a consensus that it is necessary for vocational students to acquire generic qualifications in order for them to be able to respond flexibly and effectively to changes in the workplace (Van Zolingen, 1995, Onstenk, 1997, Thijs et al. 2014). If the research of this master thesis is able to find which generic qualifications are important for carpentry students to develop and/or acquire, the school can better align its education to the demand of the industry. By doing so, the transition from school to work for carpentry students can improve.

## 1.3 Research design

In order to be able to answer the research question a research design (figure 1.2) is made in which the steps of the research of this master thesis are displayed. In the first phase (1) there are two activities that contribute to the knowledge gathering for the research of this master thesis. In the first place, a scientific literature study about the topic is done. The literature study elaborates on the transition from school to work and compares different interpretations of generic qualifications and it describes the AMO-framework.

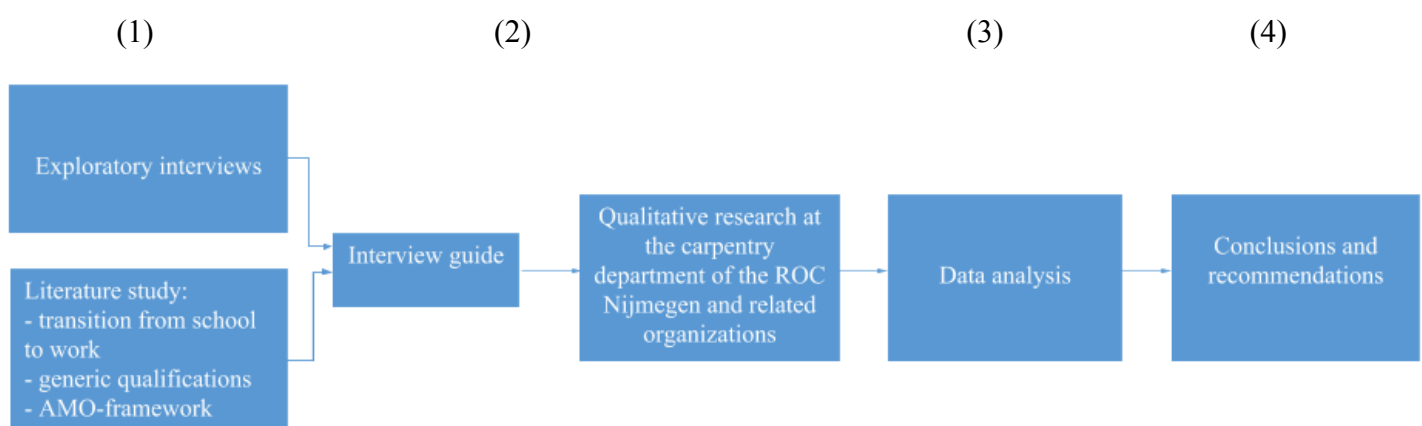


Figure 1.2: Research design

In the second place, some exploratory interviews are done with the manager of the ROC Nijmegen and with some carpentry teachers. These interviews contribute to the formulation of the problem at hand. In the second phase (2) a qualitative research at the ROC Nijmegen and at the organizations in which the carpentry students work in is conducted. In this phase semi-structured interviews based on the literature are done with second and third year carpentry students and with representatives from the organizations. After data collection, the data is analyzed in the third phase (3) of the research of this master thesis. Finally, based on the data analysis, in the fourth phase (4) the research of this master thesis draws conclusions and gives recommendations to the ROC Nijmegen.

#### 1.4 Outline

The second chapter discusses the theory of this master thesis. It elaborates on the role of generic qualifications and it compares different interpretations of generic qualifications. Furthermore, the second chapter elaborates on the AMO-framework and presents the conceptual model of the research of this master thesis. The third chapter discusses the methodology of this master thesis, as it describes which data collection and data analysis methods are used. The fourth chapter reports the results and gives answer to the research question. The final chapter, chapter 5, presents the conclusion and discussion, the limitations and implications for further research and the recommendations. The final chapter also reflects on the research of this master thesis.

## 2. Theory

This chapter focuses on the theory of this master thesis. First, the growing importance of generic qualifications is discussed. Second, this chapter compares three interpretations of generic qualifications, namely key qualifications (Van Zolingen, 1995), components of professional competence (Onstenk, 1997) and the 21<sup>st</sup> century skills (Thijs et al., 2014). The emphasis in this comparison is on the key qualifications described by Van Zolingen (1995), as these key qualifications are used to express work performance in the research of this master thesis. Third, the concepts of the AMO-framework, ability, motivation, and opportunity and the influence of these concepts on the development and/or acquisition of key qualifications are elaborated on (Blumberg & Pringle, 1982, Billet, 2001). Finally, the research framework of this master thesis is displayed (Figure 2.1).

### 2.1 Developments in the labor market and the transition from school to work

The role of vocational education is to prepare students for positions within the labor system (Van Zolingen, 1995). Alignment between vocational education, the labor market and the labor system is important to support the stream of students moving from school to work. However, the relation between supply and demand of school and work knows a variety of problems.

There are three structural resources that cause problems in this relationship (Hövels, 1985 in Van Zolingen, 1995).

In the first place there is a structural-technical resource. This resource causes tension due to the separation of education as a distinct system. Education is no longer part of the labor system, which causes differences in the way that education is structured compared to the labor system. Because of this separation, the education system responds late to changes in the labor system which causes discrepancies to occur as students do not possess the right skills needed for a certain job due to the outdated skills they learn at school. Schools struggle to qualify their students for a variety of jobs within the labor system.

In the second place there is a structural-political resource. This resource causes tension due to the different roles vocational education fulfills. Next to the function to qualify students for their future occupation, schools also fulfill a pedagogical and societal function as they support the social, cultural and personal development of students. Education therefore has to provide students with a variety of skills that go beyond the specific qualifications needed to do their job. This means for example that a carpentry student does not only learn how to build

a house but he also learns how to cooperate in a group. This second qualification, cooperating in a group, goes beyond the specific technical qualifications needed to be a carpenter. These type of qualifications are called redundant qualifications. These redundant qualifications do however have potential significance for the development and performance of an employee.

In the third place there is a structural-distributive resource. This resource causes tension because of the selection and allocation function the education system has. The education system selects students for different valued positions, by which it legitimizes existing social relations.

The three structural resources mentioned cause problems in the transition from school to work for both employers and employees. Table 2.1 shows four types of transition problems that can exist between school and work (Van Hoof, 1987 in Van Zolingen, 1995, p.61).

*Table 2.1: Problems related to the transition from school to work (Van Hoof, 1987 in Van Zolingen, 1995, p.61)*

<b>View</b>	<b>Place</b>	
	Labor market	Work
Employers	Personnel provision problems	Qualification problems
Employees	Distribution problems	Utilizing problems

There are two types of transition problems that employers have to deal with, namely personnel provision problems and qualification problems.

Personnel provision problems are concerned with difficulties regarding personnel provision when trying to fill in jobs. When this problem occurs it means that an employer cannot find employees on the labor market who are suited for the job. In the 80's for example, employers could not find employees to fill in jobs that requested specific IT knowledge which caused problems in the personnel provision.

Qualification problems arise when there is a discrepancy between the required and the available qualifications at the labor market. This means that an employer cannot find employees who have the suitable qualifications for the job, as required by the organization. The employees have to deal with two other types of transition problems, namely distribution problems and utilizing problems.

Distribution problems occur when an unemployed person cannot find a job that suits his ability. This means that an employee in the labor market cannot find a job that

corresponds with the content of his education. This problem can force an employee to fulfill a job that is below his abilities and knowledge. This can cause a technician for example to work as an assistant technician as there is no job available in the function for a technician in the labor market.

Utilizing problems occur when the qualifications of an employee are not fully utilized. This means for example that an assembly line worker has much more qualifications than just being able to wrap a paper around a product, but these qualifications are not being utilized by his employer. This is described as underutilization.

In order to deal with these transition problems, two strategies are presented as ideal types by Van Hoof (1987 in Van Zolingen, 1995).

The first strategy is the naïve approach, in which the idea is to have a direct connection between the education and labor system. The solution for the different connection problems in this strategy is based on a continuous detailed reconciliation of the quantity and quality of school graduates. This approach is not realistic, as continuous reconciliation between two large systems, like the education and labor system, is difficult. A change in the labor system does not immediately cause a change in the education system, which in this approach causes an endless circle of late responsiveness.

The second strategy is the flexible approach, which was developed from the beginning of the 70's. This strategy supposes an interaction between the education system and the labor system. By giving a less specialized and more general character to vocational education, the goal of this strategy is to educate flexible employees who possess a set of generic qualifications which are applicable in a variety of situations.

The case of this master thesis, schooling in carpentry, deals with a qualification problem. This means that there is a discrepancy between the required qualifications by future employers of the carpentry students and the available qualifications that the carpentry students possess.

### 2.1.1 Developments in vocational education: the WEB and generic qualifications

The reconstruction period of the 50's and the 60's was characterized by economic growth, which caused an expansion of industrial business (Van Zolingen, 1995). In this period there was a growing demand for well-educated employees. This period of rapid growth was followed by an economic recession which started in the late 80's. Due to this economic recession, a small number of workplaces was available for vocational students to learn within organizations (Hövels et al., 2006). At the same time organizations complained about students

who graduated from vocational education, as they could not meet the demands of the industry which was due to the changes in the labor market discussed before in paragraph 2.1 (Van Hoof, 2007). At that time, the Advisory Committee Wagner (1983) stressed the need for a shared responsibility of the government, the education system, and the labor system about the way that vocational education should be designed. In a national consultation between the government, the education system, and the labor system the involved parties agreed to share responsibility and to incorporate the interests of all parties involved in the design of vocational education. Because of this collaboration, the transition from school and work should improve. A few years later, all different parties concerned e.g. the government, the education system and the labor system agreed that vocational students had more job opportunities if they were broadly educated and acquired general qualifications, so that they could adapt themselves continuously to changes. This viewpoint corresponds with the flexible approach (paragraph 2.1).

The three parties mentioned before needed to interact structurally to give vocational education a more general character in order for vocational students to acquire generic qualifications (paragraph 2.1). As a result of these developments, a debate about the policies regarding vocational education occurred and a new institutional framework which was captured in the Education and Vocational Training Act was developed in 1995 (in Dutch: Wet Educatie en Beroepsonderwijs, 1995). In this act, the three involved parties mentioned above, developed a national qualification structure for vocational education. The qualification structure specified what vocational students should learn in the various disciplines of vocational education (Hövels et al., 2006). By doing so, the gap between the demanded qualifications in the industry and the qualifications offered by students of vocational education should be reduced. The involved parties established learning outcomes for each vocational discipline to which each curriculum was adjusted. By establishing curricula based on these learning outcomes which were created by both schools and organizations, connections between school and work should improve (Hövels et al., 2006).

Recently (SBB, 2016), the national qualification structure for vocational education has been revised. The goal of the revision was to further broaden the qualification structure in order for the schools and the labor market to better align school to work. Furthermore, the number of qualifications is reduced in order for vocational education to respond more flexibly to changes in the labor market.

The qualification structure also developed four levels in vocational education which were based on the domain of a function and on the level of professional practice (Van Hoof,

2007). The first level (in Dutch: MBO niveau 1), the lowest level, is the level of the assistant. The assistant can manage simple tasks. The basic professional practitioner is the second level (in Dutch: MBO niveau 2), which focuses on the management of a large range of executive tasks. The third level (in Dutch: MBO niveau 3) is the skilled worker. This worker can independently perform activities that belong to its profile. The fourth level (in Dutch: MBO niveau 4), the highest level, is the level of the middle manager or specialist. In this level work is done fully independent and is associated with management tasks and specialization. The qualification structure presents the learning objectives for each level. The carpentry students in the research of this master thesis are being educated to perform at the third level.

As we have seen in previous paragraphs, besides knowledge about the content of an occupation, schools should also provide students with generic qualifications, such as social and cultural skills and skills to learn to learn that they need to participate in the business community and the society as a whole (Van Hoof, 2007). As a student needs these generic qualifications in order to behave and perform as the industry demands, the research of this master thesis uses these generic qualifications to express work performance. The next paragraphs describe and compare three different interpretations of generic qualifications. First, the key qualifications for vocational education are discussed (Van Zolingen, 1995). Second, the components for professional competence are described (Onstenk, 1997). Finally, the 21<sup>st</sup> century skills are presented (Thijs et al., 2014). One of these interpretations is used to express work performance in the research of this master thesis, this is discussed in paragraph 2.1.5.

### 2.1.2 Key qualifications for vocational education

According to Kyndt et al. (2014), the nature of the required qualifications demanded by employers changed. As discussed before, due to commercial, technological and organizational changes and changes in the labor system the demand for generic qualifications increased and employers asked for flexible employees (Van Zolingen, 1995). These generic qualifications should enable an employee to adapt to new situations and to acquire specific or new knowledge during their entire career. Because of these changes, scientific interest for these generic qualifications increased. Mertens was the first one to refer to these generic qualifications by naming them “Schlüsselqualifikationen” (Mertens, 1975 in Van Zolingen, 1995). By doing so, Mertens referred to a set of qualifications that would increase the mobility and ability of employees to adapt to unpredictable changes in the environment. Mertens, however, focused on a general interpretation of these “Schlüsselqualifikationen”, but

developments in the labor market made it important to interpret these generic qualifications in the context of an occupation. This occupation specific interpretation is needed as not every occupation requires the same interpretation of a generic qualification (Van Zolingen, 1995). Van der Velden (2011) also emphasizes this point of view, as he claims that a generic qualification, for example such as working together, cannot be developed in the right way unless it is seen in the context of an occupation. It makes no sense to teach a student how to work together in general, as every occupation demands a specific way of working together. A carpentry student and a nursery student for example both need to be able to work together with colleagues, but due to the nature of their occupation the way that they are required to do so differs. Whereas a carpenter should be able to work together with electricians and painters, a nurse needs to work together with doctors and patients. Van Zolingen (1995) therefore updated the “Schlüsselqualifikationen” within the context of an occupation. The “Schlüsselqualifikationen” are renewed in the term “Key qualifications” which is described as:

*“Key qualifications are the knowledge, insight, skills and attitudes that are part of the permanent core of an occupation or a group of related jobs with the possibility of transfer to other, new jobs within that occupation, and of innovations within that occupation, which contribute to the development of an employee’s competence and facilitate transitions within his career” (Van Zolingen, 2002, p. 222).*

The emphasis is on the broad application of these key qualifications within an occupation. As mentioned in chapter 1, vocational education plays an important role in the development of these key qualifications (Van Zolingen, 1995). Within their period of work experience, students can develop key qualifications within the context of their occupation. The interpretation of key qualifications by Van Zolingen (2002) is characterized by six different dimensions, which are displayed in table 2.2. The interpretation is geared to the developments in the industry, as it also emphasizes the importance of the possession of socio-communicative, personality, socio-normative and strategic skills.

The first dimension is the general dimension, this dimension covers the general qualifications that a student needs in his occupation and which can be applied in many situations. These qualifications such as arithmetic skills, language and reading skills, general technical knowledge, general knowledge of language, general knowledge of computing, the

ability to handle information, the ability to plan work, quality awareness, and interdisciplinary knowledge make it easier for an employee to transfer between jobs. As mentioned before, these qualifications are characterized by their broad application in different situations. Basic arithmetic skills for example can be useful for an employee to understand measurements on a construction plan, but also to calculate the costs of the materials he needs to do a certain job. General technical knowledge can be useful for an employee when he needs to use his phone or when he needs his computer. Interdisciplinary knowledge refers to the integration of knowledge that belongs to more than one discipline (Gilbert, 1998). For an employee this is useful when he has to work together with colleagues from other disciplines.

Secondly, the cognitive dimension is distinguished. This dimension refers to the capacity that a student has to think and act and covers skills such as the ability to identify and solve problems, abstract thinking, methodical thinking, intellectual flexibility, learning to learn and tacit skills. These qualifications are also beneficial for an employee to acquire as cognitive qualifications can be usable in different situations. Being able to identify and solve problems for example may be useful for an employee when he identifies a mistake in the planning by which he can prevent for something to go wrong. It is also useful for example when he notices that his salary check is not correct, so he can take action. Learning to learn is another important qualification in the cognitive dimension, as it is important to keep learning during work (Rotherham & Willington, 2009). Because of technical developments for example, an employee may have to learn how to use a new machine or how to use an iPad.

The third dimension of the key qualifications for vocational education is the personality dimension. This dimension is about individual behavior which for example should consist of self-reliance, a sense of responsibility, accuracy, self-confidence, decisiveness, exercising initiative and so on. These qualifications for a large part determine how the employee behaves at work. Self-confidence for example is an important qualification for an employee. If he shows his boss that he is confident, his boss will trust him to do a task on his own. Self-confidence however may also be of use for an employee when he has to communicate with his colleagues. Perseverance is another qualification from the personality dimension that is important for an employee in different situations. If an employee works outside most of the time, he needs to deal with all types of weather conditions. Even if it rains, he has to do his job, which sometimes might ask for perseverance. The employee also needs perseverance when he has to deal with a tight planning. He has to make sure that his work is done at the end of the day.

Table 2.2: Key qualifications for vocational education (van Zolingen, 2002, p.222)

	<b>Definition:</b> Key qualifications are the knowledge insight, skills and attitudes that are part of the permanent core of an occupation or group of related jobs with the possibility of transfer to other, new jobs within that occupation, and of innovations within that occupation, which contribute to the development of an employee's competence and facilitate transitions within his career.
<b>1</b>	<b>General-instrumental dimension:</b> <ul style="list-style-type: none"> <li>• occupational knowledge and skills that have fundamental or permanent character and that can be applied in many situations (including basic skills such as arithmetic, language and reading, general technical knowledge, general knowledge of languages, general knowledge of computing, the ability to handle information, ability to plan work, quality awareness, commercial insight)</li> <li>• interdisciplinary knowledge</li> </ul>
<b>2</b>	<b>Cognitive dimension:</b> <ul style="list-style-type: none"> <li>• thinking and acting (identifying and solving problems, abstract thinking, methodical thinking, intellectual flexibility, learning to learn, tacit skills, such as familiarity with material)</li> </ul>
<b>3</b>	<b>Personality dimension:</b> <ul style="list-style-type: none"> <li>• individual behavior (self-reliance, sense of responsibility, accuracy, self-confidence, decisiveness, exercising initiative, coping with stress, creativity, imagination, willingness to achieve, perseverance, modern citizenship)</li> </ul>
<b>4</b>	<b>Socio-communicative dimension:</b> <ul style="list-style-type: none"> <li>• communicating (ability to express oneself orally, ability to express oneself in writing, knowledge of modern languages)</li> <li>• the ability to work together with colleagues, supervisors, and clients (social skills, solidarity and empathy)</li> </ul>
<b>5</b>	<b>Socio-normative dimension:</b> <ul style="list-style-type: none"> <li>• ability to adapt to the corporate culture (loyalty, identification, dedication, complying with safety measures, willingness to take part in further learning, representativeness, knowledge of the organization)</li> </ul>
<b>6</b>	<b>Strategic dimension:</b> <ul style="list-style-type: none"> <li>• emancipatory behavior: showing a critical attitude to work and one's own interests (dealing critically with choices in the technical field and the effects they have; taking an active part in decision-making and promotion of interests).</li> </ul>

The fourth dimension is the social-communicative dimension. This dimension is about the way that the student communicates and works together with colleagues, supervisors and clients. An employee has to know what the appropriate way to communicate is with different stakeholders. For example, he has to be able to communicate with his colleagues or with clients, which both ask for a different approach. Another qualification from the socio-communicative dimension is being able to work together. An employee has to be able to work together with all kinds of people with different characteristics. He needs to know how to adapt to these different situations.

The fifth dimension of the key qualifications for vocational education is the socio-normative dimension. This dimension focuses on the way an employee can adapt to and identify with the corporate culture of the organization he works in. Identification for example can be important for an employee to feel comfortable within the organization. This might help him for example to adapt if he needs to work in different departments of the organization. Another qualification that belongs to the socio-normative dimension is that an employee

complies to the rules of the organization. He should for example apply to the dress code of his organization and be aware of the safety measures.

The final dimension is the strategic dimension. This dimension covers qualifications regarding the critical attitude of an employee with respect to his work and own interests. An employee for example has to stand up for himself if he does not agree with a new rule at work or when he disagrees with critique that he receives from his employer.

According to Van Zolingen (2002) most of these qualifications can be acquired by learning or be developed during work. Some key qualifications can be mastered at school, but most of them, for example such as working together with colleagues, can only be learned from experience in practice. The period of work experience therefore is of great importance for vocational students. Because of the combination of theory and practice, students who received vocational education should be able to develop these key qualifications further during their period of work experience (Van Zolingen, 2002).

### 2.1.3 Components of professional competence for vocational education

Onstenk (1997) presents another interpretation of generic qualifications as he speaks of competence. The reason to use another concept in this interpretation is that the term 'qualification' and the term 'competence' differ in the perspective by which their function is approached. The term 'qualification', according to Onstenk (1997) is defined from the perspective of the labor system as a set of skills that is needed to perform a set of tasks. The term 'competence', is defined from the perspective of the individual employee. As it is the employee who possesses generic qualifications, Onstenk (1997) prefers to use this perspective. A competence is a set of skills and their underlying relations that are used to perform concrete activities (Onstenk, 1997). It refers to the ability of a skilled person to carry out operations and solve problems and thus is seen from the perspective of the individual. A competence is not static but it develops over time. This development is important as employers are looking for employees who can develop and adapt in the changing organization (Onstenk, 1997). An individual can develop his competencies during his entire work career, but the first steps are taken during his education (Billet, 2001).

Onstenk (1997) presents a scheme which can be used to analyze the different components of professional competence that a skilled worker needs to perform in his occupation (Table 2.3).

Table 2.3: Components of professional competence (Onstenk, 1997, p. 125)

1	<b>Professional competence</b> <ul style="list-style-type: none"> <li>• Practical-technical skills</li> <li>• Interaction skills</li> <li>• Information processing skills</li> </ul>
2	<b>Methodical competence</b> <ul style="list-style-type: none"> <li>• Control skills</li> <li>• Methodological skills</li> </ul>
3	<b>Governmental-organizational competence</b> <ul style="list-style-type: none"> <li>• Responsibility</li> <li>• Flexibility</li> </ul>
4	<b>Strategic competence</b> <ul style="list-style-type: none"> <li>• Defend own interests</li> <li>• Employability</li> </ul>
5	<b>Social-communication competence</b> <ul style="list-style-type: none"> <li>• Collaboration skills</li> <li>• Deal with criticism</li> <li>• Giving/receiving feedback</li> </ul>
6	<b>Normative-cultural competence and habitus</b> <ul style="list-style-type: none"> <li>• Involvement, professional attitude</li> <li>• Motivation, performance readiness</li> </ul>
7	<b>Learn and design competence</b> <ul style="list-style-type: none"> <li>• Learning skills</li> <li>• Reflection and double-loop learning</li> <li>• Transition skills</li> <li>• Transfer skills</li> <li>• Design skills</li> </ul>

The first component, professional competence, consists of the occupational knowledge and skills that are at the core of an occupation. Within this competence, practical-technical, interaction, and information processing skills are needed. Practical-technical skills are skills that are acquired in practice and which are incorporated in an individual's work routine. These skills enable an employee to react to a specific situation as they recognize patterns and habits. Interaction skills enable an employee to deal with others at work. Therefore, an employee should find a balance between his own interests and feelings and the interests and feelings of the person he interacts with. Information processing skills are about the ability to deal with problems and to process different types of information. An employee should be able to process all the input he receives. Van Zolingen (1995) refers to these skills in the general-instrumental dimension. This dimension emphasizes the importance of the knowledge and skills that have a permanent character in the occupation and which are of use for the employee in different situations.

The second component, methodical competence, includes control skills and methodical skills. These skills enable an employee to plan, organize and solve problems

regarding his own work. Bunk (1994 in Onstenk, 1997) emphasizes on the flexibility of an employee, as he should be able to respond quickly to different situations. This component is comparable with the cognitive dimension distinguished by Van Zolingen (1995), as both relate to skills that an employee needs to think and act.

The third component, governmental-organizational competence, is about the ability to operate within the system of functions of the organization. This component focuses on the way that an employee performs within the context of the organization. Responsibility and flexibility are important within this competence. According to Bertrand and Noyelle (1988, in Onstenk, 1997) this means that an employee should be able to make decisions and take responsibility within poorly defined and continuously changing environments. The way that an employee behaves mostly determines if he is able to operate within the organization. Van Zolingen (1995) describes the different characteristics of behavior in the personality dimension.

The fourth component, the strategic competence, has to do with the ability of the employee to deal with his membership and the associated codes of conduct in the organization. The employee needs to be able to defend his own interests regarding his position in the organization. Furthermore, the employee should be broadly employable. The employee needs to be willing to put in an extra effort. Van Zolingen (1995) refers to these skills in the strategic dimension, as an employee should show a critical attitude to work and his own interests.

The fifth component, the social-communication competence, includes that the employee works in a system in which he has work together with others. Therefore, collaboration skills are important and employees need to be able to deal with critics and feedback. It is important that the employee knows when and how to adapt his communication according to the situation he is in. Van Zolingen (1995) addresses these skills in the socio-communicative dimension. The employee should know how to communicate with whom and how to deal with colleagues when working together.

The sixth component, the normative-cultural competence and habitus, focuses on how the organization functions as a cultural system. It is important that the employee is able to deal with the culture of the organization. This means that he has to be involved and needs to show a professional attitude with respect to the norms and values of the organization. Employees need to rely on mutual expectations, as they are aware of each other's behavior in the system. This component can be linked to the socio-normative dimension of key qualifications (Van Zolingen, 1995). The socio-normative dimension also addresses how an

employee needs to be able to adapt to the corporate culture through identification with the norms and values within the organization. The need for involvement that is mentioned in the normative-cultural competence is expressed as loyalty and dedication in the socio-normative dimension.

The final component, learn and design competence, focuses on the development of the competences of an employee. Changes within the career of an employee ask for specific requirements. First, it is important that an employee is able to learn. Therefore, he needs the ability to reflect as the employee should learn from experience. Second, employees should be able to apply their skills in new situations. This means that they have to develop their transition and transfer skills. Finally, employees need design skills to constitute labor in the future. Therefore, employees should put an effort into improving the quality of their work. Onstenk (1997), devotes a separate component to learning skills. Van Zolingen (1995) does not mention these skills in a separate dimension, but incorporates them in the cognitive dimension. Learning to learn is part of the cognitive dimension, which asks for the employee to learn, reflect and apply new knowledge.

#### 2.1.4 21<sup>st</sup> Century skills

Recently there is much attention to why generic qualifications are needed and what they entail (Thijs et al., 2014). Trends within society, such as developments in technology, digitization, globalization and individualization that caused changes in the 80's are still influencing the labor and education system (Christoffels & Baay, 2016). Simple and routine work is taken over by machines, which causes low end jobs to disappear. Therefore, employees need to be equipped with more than just practical skills (in Dutch: vakmatige vaardigheden) in order to stay useful for the employer (Christoffels & Baay, 2016). What this set of generic skills, besides practical skills, that employers ask for actually entail are the so called 21<sup>st</sup> century skills according to Thijs et al. (2014). The 21<sup>st</sup> century skills are described as the generic skills and the knowledge, understanding and attitudes that are required in order to be able to function in, and to contribute to the 21st century society. There are however questions if the designation used to describe this set of skills is causing confusion, as it implies that the demand for these type of skills is originated in the 21<sup>st</sup> century and therefore new (Christoffels & Baay, 2016). This implication is wrong, as the demand for these generic skills has already been present since the 70's. It seemed, by giving it the name 21<sup>st</sup> century skills, to be new, but the content stayed the same. There are many different interpretations of

what 21<sup>st</sup> century skills should entail, as their content depends on the circumstances in which they are demanded. Voogt & Pareja Roblin (2010) compare several existing models of 21<sup>st</sup> century skills used by different countries and associations. They compare different models and projects. The first model, the P21 (Partnership for 21<sup>st</sup> Century Learning) originated in the United States. The goal of this model is to position 21<sup>st</sup> century learning in secondary education. The second model, also originated in the United States called “EnGauge”, has the goal to advance 21<sup>st</sup> century skills of students and teachers in different education sectors. The third model, the NAEP (Technological Literacy Framework for 2012 National Assessment of Educational Process) is developed with the goal to determine which ICT skills pupils of secondary education should possess. A project that Voogt & Pareja Roblin (2010) compared is the ATCS (Assessment and Teaching of 21<sup>st</sup> century skills), which was part of an international project which goal was to develop operational definitions of 21<sup>st</sup> century skills and the design of appropriate assessment tasks to be used in class. The second project is the NETS (National Education Technology Standards), which was developed by the International Society for Technology in Education with the goal to set standards about the level of ICT knowledge of students (Voogt & Pareja Roblin, 2010). Thijs et al. (2014) reviewed the comparison made by Voogt & Pareja Roblin (2010) as the most condoned description of existing models. The interpretation of what the 21st century skills entail is given in table 2.4 (Thijs et al., p.26-29). These 21<sup>st</sup> century skills can be coupled to the key qualifications (Van Zolingen, 1995) and the components of professional competence (Onstenk, 1997).

In the first place, problem-solving skills (3) – (Table 2.4) and the critical thinking skills (2) can be compared with the cognitive dimension of Van Zolingen (1995) and the methodical competence of Onstenk (1997). The problem-solving skills enable an employee to recognize and solve problems, to recognize patterns, to analyze different situations and to make decisions.

In the second place, creativity skills (1) and self-regulation skills (8) can be compared with the strategic dimension of Van Zolingen (1995) and the strategic competence and learn and design competence of Onstenk (1997). Both skills, creativity and self-regulation, are about emancipatory behavior, participation in the organization and critical reflection.

In the third place, communication skills (4) and the cooperation skills (5) can be compared with the socio-communicative dimension of Van Zolingen (1995) and the social-communication competence of Onstenk (1997). Communication and cooperation skills cover the skills that enable an employee to express themselves to others and to work together.

Table 2.4: 21<sup>st</sup> century skills (Thijs et al., 2014, p. 26-29)

1	<p><b>Creativity</b> is about coming up with new ideas and be able to perform and analyze them. It is about:</p> <ul style="list-style-type: none"> <li>• an exploratory and entrepreneurial attitude</li> <li>• thinking out of the box and seeing relations</li> <li>• master creative techniques (brainstorming ect.)</li> <li>• daring to take risks and recognize mistakes as learning opportunities</li> </ul>
2	<p><b>Critical thinking</b> is about being able to formulate an individual informed opinion. It is about:</p> <ul style="list-style-type: none"> <li>• the ability to reason effectively</li> <li>• the ability to interpret, analyze and synthesize</li> <li>• the ability to identify gaps in knowledge</li> <li>• the ability to ask meaningful questions</li> <li>• the ability to reflect critically to own learning process</li> <li>• being open to alternative opinions</li> </ul>
3	<p><b>Problem-solving skills</b> are about the ability to recognize and solve problems. It is about:</p> <ul style="list-style-type: none"> <li>• the ability to identify and analyze problems</li> <li>• knowing strategies to deal with unknown problems</li> <li>• the ability to generate, analyze and select problem-solving strategies</li> <li>• create patterns and models</li> <li>• the ability to take well-reasoned decisions</li> </ul>
4	<p><b>Communication skills</b> are about the effective and efficient transfer of messages. It is about:</p> <ul style="list-style-type: none"> <li>• targeted exchange of information</li> <li>• the ability to deal with different communication situations and conversation techniques</li> <li>• the ability to deal with communication tools</li> <li>• the ability to see opportunities in ICT to stimulate effective communication</li> </ul>
5	<p><b>Cooperation</b> is about joint achievement of a goal. It is about:</p> <ul style="list-style-type: none"> <li>• the ability to recognize different roles individually and from others</li> <li>• the ability to ask for help, to give help and to receive help</li> <li>• the ability to have an open mind regarding other people's ideas</li> <li>• respect for cultural differences</li> <li>• the ability to negotiate with others</li> <li>• the ability to function within heterogenic groups</li> <li>• the ability to communicate effectively</li> </ul>
6	<p><b>Digital literacy</b> is about responsibly, effectively and effectively using ICT. It is about:</p> <ul style="list-style-type: none"> <li>• recognizing the basics and functions of computers and networks</li> <li>• computational thinking</li> <li>• knowledge of media</li> </ul>
7	<p><b>Social and cultural skills</b> are about effective learning, working and living with people from different backgrounds. It is about:</p> <ul style="list-style-type: none"> <li>• constructive communication in different situations</li> <li>• Recognizing codes of conduct in different situations</li> <li>• recognizing personal feelings</li> <li>• showing empathy for others</li> <li>• be aware of individual and collective responsibility as civilian in society</li> </ul>
8	<p><b>Self-regulation</b> is about realizing goal oriented behavior. It is about:</p> <ul style="list-style-type: none"> <li>• setting realistic goals and priorities</li> <li>• targeted actions</li> <li>• reflection on actions</li> <li>• knowledge of own competencies</li> <li>• responsibility for own actions</li> </ul>

In the fourth place, social and cultural skills (7) can be compared with the socio-normative dimension of Van Zolingen (1995) and the normative-cultural competence and

habitus of Onstenk (1997). Social and cultural skills enable an employee to adapt to the corporate culture of an organization.

Finally, digital literacy skills (6) are incorporated in the general-instrumental dimension of Van Zolingen (1995) and the professional competence of Onstenk (1997). These skills enable an employee to deal with technology.

### 2.1.5 Key qualifications as a measure of work performance

In the previous paragraphs, three interpretations of general qualifications needed to perform in an occupation were discussed. As mentioned before, the performance of a student at work is about the behavior that is associated with the accomplishment of expected, specified, or formal role requirements on the part of the student as an individual organizational member (Campbell, 1990). This behavior is constructed with a set of specific qualifications and a set of generic qualifications that students acquire and/or develop at school during their period of work experience. The research of this master thesis only elaborates on the development of general qualifications for work performance. The research of this master thesis uses the interpretation of general qualifications by van Zolingen (2002), the concept of key qualifications, to express work performance. This interpretation is the predecessor to the other interpretations, the components of professional competence and the 21<sup>st</sup> century skills, and it focuses on the acquisition and development of key qualifications during vocational education. Another important factor for using this interpretation is that the key qualifications are constructed from the perspective of what the industry demands. Within the research of this master thesis there seems to be a qualification problem as discussed in paragraph 2.1, as there is a discrepancy between the required qualifications by the industry and the available qualifications of the carpentry students. It is therefore important for schools to gather insights in the important key qualifications from the perspective of future employers in order to know which key qualifications are important for carpentry students to develop and/or acquire at school.

## 2.2 AMO-framework

The previous paragraphs focused on the key qualifications which the research of this master thesis uses to express the work performance of carpentry students during their period of work experience. This paragraph focuses on the concepts of the AMO-framework and their influence on the development and/or acquisition of carpentry students' key qualifications

during their period of work experience.

The AMO-framework is a framework that is often used in management disciplines when discussing an individual's work performance (Siemsen et al., 2008). The framework has been theoretically developed and empirically tested and gives insights in performance improvements and knowledge sharing (Turner & Pennington, 2015). The research of this master thesis uses the AMO-framework to look at the work performance of carpentry students. During the period of work experience, carpentry students learn how to perform in their occupation (Billet, 2001). These workplaces are, next to school, important learning environments for a student, as it is a place for them to develop and learn about their vocational knowledge in practice (Billet, 2001). In order for carpentry students to develop and/or acquire the right knowledge and skills needed to perform in their occupation, there is a growing interest in making workplaces effective learning environments (Billet, 2000). As mentioned before, the research of this master thesis looks at how the ability, the motivation, and the opportunity influence the development and/or acquisition of a carpentry student's key qualifications. The next subparagraphs describe the different aspects of the AMO-framework and their contribution to the development and/or acquisition of an individual's key qualifications.

### 2.2.1 Ability

The first dimension of the AMO-framework is ability. Ability is the extent to which necessary resources are available to make a certain outcome happen (Gruen, Osmonbekov & Czaplewski, 2006). Ability is about the student his skills or proficiencies to engage in know-how that is being exchanged (Gruen et al., 2006). Greene and Miller (1996) argue that students are more likely to achieve their goals and perform their tasks in a right way when they believe that they are capable to. Ability is the interest in looking capable to themselves or others (Greene & Miller, 1996). During the period of work experience, the abilities of a vocational student develop (Billet, 2001). There are several abilities that a vocational student needs to develop.

In the first place, vocational students who have a high level of self-regulation find themselves more capable to exercise a certain task (Miller et al., 1996). The level of self-regulation can be compared with self-control, which is the exertion of control someone has on his own actions (Muraven & Baumeister, 2000). During the period of work experience this means that a student who is able to regulate and control his own actions is more likely to

perform better, as he or she is confident about his own ability.

In the second place, the ability to perform is affected by the task effectiveness. This means that the student should have the cognitive capabilities to perform tasks in the right way (Miller et al., 1996). In order to be able to effectively perform a task, it is important that a vocational student recognizes patterns and knows how to act regarding those patterns (Miller, et al., 1996).

In the third place, the ability a student has to perform can be dependent on the experience he already has in the work field. If students have experience with a certain job, they will be more likely to feel able to do that same job again. Feldman and Arnold (1978) showed that people who have more work experience, have more self-insight about the job and organizational characteristics. The period of work experience contributes to the acquisition of experience in practice.

In the fourth place, it is important that the student has suitable knowledge about his occupation. The occupational knowledge that they gain at school is of great importance when they enter the period of work experience. What they have learned from theory and practice at school forms the foundation of their knowledge. The period of work experience contributes to further development of the occupational knowledge.

Summarized, the factors that can affect the ability of carpentry students are 1) the level of self-regulation, 2) task effectiveness, 3) experience in the work field, and (4) carpentry knowledge.

### 2.2.2 Motivation

The second component of the AMO-framework is motivation. Ryan and Deci (2000) argue that when someone is motivated this means that someone is moved to do something. Motivation is not a unitary phenomenon, the level of motivation or the orientation for motivation can differ (Ryan & Deci, 2000). Vallerand et al. (1992) names motivation as one of the most important psychological concepts in education. In the period of work experience, a student has the choice to elect to engage in workplace activities (Billet, 2001). For many vocational students, applying their knowledge in practice increases their motivation to accomplish something, in comparison to when they have to learn at school. Ryan and Deci (2000) distinguish three different types of motivation, namely amotivation, extrinsic motivation and intrinsic motivation.

The first type of motivation is amotivation. Amotivation means that there is an

absence of both intrinsic and extrinsic motivation (Vallerand et al., 1992). This means that an individual does not experience motivation at all, and therefore is not motivated (Vallerand & Bissonette, 1992). In order to develop generic skills and to improve their work performance, this type of motivation would not be beneficial for carpentry students. If they are not motivated at all, their work performance is negatively influenced.

The second type of motivation is extrinsic motivation. According to Ryan and Deci (2000), extrinsic motivation is a construct that pertains whenever an activity is done in order to attain some separable outcome. It is about doing an activity for its instrumental value. Extrinsic motivation is something within the environment that triggers someone to be motivated (Bénabou & Tirole, 2003). For the work performance carpentry students this means that something outside the carpentry students themselves motivates them to do something. Extrinsic motivation is the type of motivation that is most experienced by individuals (Ryan & Deci, 2000). The period of work experience is a period in which the carpentry student is triggered by extrinsic motivation, as they learn in practice. Within the organization different factors influence the way that the carpentry student performs. The direct and indirect support and guidance that the students receive during this period influences how they are motivated to act (Billet, 2001). These influences that trigger motivation can be divided in four different types of extrinsic motivation (Ryan & Deci, 2000, Vallerand et al., 1992). The first type is external regulation, which is doing something to satisfy an external demand. The second type of extrinsic motivation that is being distinguished is introjected regulation. This type of behavior is also performed by pressure from an external demand in order to avoid anxiety or guilt, with this type of behavior people try to maintain self-esteem. The third type of extrinsic motivation is identification, which is about identification with the importance for someone personal. This means that an individual accepts the behavior because it is important to him. The fourth type of extrinsic motivation is integrated regulation, this means that extrinsically motivated actions become self-determined (Ryan & Deci, 2000).

The third type of motivation is intrinsic motivation. Intrinsic motivation is about the fact of doing an activity for itself, and the pleasure and satisfaction derived from participation (Deci & Ryan, 1985). It is about the desire to do something for its own sake (Bénabou & Tirole, 2003). Because activities at schools are not made to be interesting, and therefore not automatically lead to intrinsic motivation, it is important to see what drives students to exercise school activities on their own (Ryan & Deci, 2000). Examples of intrinsic motivation for carpentry students can be that a carpentry student wants to become just like his father who also is a carpenter or enjoying that he is building things for other people.

Vallerand et al (1992) have developed a tripartite taxonomy of intrinsic motivation. They argue that intrinsic motivation can be classified as the intrinsic motivation to know, the intrinsic motivation to accomplish things and the intrinsic motivation to experience stimulation. Intrinsic motivation to know is about seeing new things by performing an activity for pleasure and satisfaction. Intrinsic motivation to accomplish things is about engaging in an activity to experience pleasure and satisfaction when trying to accomplish something. Intrinsic motivation to experience stimulation is about experiencing stimulating sensations that are derived from the engagement in an activity. These three types of intrinsic motivation all can occur during the period of work experience as carpentry students are constantly learning new things in practice. They might for example be enthusiastic about the accomplishment to install a window frame at a great height for the first time. In theory this might not be interesting to learn, but by experiencing it in practice, it can trigger motivation.

Amotivation, extrinsic motivation and intrinsic motivation are all forms of motivation that carpentry students can experience during their period of work experience. In the research of this master thesis these concepts are used to look at how the motivation of carpentry students influences the development and/or acquisition of key qualifications during their period of work experience.

### 2.2.3 Opportunity

The final dimension of the AMO-framework is opportunity. Blumberg and Pringle (1982), show that work performance is affected by three factors. They argue that prior research into work performance of individuals is based on the ability and the willingness to perform. They, however, stress that there is another dimension that is important when looking at the work performance of individuals, namely opportunity. Opportunity is the configuration of the forces in the environment of a person that enables that persons' work performance (Blumberg & Pringle, 1982). Siemsen et al. (2008) also argue that opportunity is an important factor influencing the work performance of an individual, as it captures all the exogenous factors that can affect an employees' performance.

According to Billet (2001) the development of the vocational knowledge and skills of a student is largely influenced by the opportunities he receives during the period of work experience. Billet (2001) refers to these opportunities at the workplace as workplace affordances. Workplace affordances determine how an individual can develop his skills, and thus his work performance, as each workplace differs. A vocational student who receives good guidance and who can easily access activities in their period of work experience is more

likely to develop their vocational knowledge and skills than students who do not receive guidance (Billet, 2001). A carpentry student, for example, who works in an organization in which he or she receives a lot of coaching and is allowed to do a variety of tasks learns more than a carpentry student who works in an organization in which he or she receives no coaching and is only allowed to do one task. The opportunities a vocational student receives during the period of work experience, therefore, influence the extent to which he is able to develop and/or acquire the key qualifications he needs to perform well.

Peters and O’Conner (1980) agree that the characteristics of a workplace influence the work performance. They developed a set of situational constraints which either directly or indirectly influence work performance. Using a critical-incidents method, situational variables were identified, which the persons who participated in the research, across a variety of jobs, indicated as a variable that affected their work performance. These variables were translated into 8 resource variables who could affect performance positively namely, job-related information, tools and equipment, materials and supplies, budgetary support, required services and help from others, task preparation, time availability, and work environment (Peters & O’Conner, 1980). They developed three dimensions along which these resources might vary *“as poor performance could be attributed to (1) the needed resource being inaccessible (unavailable), (2) not receiving enough of the needed resource (inadequate quantity), or (3) receiving a needed resource but finding its quality to be poor (inadequate quality)”* (Peters & O’Conner, 1980, p. 396).

The different situational factors mentioned above are used to look at how the opportunity of the carpentry student influences the development and/or acquisition of his key qualifications during his period of work experience.

### 2.3 Research framework

This paragraph discusses the research framework that is developed from theory. The reason to use a research framework instead of a conceptual model is that a conceptual model shows all factors and the relations between these factors. However, the size of and the time limit to write this master thesis were not sufficient to cover all that. The key concepts of this master thesis namely key qualifications, ability, motivation, and opportunity are used to fill in the preliminary framework that was presented in chapter 1. This resulted in the research framework that is displayed in figure 2.1. The research of this master thesis gives insight into the influence of ability, motivation, and opportunity on the development and/or acquisition of

the key qualifications that carpentry students need. The reason for this is that the research of this master thesis focuses on the growing importance of generic qualifications as discussed in paragraph 2.1. The underlying factors that belong to the dimensions of key qualifications can be found in table 2.2. Furthermore, the research of this master thesis determines which factors of ability, motivation and opportunity form a barrier or facilitate the development and/or acquisition of carpentry student's key qualifications. For ability, the factors level of self-regulation, task effectiveness, experience in the work field, and carpentry knowledge are derived from theory. Next, the literature study pointed out that there were three types of motivation namely amotivation, intrinsic motivation and extrinsic motivation. Finally, the factors job-related information, tools and equipment, materials and supplies, help from others, task preparation, time availability and work environment were derived to determine the influence of opportunity. The research of this master thesis does not look at the underlying relations between ability, motivation, and opportunity.



Figure 2.1 Research framework

### 3. Methodology

This chapter elaborates on the methodology of this master thesis. The first paragraph discusses the research approach. The second paragraph shows the operationalization of the key concepts of the research of this master thesis. In the third paragraph, the selection of interviewees is explained. The fourth paragraph elaborates on the methods that were used during the data collection and the data analysis. Thereafter, the fifth paragraph discusses the validity and reliability. The final paragraph ends with a discussion of the research ethics of this master thesis.

#### 3.1 Research approach

A distinction can be made between quantitative and qualitative research. The research of this master thesis applied qualitative research. Qualitative research uses a naturalistic approach in which a phenomenon is explored, examined and described in its own context (Golafshani, 2003). Outcomes of qualitative research are not in statistical numbers but they take a more narrative form in which the underlying philosophy is being explored. For the research of this master thesis a qualitative approach was chosen, as the research question tries to answer a question by exploring a phenomenon in its own context. The research question of this master thesis is: Do carpentry students develop and/or acquire the key qualifications they need during their period of work experience and what is the influence of ability, motivation, and opportunity?

Practical research is about applying knowledge and using the research in order to make practical changes (Vennix, 2011). Because the research of this master thesis focuses on the improvement of the school to work transition and the results serve as implications for improvements, it can be qualified as practical research.

A single case study is used, which means that a single phenomenon is explored and researched in its own context (Baxter & Jack, 2006). In the research of this master thesis the case that is being studied is the one of carpentry education at the ROC Nijmegen. In order to be able to answer the research question and the sub questions, a qualitative study was done. A qualitative study gives the opportunity to delve deep into the case and to understand the phenomenon in its own context (Vennix, 2011). In the qualitative study interviews were used to give an in-depth view of the case. The use of interviews allowed to ask for more complex explanations than a written survey, which was needed to get a thorough insight into the opinions of the respondents.

### 3.2 Operationalization

In order to be able to operationalize the key concepts of this master thesis and to transform them into questions of an interview guide, the theoretical definitions, as discussed in chapter 2, are needed. The key concepts of this master thesis are key qualifications, ability, motivation, and opportunity. In table 3.1, a summary of the key concepts and their theoretical definitions can be found.

*Table 3.1: Key concepts and theoretical definitions*

<b>Concept</b>	<b>Theoretical definition</b>
Key qualifications (Van Zolingen, 2002)	The knowledge, insight, skills and attitudes that are part of the permanent core of an occupation or a group of related jobs with the possibility of transfer to other, new jobs within that occupation, and of innovations within that occupation, which contribute to the development of an employee's competence and facilitate transitions within his career.
Ability (Gruen, Osmonbekov & Czaplewski, 2006)	The extent to which necessary resources are available to make a certain outcome happen.
Motivation (Ryan & Deci, 2000, p.54)	To be moved to do something.
Opportunity (Blumburg & Pringle, 1982)	The configuration of the forces in the environment of a person that enables that person's work performance.

The theoretical definitions of the factors of the key concepts and the numbers of the matching interview questions are displayed in table 3.2. Both the key concepts and their corresponding factors are operationalized into interview questions, this process is displayed in Appendix 2. The interview guides for the carpentry students and the representatives of the organizations can be found in Appendix 3 and 4.

### 3.3 Selecting interviewees

As mentioned before, the research of this master thesis studies if carpentry students develop and/or acquire the key qualifications they need during their period of work experience and it studies the influence of ability, motivation, opportunity. In order to be able to answer this question, two groups were selected to gather data from.

The first group of interviewees was the one of the carpentry students. These students were selected by the researcher in consultation with the ROC Nijmegen. All students who

were selected were registered as a student ‘Allround carpenter level 3’ (in Dutch: Allround timmerman niveau 3).

*Table 3.2: Key concepts with their theoretical definitions and related interview questions*

<b>Key qualifications</b>		<b>Related interview questions</b>
General-instrumental dimension (Van Zolingen, 1995)	Interdisciplinary knowledge and occupational knowledge and skills that have fundamental or permanent character and that can be applied in may situations.	3,4,5
Cognitive dimension	Refers to the way someone thinks and acts.	6,7
Personality dimension	Is about someone’s individual behavior.	8
Socio-communicative dimension	Refers to the way someone communicates and the ability to work together with colleagues, supervisors, and clients.	9,10,11
Socio-normative dimension	Someone’s ability to adapt to the corporate culture.	12,13,14
Strategic dimension	Showing a critical attitude to work and one’s own interests.	15,16
<b>Motivation</b>		
Amotivation (Vallerand & Bissonette, 1992)	When an individual perceives a lack of contingency between their behavior and outcomes.	22
Extrinsic motivation (Bénabou & Tirole, 2003)	Something within the environment that triggers someone to be motivated.	20,21
Intrinsic motivation (Deci & Ryan, 1985)	The fact of doing an activity for itself, and the pleasure and satisfaction derived from participation.	17,18,19
<b>Opportunity</b>		
Job-related information (Peters & O’Conner, 1980, p. 396)	The information needed to do the job assigned.	23,24
Tools and equipment	The specific tools, equipment, and machinery needed to do the job assigned.	30
Materials and supplies	The materials and supplies needed to do the job assigned.	31
Required services and help from others	The services and help from others needed to do the job assigned.	25,26,27
Task preparation	The personal preparation, through previous education, formal company training, and relevant job experience, needed to do the job assigned.	28,29
Time availability	The availability of the time needed to do the job assigned, taking into consideration both the time limits imposed and the interruptions, unnecessary meetings, non-job-related distractions, ect.	32,33
Work environment	The physical aspects of the immediate work environment needed to do the job assigned.	34
<b>Ability</b>		
Level of self-regulation (Muraven & Baumeister, 2000)	The exertion of control someone has on his own actions.	35,36
Task effectiveness (Miller et al., 1996)	The perception that someone has of the cognitive capabilities of performing the right tasks in the right way	37
Experience in the work field	The amount of experience one has in his occupation	38
Carpentry knowledge	The amount of knowledge about carpentry	39,40

As mentioned in chapter 2.1, this level of education enables the students to become a skilled worker. This means that they can independently perform activities that belong to their profile.

The carpentry students are educated to become a carpenter, which means that they are able to perform activities that belong to that occupation. In total, the group of students that was selected for the research of this master thesis consisted of 10 boys of 19-24 years old (Table 3.3). The group was approached by the researcher, together with the teacher of the class. The researcher introduced herself by informing the students about the research of this master thesis and asking them to participate. All students agreed to participate voluntarily. Six of them were students from the third year of school, who participated in a basic vocational program (in Dutch: Beroeps Begeleidende Leerweg, oftewel BBL) for one year. This means that they work within an organization for four days a week and spend one day a week attending classes at school. They all had an employment contract with Bouwmensen, one of the training companies which is part of 'De Technische', that assigned them to an organization. Bouwmensen is a cooperative association of construction and infra-training companies that arranges for the students of the ROC to connect with employers in the work field. Each student had a supervisor, which was assigned to him by the organization that they were placed in. The supervisor guides and supports the student with assignments he has to do at work. As the research of this master thesis focuses on the way that carpentry students develop and/or acquire the key qualifications they need during their period of work experience, the researcher first chose the 6 third year students, as they already worked within an organization for a long period of time. However, six students were not enough to form a sample size large enough, therefore the group was complemented with four second year students. These students were ahead of the rest of the students in the second year, which meant they already started with level 3 and were already working in an organization assigned by Bouwmensen. The rest of the second year students were still at level 2 and therefore the researcher decided to only include the four who already started with level 3. An overview of the selected students is presented in table 3.3. The table also shows which students belong to which organization, three students (2,4 and 8) have a '-' in the organization column, this means that the representatives of the organizations they work in did not participate in the research of this master thesis.

The second group of interviewees consisted of representatives from the organizations in which the carpentry students worked in (Table 3.4). The research of this master thesis wants to give insight into the way that carpentry students develop and/or acquire the key qualifications they need. In order to gather insights into which key qualifications this should be, the researcher needed to know which key qualifications the representatives of the organizations classified as important for the carpentry students. Therefore, interviews with representatives of the organizations were done. In consultation with ROC Nijmegen, the

researcher approached the nine organizations in which the selected students worked in. The contact information of the organizations was provided by Bouwmensen, who are the intermediary between the organizations and ROC Nijmegen. The researcher approached nine organizations, because two of the students work in the same organization. All organizations differed in size and core business (Table 3.4). Eventually, representatives of six organizations agreed to participate in the research of this master thesis. The reason for the representatives of remaining three organizations to not participate was not due to a lack of interest in the research of this master thesis. They did not participate because they had no time due to a high workload during the period of the research of this master thesis. Together with the contact person of each organization, the researcher came into contact with the representative of the organization that was thought to be best suited to do the interview. In organization a, the researcher talked with two representatives namely a realization manager and an assistant executor. The realization manager manages building projects and the assistant executor assist with guiding the daily process on the construction site. In organization b, d, and f the researcher talked with a main executor. A main executor is responsible for everything that happens on the construction site. In organization c the researcher talked with the CEO of the organization. Finally, in organization e the researcher talked to the head of the HR department. An overview of the representatives from the organizations who participated in the research of this master thesis is presented in table 3.4.

*Table 3.3: Students selected for interviews*

<b>Student</b>	<b>Age</b>	<b>School year</b>	<b>Education level</b>	<b>Organization</b>
1	20	3 <sup>rd</sup> year	Level 3	a
2	20	3 <sup>rd</sup> year	Level 3	-
3	19	3 <sup>rd</sup> year	Level 3	f
4	19	3 <sup>rd</sup> year	Level 3	-
5	20	3 <sup>rd</sup> year	Level 3	b
6	19	3 <sup>rd</sup> year	Level 3	f
7	24	2 <sup>nd</sup> year	Level 3	c
8	19	2 <sup>nd</sup> year	Level 3	-
9	17	2 <sup>nd</sup> year	Level 3	e
10	18	2 <sup>nd</sup> year	Level 3	d

*Table 3.4: Representatives from the organizations selected for interviews*

Organization	Type of core business	Size	Number of interviewees	Function of interviewees
a	Real estate, realization and investments	152 FTE's	2	1) Realization manager 2) Assistant executor
b	Service builder	216 employees	1	Main executor
c	Contractor	± 20 employees	1	CEO
d	Utility building	± 100 employees	1	Main executor
e	Development, construction and maintenance	± 100 employees	1	Head of HR
f	Contractor	50 employees	1	Main executor

### 3.4 Data collection

The research of this master thesis started with two exploratory interviews at the ROC Nijmegen with the head of the department of the ROC Nijmegen and a carpentry teacher. During these interviews the problem at hand became clear. The research of this master thesis focused on the key qualifications that carpentry students need to develop and/or acquire during their period of work experience and the influence of ability, motivation and opportunity. Two groups were interviewed. In the first part, semi-structured interviews were conducted with 10 second and third year carpentry students (Appendix 3). First, the 6 third year students were interviewed followed by the 4 students from the second year. Second, the researcher interviewed representatives from 6 organizations. These interviews were done to gather insights in the demands of the industry. Here, the researcher also used semi-structured interviews (Appendix 4). All the representatives of the organizations were asked if they wanted to receive a copy of the research of this master thesis when finished. All interviews were conducted in Dutch because this was the native language of the interviewees. All interviews were recorded and transformed into transcripts which were used for data analysis. The interviewees were explicitly told that their names, and for the representatives of the organizations also the name of the organization, stayed anonymous and that data would be used confidential. All these aspects gave the interviewees the confidence and ease to elaborate on every subject of the interview.

### 3.5 Data analysis

To analyze the data, all the information from the interviews needed to be captured. This was done by recording the interviews that were conducted with the students and the representatives of the organizations. These recordings made sure that all information from the interviews could be transformed into transcripts. Transcribing the interviews resulted in 16

transcripts, 10 transcripts of the students and 6 transcripts of the representatives of the organizations. Codifying these transcripts one by one was the next step of the data analysis. The transcripts were coded by using a deductive method. The reason to use this method was that the research of this master thesis used existing theory to develop the research framework (Saunders et al., 2011). Therefore, the research framework was used to constitute four code trees, which resulted in a list of codes that the researcher used during the coding process (Appendix 5). The four code trees display the key concepts of the research of this master thesis namely key qualifications, ability, motivation, and opportunity. However, as the research of this master thesis used semi-structured interviews which allowed the researcher to deviate from the interview guideline, concepts that were not captured in the code trees might be missed. Therefore, during the coding process, the researcher constructed new codes when necessary. After coding all transcripts, the researcher gathered quotes with the same code. By doing so, the researcher made an overview of each key concept and its relevant quotes. This overview was used to analyze the key concepts and to formulate the results to answer the research question (Chapter 4).

### 3.6 Reliability & Validity

Reliability and validity were used to evaluate the quality of qualitative research (Golafshani, 2003). It is therefore important to discuss how the research of this master thesis took measures in order to secure these indicators.

Reliability means that a research is repeatable (Golafshani, 2003). In qualitative research it is difficult to ensure reliability, as semi-structured interviews allow the researcher to ask additional questions. As every researcher can choose a different path during the interview, results may differ. Therefore, according to Golafshani (2003), in qualitative research the reliability is about the trustworthiness of the research. In order to create trustworthiness, the research of this master thesis is transparent about the methods used. The steps that were taken during the research process of data collection and data analysis are clearly described. This is done so that others can follow the thoughts of the researcher.

Validity is about if the researcher measures what he or she wants to measure (Vennix, 2011). It is important that there is alignment between the research question and the methods used. Validity was taken into account by several measures. First the researcher used semi-structured interviews, which gave the researcher space to ask for more in-depth answers if necessary. It also allowed the researcher to check at every step with the interviewee if everything was

understood. Second, the researcher used records of the interviews when analyzing data, by doing so she ensured that no information got lost. Third, the researcher did a member check. This means that the researcher has send the transcripts back to the interviewees in order for them to check if the researcher had written down what they intended to say (Saunders et al., 2011).

### 3.7 Research ethics

The research of this master thesis applied the five ethical principles constituted by the American Psychological Association (2010) namely, beneficence and nonmaleficence, fidelity and responsibility, integrity, justice, and respect for people's rights and dignity. The researcher made sure that the participants were well informed about the content of the research of this master thesis. After an explanation of the purpose and the process of the research of this master thesis, participants were given the free choice whether to participate or not. In order to gain trust from the students, the researcher participated in the classroom for several weeks. During these days, for the second year students on Mondays and for the third year students on Wednesdays, the students could get familiar with the researcher. After a few weeks, the researcher started with conducting the interviews. At the beginning of the interview, the researcher asked for permission to record the interviews with the aim of using those recordings during the analysis. The researcher ensured that only she would listen to the recordings. Furthermore, the researcher explained that if questions arose during the interview, the interviewee could ask for further explanation. The researcher concluded the interviews by asking once more if everything was clear for the interviewee and if there were further questions. The researcher made sure that the transcripts contained no information that could lead to the identity of one of the participants. As mentioned in paragraph 3.6, the researcher conducted a member check in order to check whether the researcher understood the interviewee in the right way. The same process and care was applied to the interviews with the representatives of the organizations.

During the interviews the researcher was aware of the relation between the researcher and the interviewee, as the researcher showed professional behavior. The researcher made clear that everything that the interviewee would say during the interview was confidential and anonymous to other people. By doing so, the researcher created a safe environment for the interviewee to talk freely and to avoid socially desirable answers. The researcher handled all information carefully during the analysis of the results.

## 4. Results

This chapter presents the results of the research of this master thesis. The chapter discusses the findings of the 10 interviews with the carpentry students and the 6 interviews with the representatives of the organizations. As mentioned before, the research of this master thesis applies qualitative research. Therefore, quotes from the interview transcripts are used to clarify the results. The structure of this chapter is build up according to the sub-questions that were determined in paragraph 1.1 of the research of this master thesis. Paragraph 4.1 discusses results regarding the key qualifications that carpentry students need to develop and/or acquire during their period of work experience and relates to sub-question 1 to 6. Paragraph 4.2 presents results related to the AMO-framework and relates to sub-question 7 to 9. Finally, paragraph 4.3 gives a summary of the results.

### 4.1 Key qualifications

This paragraph discusses the results regarding the key qualifications that carpentry students need to develop and/or acquire during their period of work experience, which relates to sub-question 1 to 6. The sub-questions 1 to 6 were formulated in paragraph 1.1 as:

1. Which key qualifications do the carpentry students mention they need to perform well during their period of work experience?
2. Which key qualifications do the representatives of the organizations mention the carpentry students need to perform well during their period of work experience?
3. What are the differences and similarities between the key qualifications that the carpentry students and the representatives of the organizations mentioned that the carpentry students need to perform well during their period of work experience?
4. Which key qualifications do the carpentry students mention they have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
5. Which key qualifications do the representatives of the organizations mention the carpentry students have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
6. What are the differences and similarities between the key qualifications the carpentry students and the representatives of the organizations mentioned that the carpentry students have, as required for working as a carpenter in the organization, to perform well during their period of work experience?

The next section discusses these sub-questions by elaborating on the key qualifications of each dimension that carpentry students need to develop and/or acquire during their period of work experience.

### General-instrumental dimension

According to the results regarding the general-instrumental dimension, carpentry students need a proper level of basic carpentry knowledge. The results show that the representatives of the organizations believe that the student's basic level of carpentry knowledge is too low. The representatives of the organizations mention that for example arithmetic skills are needed to understand basic fundamentals of the carpentry occupation. They believe that this is due to two reasons. In the first place, the representatives of the organizations say that the current education system does not contribute to a proper level of basic carpentry knowledge. The former education system forced students to choose a specific path at school around the age of 12. The representatives say that those students were better equipped with knowledge as they already gained experience before they started the carpentry education. Within the current education system, the carpentry student has his first experience in practice during his period of work experience. The representatives believe that the level of knowledge therefore is not yet developed to what they expect.

*“The level of basic knowledge is not sufficient, which has to do with their education. [...] years ago students went to the LTS when they were 12 years old. During those years they worked with timber every day, because their goal was clear, you were going to be a carpenter. That gave them a step ahead at work. [...] Nowadays they are not capable of doing much” (Representative of organization d).*

Secondly, the representatives say that school is lagging behind on developments in the industry. They believe that students do not have the basic knowledge that they need because school does not provide them with the knowledge they currently need.

*“Our opinion is that schools do not move along with those changes. The position of the student in the organization also has changed. However, the structure of the education stayed the same” (Representative 1 of organization a)*

One student agrees with this statement. At school he did not learn about building techniques that are used today:

*“[...] there are many ways to build things and it is difficult to learn them all. The construction industry keeps changing and my employer is progressive. My organization works with new methods of which I did not learn how those methods*

*work” (Student 1, 3<sup>rd</sup> year)*

Despite the opinion of the representatives of the organizations, all 10 students believe that their level of basic carpentry knowledge is sufficient to perform well during their period of work experience. However, the carpentry students agree with the representatives of the organizations that, in order for them to become a qualified carpenter, a sufficient level of basic carpentry knowledge is not enough. Therefore, they do believe that there is still much to learn.

*“In general my carpentry knowledge is sufficient. However, sometimes it is not enough” (Student 5, 3<sup>rd</sup> year)*

*“There is still much to learn. I believe I know the basics, but there is much to learn” (Student 1, 3<sup>rd</sup> year).*

In order to improve their basic level of carpentry knowledge, the majority of the carpentry students say that they want to receive better guidance at school. Many students mention that teachers give too little attention to them during lessons. By this they mean that their teacher often leaves the classroom to do other work. Therefore, the carpentry students are not always able to ask questions if they do not understand the subject that is taught. Furthermore, the carpentry students mention that there are only two teachers present during practical lessons. Because of this, the carpentry students often have to wait before the teacher is available to explain something for a long period of time. Hence, the carpentry students might miss valuable information which can help them to better understand what they need to learn. One of the carpentry students clearly indicates this problem as he says:

*“I will not mention names, however I believe that some teachers spend too little time on us. I know we are a small group, but instead of being in the classroom and teach us stuff, he only does things for himself. [...] he does mention that we should feel free to ask questions, however I would like him to check if we understand what he said himself” (Student 6, 3<sup>rd</sup> year)*

This might influence the level of knowledge that the carpentry students gain at school. Furthermore, results show that a carpentry student needs to be able to plan work. Six of the 10 students mention that they need to plan daily activities themselves. The carpentry students say that they learn how to plan those activities both at school and at work. One of the students for example, mentions that at school they practiced how to come up with a work schedule. Another student mentions that he has to provide his employer with a plan regarding the assignments he has to complete at work.

*“Most of the work is already planned by the organization. However, I do have to arrange my daily tasks myself. If I know that bad weather is ahead for example, I will first complete my tasks inside. [...] I have to be able to do that myself”*  
(Student 3, 3<sup>rd</sup> year)

The majority of the carpentry students believes that they are capable of planning work. However, one of the representatives mentions that although most of their students can plan work, there are always some students who still need to be monitored:

*“There are students who need to be constantly reminded by their instructor that they need to plan their assignments”* (Representative 2, organization a)

It is worth to mention that both groups agree that carpentry students do not need technical skills. Their job does not include using technology like phones or computers. One of the representatives of the organizations, however, mentions that the carpentry student needs to be interested in and understand basic technology if he aspires a higher position in the organization.

### Cognitive dimension

Results regarding the cognitive dimension show that the key qualifications identifying and solving problems and learning to learn are important regarding the performance of carpentry students during their period of work experience.

Both the carpentry students and the representatives of the organizations mention that it is important that the carpentry students are able to identify and solve problems. All 10 students say that they often face small problems at work. The results show that most of the students are insecure about their ability to solve problems. Most of the time they ask colleagues for help.

*“First I could not solve problems. [...] I always felt insecure. I doubted if I would do the right thing, so I ask others instead of doing it myself”*(Student 5, 3<sup>rd</sup> year)

The students say that they learn how to deal with problems both at school and at work. However, they also mention that most of the problems they face at work do not correspond with what they have learned at school. Therefore, the majority of the carpentry students believe that they learn most about this key qualification at work.

*“At school we learn how to deal with problems. However, what I learn in theory always differs from the situation I face at work. Therefore you need to learn how to solve problems at work”*(Student 1, 3<sup>rd</sup> year)

The representatives of the organizations believe that the development of this key qualification is a learning process. The period of work experience plays an important role in this process.

*“Students need to work together with an experienced colleague. They simply copy the way that their colleague handles the situation. It might go wrong the first time he does it himself, or even the second time, but eventually he learns how to deal with it himself” (Representative of organization d)*

The results showed that one key qualification of the cognitive dimension, learning to learn, is only mentioned by the representatives. This key qualification is about the ability of the carpentry student to learn. The representatives of the organizations expect that carpentry students participate in the period of work experience in order to learn.

*“We expect from a student that he is eager to learn. [...] By that I mean, how am I going to say this. If I explain something to a student and ask him “do you understand?” they often say yes. But actually, he did not understand me at all. [...] I always tell them that I would rather want them to ask me for further explanation, even if they ask me ten times, instead of asking once. [...] I think that is really important. They should dare to ask and to learn” (Representative of organization b)*

*“It is fine by me if a student is satisfied with an average grade, but I look for those who want to perform above average. [...] I understand that not everyone is capable to excel, but if I lower my expectations I at least expect an outstanding commitment to learn” (Representative of organization d)*

These statements show that the representatives indicate the key qualification learning to learn as an important measure of the carpentry student’s performance. According to the representatives of the organizations, a carpentry student cannot learn this key qualification, they believe that you are eager to learn or not.

### Personality dimension

The key qualifications of the personality dimension are widely discussed by both groups. The key qualifications self-confidence, sense of responsibility, exercising initiative, and perseverance, are mentioned by both the carpentry students and the representatives of the organizations. Both groups say that the construction industry asks for secure individuals, who dare to stand up for themselves.

*“You should not come to work as a cringed person, you have to show that you are confident. The construction industry is not the place to be insecure, it does not work for you if you are a quiet person” (Student 1, 3<sup>rd</sup> year)*

*“In the construction industry you cannot be afraid. If you do not dare to say that it is your turn to use the crane at the construction site, others will push you out of the way. This leads to others going home at 4 pm instead of you, because you were too scared to ask” (Representative of organization d)*

The carpentry students say that they believe that their self-confidence develops in practice. The next key qualification on which both groups agree that a carpentry student should need is exercising initiative. The representatives of the organizations say that carpentry students show that they are motivated by taking initiative. The carpentry students agree, as they say that taking initiative shows your employer that you are willing to perform.

*“That is really important to us. A carpenter has to see work. [...] For example, if the carpentry student sees a pile of wood on his way to lunch, it takes little effort to pick it up. He already knows that he will pass a container, so he should pick it up and throw it away. [...] Nowadays a lot of students have to wrong mentality, they think “it is not my mess, why should I pick it up?” I think that is a pity, I want to see initiatives like that” (Representative of organization b)*

Furthermore, a carpentry student needs to have a sense of responsibility. Results show that both the carpentry students and the representatives of the organizations agree that a sense of responsibility is important. According to the carpentry students they need to take their work seriously for both the organization and the customer.

*"Responsibility is important. If you spot a hole somewhere in the scaffold and you decide not to fill it up, a colleague could get hurt. [...] I think that that is my responsibility. You always have to be careful with what you do" (Student 5, 3<sup>rd</sup> year)*

*"I think that is important. In the end you are building a house, so you are responsible for that. I think that it is an important thing in the construction industry. [...] I believe that it is very important" (Student 7, 2<sup>nd</sup> year)*

The representatives of the organizations agree, as they need to be able to trust their employees that they take their responsibility for their work.

Next, a carpentry student needs perseverance. The representatives of the organizations mention that the carpentry occupation is challenging. The carpentry student needs to be able to withstand long hours of physical work, all kinds of weather conditions, and other setbacks that can occur at the construction site. In order to overcome these inconvenient situations, the carpentry students need to have perseverance. The carpentry students agree that in some situations they need to continue work even though it costs them an extra effort.

*“If something goes wrong, I have to fix it. [...] even if it is Friday in the afternoon and I would like to go home. [...] it just needs to be done” (Student 8, 2<sup>nd</sup> year)*

*“Expectations are high. They need to go to work when you are still asleep. [...] and they do not finish before you finish your workday. [...] so he needs to be able to withstand that” (Representative of organization d)*

Furthermore, there are several key qualifications namely accuracy, creativity, decisiveness, and coping with stress that are only mentioned by the carpentry students. According to the carpentry students, some activities require the key qualifications accuracy and creativity. The carpentry students say that they need to be accurate regarding measurements. Incorrect measurements can lead to mistakes. However, accuracy is less important according to the carpentry students if the activity for example involves pouring concrete.

*“It depends on the activity. Pouring concrete does not acquire accuracy. However, other activities need to be done according to the right measurements. If it looks bad because it is not accurate it has to be done again” (Student 9, 3<sup>rd</sup> year)*

According to the carpentry students they need to be able to come up with creative ideas. For example, the carpentry students mention that if the construction drawing is wrong, they have to think of a creative solution. The carpentry students mention that creativity enhances his abilities to solve problems.

*“If something goes wrong you have to think of creative ways to solve it”  
(Student 5 3<sup>rd</sup> year)*

Throughout the whole day, the carpentry students say that they need to be able to make decisions. At work they have to constantly decide what to do next. They believe that it is not appropriate to constantly ask your instructor for confirmation.

*“I do not have to make big decisions; however little things I have to decide myself. If you are not able to decide yourself and every time you need to ask your instructor you waste time” (Student 9, 2<sup>nd</sup> year)*

Results regarding the opportunities, which are discussed in paragraph 4.2.3. show that the carpentry students feel that there is little time available to do their job. Therefore, the carpentry students say that they need to be able to cope with stress.

*“If something needs to be finished I can be stressed. [...] I believe that I can deal with stress and stay calm. In those situations, I always try to avoid unnecessary mistakes”  
(Student 7, 2<sup>nd</sup> year).*

One key qualification of the personality dimension is only mentioned by the representatives of the organizations namely the willingness to achieve. The carpentry student needs to be motivated to perform, if he is not willing to do so he probably will not succeed.

*“Being motivated is 80% of the profit that a student can get. [...] He really has to put in everything he has if he really wants to perform. If he does not, I wonder if he will succeed” (Representative 2 of organization a)*

The carpentry students did not mention that they need the willingness to achieve during the part of the interview that focused on the key qualifications. However, in the second part of the interview the carpentry students did talk about the importance of motivation. The results regarding the motivation of the carpentry students show that the majority of the carpentry students experiences a form of intrinsic motivation. This means that they enjoy their work and that they believe it is important to perform. According to these results, the carpentry students agree with the representatives of the organizations that it is important that they are willing to achieve something at work. Paragraph 4.2.2. further elaborates on the results regarding motivation.

### Socio-communicative dimension

The results show that both groups agree about the key qualifications of the socio-communicative dimension that carpentry students need to perform during their period of work experience. The students and the representatives both referred to the ability to work together and the ability to express oneself orally as important key qualifications.

All 10 students say that the ability to work together is key in their occupation. They believe that they are good at working together. One of them explains the importance of this key qualification extensively:

*“It is really important if you ask me. I usually work together with my instructor, that is one of my colleagues. There are only a few things at work that you can do individually, most things have to be done together. I think it is really important that you can get along with most people. Not everyone has to be your best friend, but you have to be able to work together with them. You can't do stuff on your own in the construction industry” (Student 7, 2<sup>nd</sup> year).*

The representatives of the organizations agree that this is an important key qualification. They say that the students should be able to get along with their colleagues. The students need to know how to act in different social situations. Furthermore, both groups find it important that the carpentry student is able to express himself and knows how to communicate with others.

*“We help students when they are shy. They have to be able to be among colleagues and you need to be able to tell others about the project you are working on. Some find it easier to mingle than others, but we try to teach them as good as we can”*

*(Representative of organization e)*

Worth mentioning is that both the carpentry students and the representatives of the organizations explicitly say that the carpentry students do not need to be able to express themselves in written language. Reporting work activities for example is not part of their job requirements. Despite that expressing themselves in written language is not part of a carpenters' job, one of the assignments during the period of work experience includes writing a report about the way that the carpentry student prepares different work activities. However, the majority of the carpentry students emphasizes that they dislike writing reports and besides that prefer to work with their hands.

### Socio-normative dimension

Results show that the representatives of the organizations mention that carpentry students need many key qualifications of the socio-normative dimension, namely knowledge of the organization, willingness to take part in further learning, complying with safety measures, representativeness, and identification. The carpentry students also mention, identification, as results show that they believe it is important to feel comfortable at work. According to the representatives of the organizations a student feels free to ask and eventually learns more in a comfortable environment. Furthermore, the carpentry students agree with the representatives of the organizations that they need to comply with the safety measures. However, they all mention that they often face situations in which they do not comply. The carpentry students mention that this can be due to laziness or a lack of time. The representatives of the organizations emphasize that the carpentry students always need to comply with the safety rules.

*“We spend a lot of money on safety measures. [...] we believe that safety it is really important. We tell our students that complying with those measures is obligated”*

*(Representative of organization b)*

*“Yes I know the rules. [...] but I do not always work according those rules. [...] sometimes safety is forgotten because work just has to be done” (Student 1, 3rd year)*

The representatives of the organizations say that carpentry students need the willingness to take part in further learning. The representatives of the organizations say that they look for

those students who want to learn.

*“It is fine by me if a student is satisfied with an average grade, but I look for those who want to perform above average. [...] I understand that not everyone is capable to excel, but if I lower my expectations I at least expect an outstanding commitment”*

*(Representative of organization d)*

According to the representatives of the organizations, carpentry students need to act representable. The carpentry students need to behave and dress properly when they represent their organization. The representatives of the organizations say that this corresponds to the carpentry student’s knowledge of the organization. The carpentry student needs to behave according to the interests and behavioral norms of the organization.

### Strategic dimension

Results show that both groups did not discuss many of the key qualifications of the strategic dimension. According to the representatives of the organizations the carpentry students need to show emancipatory behavior. They believe it is important that the carpentry student is critical regarding decisions.

*“We want them to participate in a discussion, they should not automatically agree with what we tell them to do. We look for those students who dare to suggest something different” (Representative of organization e)*

The carpentry students however say that they do not like to be involved in discussions. However, they would stand up for themselves if they disagree.

## 4.2 AMO-framework

This paragraph discusses the results regarding the AMO-framework that relates to sub-question 7 to 9. The sub-questions 7 to 9 were formulated in paragraph 1.1 as:

7. Do the abilities of the carpentry students act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?
8. Does the motivation of the carpentry students act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?

9. Do the opportunities the carpentry students have act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?

#### 4.2.1 Ability

This paragraph shows the results regarding the ability of the carpentry students. Results regarding the factors that facilitate the development and acquisition of key qualifications namely 'level of self-regulation' and 'experience in the work field' are discussed first. Next, results regarding the factors that form a barrier to the development and acquisition of key qualifications namely task effectiveness and carpentry knowledge are elaborated on.

##### Level of self-regulation

The factor self-regulation is about the capability of the carpentry student to control emotions and to deal with changes. Four students (2, 3, 6 and 10) say that they almost never deal with emotions at work. If they would have to deal with emotions, they believe that they can deal with them. Others (student 1, 4, 5, 7 and 8) mention that they do experience emotions at work, which is often frustration. However, they say that they can deal with their emotion.

*"Yes, you probably know situations in which you and your colleague clash. If that happens we just mug to each other for a while and after a while it will be all right. You shouldn't carry that with you. [...] We just mug for some time and then you should forget" (Student 4, 3<sup>rd</sup> year)*

One student finds it hard to deal with emotions.

*"Yes, sometimes I want to do something quickly. However, if it fails I can get frustrated. [...] I always try to put it away but I find that difficult. [...] they give me feedback on how to deal with it so I can learn how to deal with it the next time" (Student 9, 2<sup>nd</sup> year)*

If the carpentry student is able to control his emotions this enhances the development and acquisition of key qualifications. Being able to control his frustrations in a stressful situation for example, helps the carpentry student to cope with stress.

Six of the 10 students say they have never had to deal with changes at work. However, they mention that if they would that they could deal with changes. Three students say that as a carpenter you deal with small changes all the time. One of them says:

*"Yes I have to deal with that. For example if I build something of which they later decide to change the construction. If that happens, I need to adjust my work again."*

*Those things happen very often. [...] I don't mind those decisions, there is nothing you can do about it anyways. It is just the way it is" (Student 7, 2<sup>nd</sup> year)*

If the carpentry student is able to deal with changes, this helps him with the development and acquisition of key qualifications. If the carpentry student for example is transferred to another organization, he is better able to adapt to the new corporate culture.

Because the majority of the students say they feel able to deal with emotions and changes, self-regulation is seen as a facilitator to the development and acquisition of the carpentry student's key qualifications.

### Experience in the work field

All 10 students say that their experience in the work field helps them to perform well during their period of work experience. Doing things in practice helps them to remember how to perform a task. Furthermore, they say that their experience learns them how to behave in certain situations.

*"I learn how to do things myself after a while. I learn quickly because of my experience" (Student 1, 3<sup>rd</sup> year)*

*"I am a few years older than the rest, which makes a difference. I think my age helps me. [...] Because of my experience in the work field I often stay calm and get less distracted" (Student 7, 2<sup>nd</sup> year)*

Experience in the work field enhances the development and acquisition of key qualifications. If the carpentry student has worked together with others before, he can use what he has learned about working together to further develop that key qualification. As results showed that work experience helps the students to develop and acquire the key qualifications they need, this factor is seen as a facilitator.

### Task effectiveness

The factor task effectiveness is about the carpentry student's cognitive abilities he needs to perform a task effectively. As mentioned in paragraph 2.2.1, a carpentry student who is able to recognize patterns in different situations and knows the action that is associated with that situation, can deal with a task effectively. Results show that this factor influences the development and acquisition of key qualifications. If the carpentry student is able to recognize patterns and effectively respond to situations, he is for example better able to identify and solve problems. However, results show that the carpentry students find it difficult to perform

tasks effectively. The majority of the carpentry students mention that they often have to ask for help. If the carpentry student has to ask for help, this means that he is not able to recognize what to do yet. Some of the carpentry students say they feel insecure if they do not know how to act, therefore a lack of task effectiveness can for example influence the key qualifications from the personality dimension such as self-confidence or decisiveness.

*"I always felt insecure about myself. I always doubted if what I was doing was the right thing, I kept on asking" (Student 5, 3<sup>rd</sup> year)*

*"It depends on the type of work I am doing. If I have to do something I have to judge and decide myself. Most of the time this goes well, but it can be wrong. If I work together with a colleague it is easier and quicker, because we can discuss things together" (Student 1, 3<sup>rd</sup> year)*

Because a lack of task effectiveness hinders the development and acquisition of key qualifications, this factor is seen as a barrier.

### Carpentry knowledge

As the results related to the general-instrumental dimension of key qualifications already showed, all 10 students believe that their basic level of carpentry knowledge is sufficient. However, within the general-instrumental dimension it is about basic knowledge of the carpentry occupation. The factor carpentry knowledge is about the overall knowledge the carpentry student has of his occupation. Results show that carpentry students face situations during their period of work experience in which they need more knowledge. The majority of the students also says that they have not enough carpentry knowledge yet.

*"In general my knowledge is sufficient, but sometimes it is just not enough"*  
*(Student 5, 3<sup>rd</sup> year)*

A lack of carpentry knowledge can form a barrier for the application of key qualifications. If the carpentry student has a lack of carpentry knowledge, he might for example not be able to solve a problem or know how to plan work. The representatives of the organizations, as already mentioned in paragraph 4.1, see a lack of carpentry knowledge as a problem. As paragraph 4.1 showed, the key qualifications learning to learn and willingness to take part in further learning are important according to the representatives of the organizations. They believe that a sufficient level of carpentry knowledge helps the carpentry student to learn more. Because the carpentry students mention that their carpentry knowledge is not enough

yet, this factor is seen as a barrier to the application of key qualifications.

#### 4.2.2 Motivation

Results regarding the motivation of the carpentry students show that they are both intrinsically and extrinsically motivated to perform well during their period of work experience. Nine out of 10 students mention that they intrinsically motivated. This means that they perform because of the pleasure or satisfaction they get from it. Eight students (1, 2, 4, 5, 6, 7, 8 and 10) say they perform because they believe it is important or because they enjoy doing their job. Student 1, 8, 9, and 10 mention that their performance is not influenced by their salary because they believe that you should always perform at work.

*“Most of the time I find my own motivation. I am critical about my own work. I just want to do it right and show them what I am capable of” (Student 10, 2<sup>nd</sup> year)*

*“I enjoy going to work. I asked them if I could stay for my period of work experience of level 3, because I enjoyed working with them during level 2” (Student 7, 2<sup>nd</sup> year)*

*“It is nice to get paid, however I think that it shouldn't matter. You just have to do your job. I think that it shouldn't make a difference if I get 5 of 10 euros per hour, I always do my best” (Student 10, 2<sup>nd</sup> year)*

Intrinsic motivation is seen as a facilitator to the development and acquisition of key qualifications, as it enhances the carpentry students' willingness to perform well during their period of work experience. However, there are students who, next to intrinsic motivation, experience a form of extrinsic motivation. Student 3, 4, 5, and 7 are extrinsically motivated. They say that they do perform better when they receive salary.

*“I think I work harder if I get paid. I think it is important to receive salary, as I put in the same effort as my colleagues and work for 40 hours a week” (Student 4, 3<sup>rd</sup> year)*

Furthermore, 5 students say that they get motivated by support and compliments they receive from their boss or colleagues. Therefore, they perform better because they receive those compliments and support.

*“Yes my colleagues motivate me. Which is necessary I believe. Some days I work from 6 am till 6.30 pm, therefore I need their support” (Student 2, 3<sup>rd</sup> year)*

One student (student 3) is only extrinsically motivated. He says that he performs better when others tell him to, when he receives salary and because he wants to receive an employment contract. Therefore, he performs only because of an external reward or outcome. Even though

extrinsic motivation triggers good behavior from outside the individual, it does accomplish that the carpentry student behaves as he should. Therefore, extrinsic motivation is seen as a facilitator to the development and/or acquisition of key qualifications as the carpentry students are willing to show the required behavior because of compliments or monetary rewards they receive. Some of the students, like student 7, mention that they sometimes experience situations in which they are not motivated at all. According to them, this occurs in situations in which they had a bad night of sleep, or when he needs to perform tasks that he dislikes. Therefore, these situations in which amotivation occurs can form a barrier to the development and/or acquisition of key qualifications. Many of the carpentry students for example, as mentioned in paragraph 4.1, have no affection with expressing themselves in written language. Therefore, they do not want to learn more about how to express themselves in written language. If they are not motivated by their teachers or instructors at work to learn how to write reports, they probably will not develop this key qualification.

### 4.2.3 Opportunity

Data analysis showed that some opportunity factors form a barrier to or facilitate the development and acquisition of the carpentry student's key qualifications. First, results regarding the factors that facilitate the development and acquisition of key qualifications namely job-related information, tools and equipment, materials and supplies, and help from others are discussed. Second, results regarding the factors that form a barrier to the development and acquisition of key qualifications namely task preparation, time availability, and work environment, are discussed.

#### Job-related information

The factor job-related information concerns the availability of information to the student. Nine of the 10 students said that they receive sufficient information to do their job during their period of work experience. Three out of 10 stated that the information they receive most of the time consists of a short explanation given by their instructor or colleague and a construction drawing.

*“Yes. You will get a drawing and some information about how to do it. If you do not fully understand what you have to do you can always ask for more information”*  
(Student 10, 2<sup>nd</sup> year)

These two sources of information are usually sufficient to do the job. Furthermore, according to seven out of 10 students, they always can ask for further explanation if something is

unclear. Receiving proper job-related information can enhance the development of key qualifications. If the carpentry student for example receives a proper construction drawing, this allows him to work accurately. One student (student 1), mentions that he does face situations in which he lacks information to do his job. He works in an organization that uses new building techniques that are unfamiliar to him.

*“Not always, my organization uses a lot of new building techniques. Therefore, the information and details on the construction drawing are not sufficient for me.*

*Nevertheless, I have to start building, even though I do not believe that I have all the information I need. Due to this, I sometimes have to undo my work and do it again. I do not think that is convenient” (Student 1, 3<sup>rd</sup> year)*

However, in general the carpentry students do not perceive job-related information as a barrier. As the majority of the carpentry students say that they receive sufficient information to do their job, the factor ‘job-related information’ is seen as a facilitator to the development and acquisition of key qualifications.

### Tools and equipment, materials and supplies

All 10 students agreed that they have access to the tools and equipment they need to do their job during their period of work experience. The students receive a tool box from school, which they can use during their entire education. Three out of 10 students said that the organization provides them with additional tools if they aren’t available.

*“At school we received a tool box which contains a lot of tools. If you still lack something that you need you can ask for it at work” (Student 7, 2<sup>nd</sup> year)*

Next to the factor tools and equipment, the 10 students also agreed that there are sufficient materials and supplies available to do their job. Most of the organizations the students work in arrange the materials and supplies that they need. Five out of 10 students also pointed out that the organization orders additional materials and supplies if needed.

*“Yes, and if I need something that isn’t present I have to write it down so they can order it for me” (Student 2, 3<sup>rd</sup> year)*

The statements show that the carpentry students have access to the tools and equipment, and the materials and supplies they need. Therefore, these factors are seen as a facilitator.

### Help from others

The factor help from others is about the help the carpentry student receives. Two out of 10 students are supervised by an instructor or colleague every day. If they need help that person

is always present.

*“We work in pairs, so there is always a colleague with me to ask for help”*

*(Student 10, 2<sup>nd</sup> year)*

Even though few students receive this intensive type of guidance, four out of 10 students mention that they can always get the help that they need. They always feel free to ask. This is an important factor that facilitates the development and acquisition of key qualifications. If the carpentry students feel free to ask for help, they can develop their knowledge and skills. Therefore, the factor help from others is seen as a facilitator of the development and acquisition of key qualifications.

### Task preparation

A majority of the students does not feel prepared to perform certain tasks at work based on what they have learned at school. Results show that the main reason for this is because of what they learn in the practical lessons at school. During these practical lessons the students need to learn how to perform different tasks such as installing a door or milling timber. The students say that there is little material and equipment present at school. Therefore, they often feel that they didn't get the chance to learn how to perform a task properly. Furthermore, students mention that these practical lessons lack guidance. By this the carpentry students mean that there are only two teachers present, who have to support everyone at the same time. Several students therefore feel that they do not always get the chance to ask what they need.

*“We need more support. Sometimes I have to wait for almost 30 minutes if I want to ask something. Therefore, I am not able to finish the task. [...] there are about 30 students during that lesson and only two teachers, of which one of them needs to stay close to the machines” (Student 8, 2<sup>nd</sup> year)*

One student (student 9) however, believes that it is not a problem if he does not learn how to perform certain tasks at school. According to him, the period of work experience is part of the learning process, as he says:

*“Well I believe we do not only learn at school. I learn a lot during my period of work experience, I believe that is just fine. We cannot learn everything at school and for some tasks we can't expect school to purchase all the goods if we can learn it at work” (Student 9, 2<sup>nd</sup> year)*

However, the majority of the students wants to learn more tasks at school in order to improve their performance at work. Therefore, the factor task preparation is seen as a barrier. A lack of task preparation for example leads to a lower level of basic carpentry knowledge.

## Time availability

In total 6 out of 10 students say they have too little time to do their job. They mention that work is planned tightly. This is however, according to them, necessary as work has to be done in order for the next building phase being able to start on time. Sometimes they have to put in an extra effort to finish their job on time:

*“Yes. [...] at work you have to finish something within a certain time period, because than the next phase has to start. For example, pouring concrete. [...] so there is time pressure” (Student 10, 2<sup>nd</sup> year)*

*“Sometimes the planning is a little bit too tight. Once they know that you can do it in a certain period of time, they will keep planning it that tight and that is a bit of a problem. It is not always healthy” (Student 1, 3<sup>rd</sup> year)*

*“Yes. [...] sometimes you are falling behind, but then you just double your effort and it will be ok” (Student 2, 3<sup>rd</sup> year)*

Because of time pressure the carpentry student might perform below his capabilities or he can easily make mistakes. There are however, two students, who did not face a situation in which they lacked time yet.

*“Yes, up till now I have had enough time. I have not been in a situation yet in which I was short of time” (Student 7, 2<sup>nd</sup> year)*

However, these two students are second year students. Therefore, they have not been in many situations yet in which they could have experienced time pressure.

Because the majority of the carpentry students experience that they have too little time to do their job, the factor time availability is seen as a barrier to the development and acquisition of key qualifications. If there is less time available, there is less time to learn.

## Work environment

The majority of the students mentions that disturbances in the work environment can lead to distraction. Because the students work in the construction industry, they have to deal with noise at the construction site and weather conditions. This means that if it is for example warm, cold, rainy or snowy, work still has to be done, which can be annoying according to some the students. Furthermore, the carpentry students say that they get easily distracted by the noise at the construction site. However, all students mention that this is part of their job. Some however can adapt better to these distractions than others.

*“We usually work outside, that can be nice and warm or annoying and cold. You just have to continue working, it is part of the job. There is also noise at the construction site, that is part of the industry” (Student 1, 3<sup>rd</sup> year)*

Because factors in the work environment of the carpentry students can distract them from their work, the factor work environment is seen as a barrier to the development and acquisition of key qualifications.

### 4.3 Summary of results

This paragraph gives a summary of the results that are discussed in this chapter. These results relate to the research question which was formulated in paragraph 1.1 as: do carpentry students develop and/or acquire the key qualifications they need during their period of work experience and what is the influence of ability, motivation, and opportunity?

Table 4.1 summarizes the results that were discussed in paragraph 4.1 and relates to sub-question 1 to 6. The research of this master thesis focuses solely on the key qualifications that carpentry students need to develop and/or acquire according to the respondents.

Therefore, table 4.1 only shows the 22 key qualifications that were mentioned during the interviews instead of all the 42 key qualifications (Table 2.2) that were determined by Van Zolingen (1995). This summary also shows that no additional codes were found during the coding process.

Firstly, results showed that the carpentry students mentioned that they need 17 key qualifications to perform well during their period of work experience (Table 4.1, column 3). The 17 key qualifications mentioned by the carpentry students were: basic occupational knowledge, the ability to plan work, quality awareness (general-instrumental dimension), identifying and solving problems (cognitive dimension), accuracy, self-confidence, sense of responsibility, decisiveness, exercising initiative, coping with stress, creativity, willingness to achieve, perseverance (personality dimension), ability to express oneself orally, ability to work together (socio-communicative dimension), identification, and complying with safety measures (socio-normative dimension).

Secondly, results showed that the representatives of the organizations mentioned that the carpentry students need 18 key qualifications to perform well during their period of work experience (Table 4.1, column 4). These 18 key qualifications mentioned by the representatives of the organizations were: basic occupational knowledge, the ability to plan work, quality awareness (general-instrumental dimension), identifying and solving problems,

learning to learn (cognitive dimension), self-confidence, sense of responsibility, exercising initiative, willingness to achieve, perseverance (personality dimension), ability to express oneself orally, ability to work together (socio-communicative dimension), identification, knowledge of the organization, representativeness, complying with safety measures, willingness to take part in further learning (socio-normative dimension), and emancipatory behavior (strategic dimension).

Thirdly, the results mentioned above, showed some similarities and differences. Table 4.1 shows that both groups agreed on 13 key qualifications that the carpentry students need in order to perform well during their period of work experience. However, there are four key qualifications that were only mentioned by the carpentry students namely accuracy, decisiveness, coping with stress, and creativity, which all belong to the personality dimension. Results also show that the carpentry students did not mention that they need a key qualification of the strategic dimension. Otherwise, five key qualifications are only mentioned by the representatives of the organizations namely learning to learn (cognitive dimension), knowledge of the organization, representativeness, willingness to take part in further learning (socio-normative dimension), and emancipatory behavior (strategic dimension).

Next, results showed that the carpentry students mentioned that they have 13 of the 17 key qualifications, as required for working as a carpenter in the organization, of which they said they need to perform well during their period of work experience. This means that the carpentry students said that they do not have four key qualifications, as required for working in the organization, to which they referred to as needed in order to perform well during their period of work experience. These four key qualifications are identifying and solving problems (cognitive dimension), decisiveness (personality dimension), identification, and complying with safety measures (socio-normative dimension).

Moreover, results showed that the representatives of the organizations mentioned that the carpentry students have 8 of the 18 key qualifications, as required for working in the organization, of which the representatives of the organizations said the carpentry students need to perform well during their period of work experience. This means that, according to the representatives of the organizations, the carpentry students do not have 10 key qualifications, as required for working in the organization, that were referred to as needed by the representatives of the organizations. These 10 key qualifications are basic occupational knowledge, ability to plan work (general-instrumental dimension), identifying and solving problems, learning to learn (cognitive dimension), exercising initiative (personality dimension), identification, knowledge of the organization, complying with safety measures,

willingness to take part in further learning (socio-normative dimension), and emancipatory behavior (strategic dimension).

*Table 4.1: Key qualifications that carpentry students need according to both groups*

Dimension	Key qualifications <sup>1</sup>	Carpentry students	Representatives of the organizations
<b>1. General-instrumental dimension</b>	Basic occupational knowledge	X <sup>*(2,3)</sup>	X
	The ability to plan work	X*	X
	Quality awareness	X*	X*
<b>2. Cognitive dimension</b>	Identifying and solving problems	X	X
	Learning to learn		X
<b>3. Personality dimension</b>	Accuracy	X*	
	Self-confidence	X*	X*
	Sense of responsibility	X*	X*
	Decisiveness	X	
	Exercising initiative	X*	X
	Coping with stress	X*	
	Creativity	X*	
	Willingness to achieve	X*	X*
	Perseverance	X*	X*
<b>4. Socio-communicative dimension</b>	Ability to express oneself orally	X*	X*
	Ability to work together	X*	X*
<b>5. Socio-normative dimension</b>	Identification	X	X
	Knowledge of the organization		X
	Representativeness		X*
	Complying with safety measures	X	X
	Willingness to take part in further learning		X
<b>6. Strategic dimension</b>	Emancipatory behavior		X

<sup>1</sup> Only the key qualifications which were mentioned during the interviews are displayed in this table

<sup>2</sup> X = key qualifications that carpentry students need according to each group

<sup>3</sup> \* = key qualifications that the carpentry students have, as required for working in the organization, according to each group

A comparison shows that both groups agree that the carpentry students have the key qualifications quality awareness (general-instrumental dimension), self-confidence, sense of responsibility, willingness to achieve, perseverance (personality dimension), ability to express

oneself orally, and the ability to work together (socio-communicative dimension), as required for working in the organization.

Furthermore, both groups agree that the carpentry students need but do not have the key qualifications identifying and solving problems, identification, and complying with safety measures, as required for working in the organization. Moreover, there are three key qualifications, basic occupational knowledge, the ability to plan work, and exercising initiative, on which both groups agree that the carpentry students need, but of which only the carpentry students said they have, as required for working in the organization. Finally, as mentioned before, there are five key qualifications that only the representatives mentioned that the carpentry students need. These key qualifications are learning to learn (cognitive dimension), knowledge of the organization, representativeness, willingness to take part in further learning (socio-normative dimension), and emancipatory behavior (strategic dimension). According to the representatives of the organizations, the carpentry students only have one of these five key qualifications, as required for working in the organization, namely representativeness.

In the second place, paragraph 4.2 showed the results regarding sub-question 7 to 9 regarding ability, motivation, and opportunity. Table 4.2 gives an overview of the factors of AMO that form a barrier or facilitate the development and/or acquisition of the key qualifications that carpentry students need during their period of work experience.

*Table 4.2: Barriers and facilitators to the development and acquisition of key qualifications*

Concept	Factor	Barrier	Facilitator
<b>Ability</b>	Level of self-regulation		X
	Task effectiveness	X	
	Experience in the work field		X
	Carpentry knowledge	X	
<b>Motivation</b>	Intrinsic motivation		X
	Extrinsic motivation		X
	Amotivation	X	
<b>Opportunity</b>	Job-related information		X
	Tools and equipment		X
	Materials and supplies		X
	Help from others		X
	Task preparation	X	
	Time availability	X	
	Work environment	X	

Firstly, the results regarding the ability of the carpentry students showed that the development and/or acquisition of key qualifications is facilitated by the carpentry student's level of self-regulation and their experience in the work field. However, a lack of task effectiveness and a lack of carpentry knowledge form a barrier for the development and/or acquisition of the carpentry student's key qualifications.

Secondly, the results showed that the majority of the carpentry students experiences both intrinsic and extrinsic motivation to perform during their period of work experience. As the results in paragraph 4.2.2. showed, intrinsic motivation and extrinsic motivation facilitate the development and/or acquisition of key qualifications. Amotivation on the other hand, can form a barrier to the development and/or acquisition of key qualifications.

Finally, the results regarding the opportunities showed that the carpentry student receives enough information at work, has access to sufficient tools and equipment, and materials and supplies, and receives enough help. These factors are seen as facilitators to the development and/or acquisition of key qualifications. On the other hand, a lack of task preparation, time availability and disturbances in the work environment can form a barrier to the way that carpentry students develop and/or acquire key qualifications.

## 5. Conclusion and discussion

In the first place this chapter answers the research question of this master thesis as it presents the conclusion. In the second place, this chapter discusses the limitations of the research of this master thesis and gives implications for further research. At last, this chapter gives recommendations to the ROC Nijmegen in order to improve the transition from school to work for carpentry students.

### 5.1 Conclusion

The research question of this master thesis was formulated in paragraph 1.1 as: do carpentry students develop and/or acquire the key qualifications they need during their period of work experience and what is the influence of ability, motivation, and opportunity? In order to answer the research question, this paragraph answers the sub-questions. When answering these questions, a distinction is being made between the sub-questions related to the key qualifications carpentry students need (sub-question 1-3) and the key qualifications carpentry students have as required for working in the organization (sub-question 4-6). This is done in order to overcome untidiness and to clarify the similarities and differences between the response of both interview groups. Thereafter, the results that were found in the research of this master thesis are compared with literature.

Firstly, this paragraph gives insight into which key qualifications carpentry students need, by answering sub-question 1 to 3. In paragraph 1.1 these sub-questions were formulated as:

1. Which key qualifications do the carpentry students mention they need to perform well during their period of work experience?
2. Which key qualifications do the representatives of the organizations mention the carpentry students need to perform well during their period of work experience?
3. What are the differences and similarities between the key qualifications that the carpentry students and the representatives of the organizations mentioned that the carpentry students need to perform well during their period of work experience?

Answering these sub-questions is done by discussing each dimension of key qualifications in sequence.

First of all, both groups of respondents mentioned the same key qualifications of the general-instrumental dimension that the carpentry students need to perform well during their period of work experience namely, basic occupational knowledge, the ability to plan work,

and quality awareness. The majority of the carpentry students mentioned that they need sufficient knowledge of the carpentry occupation in order to be able to perform their work activities. The representatives of the organizations agree, as all of them said the carpentry students need basic occupational knowledge to understand the fundamentals of the carpentry occupation. Moreover, the representatives also said that a proper level of basic occupational knowledge is needed to enhance the carpentry student's learning process. By this they mean that a thorough understanding of the carpentry occupation helps the carpentry student to adapt and learn quickly in new situations. Furthermore, the carpentry students and the representatives of the organizations both mentioned that the carpentry students need to be able to plan work. Both groups of respondents said that the carpentry student needs this key qualification because he needs to be able to plan his daily activities at work himself. Finally, the carpentry students need the key qualification quality awareness. The representatives of the organizations explained that the carpentry students provide a service for their customers. Therefore, they expect the carpentry students to deliver quality. The carpentry students mentioned that they are aware of this expectation and thus that they also believe that they need this key qualification.

Secondly, both groups mentioned that the carpentry students need the key qualification identifying and solving problems of the cognitive dimension. The majority of the carpentry students said that they often face small problems at work, which they need to solve themselves. The representatives of the organizations agree, they said that facing small problems is part of daily work routines. Therefore, the carpentry students need to be able to deal with problems themselves, in order to for example prevent work delay. Besides the ability to identify and solve problems, only the representatives of the organizations mentioned another key qualifications of the cognitive dimension that the carpentry students need to perform well during their period of work experience, namely learning to learn. Results showed that the representatives of the organizations emphasize that they expect the carpentry students being eager to learn. According to the representatives of the organizations the carpentry students need eagerness to learn, as it enables them to grow. Moreover, the representatives of the organizations believe that being eager to learn stimulates the development of other key qualifications. For example, they mentioned that a carpentry student who knows how to learn dares to ask questions and shows that he is willing to achieve. The carpentry students themselves did not mention that they need this key qualification. They seem unaware of the importance of the key qualification learning to learn.

Thirdly, in total nine key qualifications of the personality dimension were mentioned

as needed. Five of these key qualifications were mentioned by both the representatives of the organizations and the carpentry students namely self-confidence, sense of responsibility, exercising initiative, willingness to achieve, and perseverance. Besides these five key qualifications, the carpentry students mentioned that they also need four additional key qualifications from the personality dimension namely, accuracy, decisiveness, coping with stress, and creativity. It is important to notice that only the carpentry students mention that they need a large number of key qualifications of the personality dimension in contrast with the representatives of the organizations.

Fourth, both the carpentry students and the representatives of the organizations agree on which key qualifications carpentry students need to perform during their period of work experience of the socio-communicative dimension. These key qualifications are the ability to express oneself orally and the ability to work together. Both groups mentioned that a carpenter works together with colleagues most of the time because the activities he has to do cannot be performed individually. Furthermore, a carpenter often has to work with people from other disciplines such as painters or electricians. Therefore, both groups emphasize that it is important for the carpentry student to possess these key qualifications.

Fifth, the representatives of the organizations emphasize that carpentry students need key qualifications of the socio-normative dimension. They mentioned that the carpentry students need five key qualifications of this dimension, namely identification, knowledge of the organization, representativeness, complying with safety measures, and willingness to take part in further learning. The carpentry students only mentioned that they need identification and complying with safety measures. Therefore, it seems that the carpentry students are unaware that they, according to the representatives of the organizations, also need the key qualifications knowledge of the organization, representativeness, and willingness to take part in further learning. This is interesting, as the carpentry students seem unaware that the key qualifications of the socio-normative dimension are important according to their future employers.

Finally, only the representatives of the organizations mentioned that the carpentry students need a key qualification from the strategic dimension. The representatives of the organizations said that the carpentry students need to show emancipatory behavior. They expect that the carpentry student is able to have a critical attitude towards work. The representatives of the organizations also relate to learning to learn, a key qualification of the cognitive dimension, as reflecting leads to new insights.

The next section discusses if the carpentry students have the key qualifications, as required for working in the organization, that the previous section presented they need. Therefore, sub-questions 4-6 are answered, that were formulated in paragraph 1.1 as:

4. Which key qualifications do the carpentry students mention they have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
5. Which key qualifications do the representatives of the organizations mention the carpentry students have, as required for working as a carpenter in the organization, to perform well during their period of work experience?
6. What are the differences and similarities between the key qualifications the carpentry students and the representatives of the organizations mentioned that the carpentry students have, as required for working as a carpenter in the organization, to perform well during their period of work experience?

This section uses the same structure as before and answers the sub-questions by discussing each dimension of key qualifications in sequence.

First of all, both groups agreed that the carpentry students have the key qualification quality awareness, as required for working in the organization. However, even though both groups agreed that carpentry students also need basic occupational knowledge and the ability to plan work from the general-instrumental dimension, the representatives of the organizations do not agree with the carpentry students who have said that they have these two key qualifications, as required for working in the organization. Whereas the majority of the carpentry students said that they believe that they have sufficient basic occupational knowledge, as required for working in the organization, the representatives of the organizations said that their level of basic occupational knowledge too low. The representatives think that this is due to the current structure of education, in which the carpentry students gain too little experience. Results showed that, according to the representatives of the organizations, another reason for this could be that the knowledge the carpentry students gain at school is outdated. Furthermore, results showed that the carpentry students think that they are able to plan work. However, the representatives of the organizations do not agree, as they mentioned that the carpentry students are not able to plan work according to their expectations. They mentioned that the carpentry students are too dependent on the help of others to plan work.

Moreover, the carpentry students and the representatives both mentioned that they need the key qualification identifying and solving problems. Both groups agree that the

carpentry students do not have this key qualification as required for working in the organization. The majority of the carpentry students mentioned that they often doubt about what the right solution should be. Furthermore, they mentioned that the problems they face at work often differ from what they have learned at school. Therefore, they do not know how to solve those problems. The representatives of the organizations also acknowledge this, as they said that the carpentry students still need help from others to come up with the right solution. As mentioned before, only the representatives of the organizations said that the carpentry students need the key qualification learning to learn. The representatives of the organizations said that the carpentry students do not have this key qualification as required for working in the organization. The reason for this could be that the carpentry students are not aware that they need this key qualification.

Next, the carpentry students and the representatives agree that the carpentry students have the key qualifications self-confidence, sense of responsibility, willingness to achieve, and perseverance of the personality dimension, as required for working in the organization. The representatives of the organizations do not agree with the carpentry students that they have the key qualification exercising initiative, as required for working in the organization. According to the representatives of the organizations, the carpentry students show too little initiative. They believe this is due to a bad mentality and that the carpentry students only want to perform the tasks they are intended to do. Furthermore, the carpentry students mentioned that they have the key qualifications accuracy, coping with stress, and creativity, as required for working in the organization. The representativeness of the organizations however did not mention that the carpentry students need these key qualifications and therefore no statements were related to whether the representatives of the organizations believed the carpentry students have those three key qualifications as required for working in the organization.

Moreover, results showed that both groups agreed that the carpentry students need two key qualifications of the socio-communicative dimension namely the ability to express oneself orally and the ability to work together. Both groups also agreed that the carpentry students have these two key qualifications as required for working in the organization. According to both groups, the carpentry students are well able to work together with their colleagues and are able to communicate with others clearly.

Next, results regarding the socio-normative dimension were interesting. The carpentry students mentioned that they do not have any of the key qualifications of this dimension, as required for working in the organization, even though the representatives of the organization emphasize that they need a large number of key qualifications of this dimension. The

carpentry students did mention that they need the key qualification complying with safety measures. However, the majority of the carpentry students mentioned that they often face situations in which they do not comply with the safety measures. The representatives of the organizations agree, as they see a lot of situations in which the carpentry students do not comply to the safety measures. Furthermore, representatives of the organizations mentioned that the carpentry students also do not have the key qualifications identification, knowledge of the organization, and willingness to take part in further learning, as required for working in the organization. It is important to notice that the carpentry students are not aware of the importance of acquiring the key qualifications of the socio-normative dimension. According to the representatives of the organizations, the carpentry students key qualifications do not meet their requirements.

Finally, the representatives of the organizations mentioned that the carpentry students do not have the key qualification emancipatory behavior as required for working in the organization. According to them, the carpentry students do not reflect critically on their own work. This would, in their opinion enhance the learning process of the carpentry students. The carpentry students did not mention whether or not they have this key qualification, as required for working in the organization, because they did not mentioned that they need a key qualification of this dimension.

Concluding, some important findings need to be kept in mind. The carpentry students do not have 3 of the 13 key qualifications, as required for working in the organization, that were mentioned as needed by both groups of respondents. These are the key qualifications identifying and solving problems (cognitive dimension), identification, and complying with safety measures (socio-normative dimension). Furthermore, of the key qualifications both groups agreed on that the carpentry students need, the representatives of the organizations do not agree with the carpentry students about three key qualifications that the carpentry students think they have as required for working in the organization. This holds for the key qualifications basic occupational knowledge, the ability to plan work (general-instrumental dimension), and exercising initiative (personality dimension). For these three key qualifications the carpentry students think that they meet the expectations of the representatives of the organizations. However, the representatives of the organizations said that they do not. Finally, five key qualifications were only mentioned as needed by the representatives of the organizations namely learning to learn (cognitive dimension), knowledge of the organization, representativeness, willingness to take part in further learning

(socio-normative dimension), and emancipatory behavior (strategic dimension). It is striking that the representatives of the organizations emphasize the importance of learning and interest in the organization, even though the carpentry students are unaware of the importance of key qualifications regarding these matters. This means that regarding these requirements, the carpentry students do not develop and/or acquire all the key qualifications they need. The representatives of the organizations are looking for carpentry students who show that they know how to learn, are willing to learn, put in an effort for the organization, and are able to critically reflect on their own work.

These conclusions show that the carpentry students do not develop and/or acquire all the key qualifications they need. This confirms that there is a qualification problem, which was discussed in Chapter 2. According to Van Hoof (1987), a qualification problem is present when there is a discrepancy between the required and the available qualifications at the labor market. The research of this master thesis showed that the carpentry students do not have the required qualifications by representatives of the organizations that relates to learning and organizational interests.

Furthermore, the results of the research of this master thesis showed that the carpentry students need a large number of key qualifications. However, the research of this master thesis showed that carpentry students do not develop and/or acquire all the key qualifications that they need. This confirms that the carpentry student's education plays an important role regarding the development and/or acquisition of these key qualifications. This agrees with the studies by Van Zolingen (1995, 2002), that indicated that vocational education plays an important role regarding the development and/or acquisition of key qualifications.

Furthermore, the results of this master thesis are in line with the flexible approach described by Van Hoof (1987) which was discussed in chapter 2 of this master thesis. The flexible approach supposes an interaction between the education system and the labor system in order to design an educational program that provides the carpentry students with the broad spectrum of key qualifications they need. However, results showed that there are some difficulties regarding this process for the carpentry education.

In the first place, because of developments in the industry, the representatives of the organizations mention that they were forced to restructure their organization. These new structures force the organizations to outsource work to subcontractors. In order to execute certain tasks during the period of work experience, the carpentry student has to work with those subcontractors. Therefore, the organization is not fully in control of the carpentry student's education. Because of these developments, the representatives of the organizations

mention that it is becoming increasingly difficult to monitor the development of the key qualifications of carpentry students. However, there is no alignment between the organizations and the school about how to overcome this problem, which may cause the carpentry student not being able to develop and acquire the key qualifications he needs.

Furthermore, the research of this master thesis confirms that the school is lagging behind on other developments in the industry (Van Hoof, 1987). New techniques and new knowledge are not yet incorporated in the carpentry education, which leads to a lack of knowledge. Learning about these new techniques would facilitate the carpentry student's learning process at work as he would be better able to understand certain activities. Thereby, the carpentry students and the representatives of the organizations mention that the level of knowledge of some of the carpentry teachers is not up-to-date. Because most of them do not have recent work experience in the construction industry, their knowledge is outdated.

Finally, carpentry students say that they receive too little attention and support during classes at school. Teachers are often busy with other activities and not present during theoretical lessons. Therefore, the carpentry students are not always given the opportunity to ask questions or further explanation. Furthermore, according to the carpentry students, the presence of only two teachers during practical lessons is not enough. One teacher needs to watch over the machinery, which leaves only one teacher to answer questions. If the carpentry students are not always able to ask questions or to ask for further explanations, they might not learn enough to be well prepared for work.

Finally, results support the findings by Van Zolingen (1995, 2002) that the key qualifications a vocational student needs are dependent on the context of his occupation. Van Zolingen (1995, 2002) found that service engineers need 14 key qualifications: self-reliance, responsibility, accuracy, quality awareness, social skills, willingness to take part in further learning, the ability to handle information, the ability to cope with stress, the ability to solve problems, methodical thinking, exercising initiative and the ability to be decisive and creative. These key qualifications correspond with the key qualifications that the carpentry students need. However, the research of this master thesis found that a carpentry student needs 22 key qualifications. Therefore, in comparison with the service engineer, he needs 8 more key qualifications namely emancipatory behavior, the ability to plan work, learning to learn, initiative, perseverance, identification, knowledge of the organization, representativeness, and complying with safety measures.

Next, the research of this master thesis also focused on the influence of AMO on the

development and/or acquisition of key qualifications that carpentry students need to during their period of work experience. Sub-questions 7 to 9 focused on the influence of AMO.

These sub-questions were formulated in paragraph 1.1 as:

7. Do the abilities of the carpentry students act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?
8. Does the motivation of the carpentry students act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?
9. Do the opportunities the carpentry students have act like a barrier or facilitate the development and/or acquisition of key qualifications during the period of work experience?

Firstly, results regarding the ability of carpentry students showed that a lack of task effectiveness and a lack of carpentry knowledge form a barrier to develop and/or acquisition of the key qualifications carpentry students need during the period of work experience. As explained in chapter 4, a lack of task effectiveness means that the carpentry student is unable to recognize how to deal with a certain task effectively. A lack of task effectiveness especially forms a barrier to the development and/or acquisition of key qualifications that belong to the personality dimension, as for example the carpentry student's feelings of insecurity increases. Furthermore, a lack of carpentry knowledge forms a barrier to the application of key qualifications. If the carpentry student lacks knowledge about certain contents or activities, he is for example unable to solve problems or unable to plan work. A lack of carpentry knowledge is also mentioned by the representatives of the organizations to form a barrier to the learning process of the carpentry student. They believe that a lack of carpentry knowledge slows down the learning process as the carpentry student understanding decreases. However, the development and/or acquisition of key qualifications is facilitated through a proper level of self-regulation, which means that the carpentry student is able to control emotions and is able to deal with change, and the carpentry student's experience in the work field. Prior experience in the work field helps the carpentry students how to behave in certain work situations, this enhances the development and/acquisition of the key qualifications he needs.

Secondly, results regarding the motivation of carpentry students showed that motivation plays an important role regarding the development and acquisition of key qualifications during the period of work experience (Table 4.2). Paragraph 4.2.2. showed that

the majority of the carpentry students perform because of the pleasure or satisfaction they derive from work. This means that they are intrinsically motivated. Intrinsic motivation enhances the willingness of the carpentry student to perform, and therefore is seen as a facilitator to the development and/or acquisition of key qualifications. Furthermore, a large number of the carpentry students also experiences some forms of extrinsic motivation. Half of the group of carpentry students mentioned that they want to perform because of the support and compliments they receive from others. This is beneficial for the development and/or acquisition of key qualifications, for example such as representativeness. The carpentry student is more likely to wear the prescribed clothing to work if his colleagues complement him for doing so. Moreover, four students mentioned that they are extrinsically motivated because of the salary they receive. They believe that they put in an extra effort because of this reward. This also facilitates the development and/or acquisition of key qualifications, as for example the carpentry student will put in an effort to show good team work if he knows that afterwards he is rewarded. As Table 4.2 shows there is a form of motivation that forms a barrier to the development and/or acquisition of key qualifications, namely amotivation. Results showed that a few students said that they sometimes face situations in which they are not motivated at all. One of the students mentioned that he sometimes is not motivated at all to do his job after a bad night of sleep. He said for example that if he is tired, he won't show perseverance if he needs to work late. Furthermore, one of the students mentioned that he is not motivated at all if he needs to perform a job that he dislikes. Therefore, he might not put in the effort to deliver a good quality of work. In these situations, the carpentry students mentioned that they do not want to put in an effort to show the behavior the organization expects from him. Therefore, amotivation is seen as a barrier to the development and/or acquisition of key qualifications.

Finally, results regarding opportunity showed that a lack of task preparation, a lack of time availability and disturbances in the work environment, such as noise or weather conditions, form a barrier to the development and/or acquisition of key qualifications. A lack of task preparation indicates that the carpentry student feels that he is not properly taught at school how to perform in certain work situations. This hinders the carpentry student to execute tasks at work according to the right proceeding. He might, for example, feel insecure about how to act or he might be unable to find a proper solution to a problem at hand which he could have learned at school. Furthermore, the carpentry students said that they often face situations in which little time is available to do their job, because during work they also need to do assignments. Therefore, a lack of time sometimes hinders the carpentry students to do

those assignments adequately. This means that a lack of time availability does not support the learning process of the carpentry student. Therefore, this factor is seen as a barrier to the development and/or acquisition of key qualifications. Finally, disturbances in the work environment can distract the carpentry student from his learning process during work. The carpentry students said that they are often distracted from work by different weather conditions or loud noises at the construction site. Besides barriers, the research of this master thesis found that the factors sufficient job-related information, the availability of tools and equipment and materials and supplies, and help from others are facilitators of the development and/or acquisition of key qualifications. Sufficient job-related information for example increases the carpentry student's confidence, as most of them said that together with the information he receives he feels able to perform the task at hand. The carpentry students said that the availability of tools and equipment for example enables him to perform his tasks. Moreover, the carpentry students receive the help that they need. The carpentry students said that colleagues teach them much about how to perform and behave, which facilitates the development of the carpentry student's key qualifications.

It is difficult to compare these results with prior research. There has not been done previous research that combined the influence of AMO on the development and/or acquisition of key qualifications. However, the research of this master thesis used key qualifications to express work performance. The results do confirm the findings of Siemsen et al. (2008), that the work performance of an individual (expressed in key qualifications) can be influenced by ability, motivation, and opportunity. Furthermore, the research of this master thesis identified barriers and facilitators to the development and/or acquisition of carpentry student's key qualifications during their period of work experience. Therefore, the results do not completely support the findings of Billet (2000, 2001) that work places are effective learning environments. In order for the work place to function as an effective learning environment for the carpentry students, the barriers need to be addressed.

## 5.2 Limitations and strong points of the research

This paragraph presents some strong points and the limitations of the methodology of the research of this master thesis.

First of all, the use of interviews with the carpentry students proved to be a suitable method to obtain the information the researcher needed. Because the research of this master thesis showed that the carpentry students have no affinity with written language and their overall education level is low, the use of a questionnaire probably would not have produced

the desired response. Conducting interviews allowed the researcher to make contact with the carpentry students and to further explain the goal of the research, which made them feel at ease. Therefore, the researcher was able to collect the data she needed, which increased the reliability of the outcomes of the research of this master thesis.

Secondly, the use of interviews with the representatives of the organizations also appeared to be a suitable method. Besides getting insight in the results that were needed to answer the research question, the interview gave the researcher the opportunity to ask more in-depth questions. Thereby, the researcher gathered insight in additional information regarding the causes that lead to the problem at hand. This helped the researcher to get a more thorough view on the subject.

Thirdly, the research of this master thesis combined the AMO-framework and its influence on the development and/or acquisition of key qualifications, which is new in the literature about this topic. The results showed that there are factors of ability, motivation, and opportunity that form a barrier to the development and/or acquisition of the carpentry student's key qualifications. Therefore, using the AMO-framework added something extra the practical research of this master thesis.

Furthermore, the choice to use the interpretation of general qualifications by Van Zolingen (1995, 2002), key qualifications, seemed to be an accurate choice. When analyzing the interviews, no new codes were identified. Therefore, the list of codes, which was based on the key qualifications that were defined by van Zolingen (2002, table 2.2, p.19), appeared to be a good reflection of the subject at hand.

However, there were some limitations. Of which the first one is related to the generalizability of the research of this master thesis. As this master thesis was a single case study, the case of the carpentry education at the ROC Nijmegen, one has to be careful to generalize results to carpentry education at other ROC's. Because carpentry students at other ROC's work in the same industry as the carpentry students of the ROC Nijmegen, similar problems might exist. However, the curriculum of a carpentry education at other ROC's may differ.

A second limitation is the number of interviewees that were interviewed. There were 16 interviewees involved in the research of this master thesis, of which ten carpentry students and six representatives of the organizations. However, there are many more carpentry students and representatives of the organizations who are related to the carpentry education. Therefore, the results of this master thesis might not apply to all carpentry students and representatives of the organizations. However, because of a time limit and a limited size of the research of this

master thesis, involving a larger group of respondents was not possible.

A third limitation is the selection of interviewees. The research of this master thesis focuses on the development and acquisition of key qualifications during the period of work experience. In order to obtain a proper view on the development and acquisition of these key qualifications, the carpentry students and the representatives of the organizations were selected as interviewees. However, results have shown that some of the key qualifications are developed and acquired at school, prior to and during the period of work experience. Therefore, in order to be able to give a more comprehensive view, involving the school's perspective on the development and acquisition process of key qualifications at school would have been interesting.

Next, there is another limitation regarding the selection of the interviewees. Not all representatives of the organizations were able to answer all of the researcher's questions. The reason for this is that some of the representatives of the organizations fulfill high positions in their organizations such as CEO or head of HR (see table 3.4). Because of their position, they are not daily involved in the carpentry student's period of work experience. Therefore, they were not always fully aware of the details that the researcher asked for regarding the carpentry student. It would have been helpful to select those representatives who are closer to the students.

Another limitation has to do with the AMO-framework. Because the scope of this master thesis was limited, the research of this master thesis did not look at the relations among the AMO-factors. However, the effect of ability on motivation might affect the way that a carpentry student develops and acquires key qualifications.

Furthermore, the interview questions regarding the influence of ability, motivation and opportunity were only asked to the carpentry students. Therefore, results show which factors of AMO form a barrier to or facilitate the development and acquisition of key qualifications from the perspective of the carpentry student. The representatives of the organizations might have a different opinion on what the influence of ability, motivation, and opportunities is on the performance of the carpentry students.

### 5.3 Implications for further research

Based on the research of this master thesis, several implications for further research can be done.

Firstly, further research can be done using key qualifications to express work performance regarding carpentry educations at other ROC's. The research of this master

thesis confirmed that the key qualifications carpentry students need are dependent on the carpentry occupation. Therefore, it is interesting to see if research into the key qualifications of carpentry students of other ROC's substantiate the results of the research of this master thesis. This would show if other ROC's deal with similar problems regarding the transition from school to work as the ROC Nijmegen and could be useful to improve the transition from school to in the entire construction industry.

Secondly, further research can be done by further exploring the relation between key qualifications and the AMO-framework. As mentioned before, the research of this master thesis did not include the underlying relations between the factors of ability, motivation, and opportunity and the influence of those relations on work performance. However, these underlying relations might give new insights in the influence of ability, motivation, and opportunity on work performance.

Thirdly, the research of this master thesis can be expanded by including the perspective of the teachers of the school. The research of this master thesis did not include the perspective of the teachers of the school regarding the key qualifications carpentry students need to develop and/or acquire during their period of work experience. However, those insights can give a more comprehensive view on how and which key qualifications the carpentry students should develop and/or acquire key qualifications at school.

## 5.4 Recommendations

This paragraph focuses on the practical relevance of the research of this master thesis. As discussed in paragraph 1.1, the goal of this master thesis was to improve the transition from school to work for carpentry students. Therefore, this paragraph gives some recommendations to the ROC Nijmegen.

The first recommendation is for the school to devote more attention to the development and acquisition of the carpentry student's key qualifications learning to learn (cognitive dimension), identification, knowledge of the organization, representativeness, complying with safety measures, and willingness to take part in further learning (socio-normative dimension), and emancipatory behavior (strategic dimension). The carpentry students need to be aware that developing and acquiring these key qualifications is required by their future employees and therefore important for their future career. Firstly, the carpentry students need to be aware of the importance of and acquire the key qualification learning to learn. At school, the carpentry students need to learn how to learn, because their future employers expect them to learn throughout their entire career. Furthermore, school needs to

provide the carpentry students with the understanding of the importance of organizational rules and norms (key qualifications of the socio-normative dimension). The carpentry students need to learn that the representatives of the organizations find it important for them to identify with, be aware and comply with organizational rules. The school needs to emphasize to the carpentry students that, in order to meet the requirements of their future employees, they need to understand the importance of and acquire the key qualifications of the socio-normative dimension. Finally, the school needs to teach the carpentry students how to show a critical attitude towards work (emancipatory behavior, strategic dimension).

The second recommendation is for the school and the organizations to address the factors of AMO that form a barrier to the development and/or acquisition of the carpentry student's key qualifications during their period of work experience. First of all, regarding ability, the school needs to learn the carpentry students to get familiar with how to respond to specific work situations and/or activities, in order to improve the carpentry student's task effectiveness. Furthermore, the level of carpentry knowledge that the students acquire at school needs to improve. If the carpentry knowledge of the carpentry students would improve, this would enhance their learning process at work, as they would be better able to adapt to the work environment. Secondly, both the representatives of the organizations and the school need to overcome situations in which the carpentry student is not motivated at all. The results of this master thesis showed that the carpentry students sometimes face situations in which they are not motivated at all, such as when they need to perform a task they dislike. In these situations, results showed that the development and/or acquisition of the carpentry student's key qualifications is not stimulated. Therefore, if the school and the colleagues at work are able to motivate the carpentry students during these situations, the carpentry student is more likely to learn and/or acquire key qualifications during their period of work experience. Finally, regarding the opportunity, the school needs to better prepare the carpentry students for how to perform different work activities at work (task preparation). The carpentry students mentioned that they often face situations at work about which they did not learn enough at school in order to deal with the task at hand. Therefore, the school needs to better inform and teach the carpentry students different tasks, in order for the carpentry student to know how to behave and act when facing those tasks. Furthermore, the results showed that the carpentry students said that they often lack time at work to do their job. The results showed that the carpentry students sometimes are not given the opportunity to perform certain tasks that they need to learn because of a lack of time available to them and their colleagues. Therefore, the representatives of the organizations need to address the time pressure in order for the

carpentry student to be able to develop and/or acquire the key qualifications he needs during his period of work experience. At last, the results showed that disturbances in the work environment such as weather conditions or noises distract the carpentry student from work. In order for the carpentry student not to be distracted from his learning process and to develop and/acquire the key qualifications he needs during his period of work experience, disturbances from the environment need to be minimalized, as too the extent to which this is possible at the construction site.

The third recommendation for the school is to communicate more frequently with the organizations where the carpentry students work. Even though there is a partnership between the ROC Nijmegen and the local industry, results showed that the possibility to learn how to adjust school to work is not optimally utilized by the parties involved. The school needs to be better aware of the developments in the industry and the influence of these developments on the organization's expectations of the carpentry students. These conversations can help the school to align their curricula more to the demands of the future employees. Furthermore, better communication can help the school to keep their carpentry knowledge up-to-date.

The final recommendation relates to the guidance and support the carpentry students receive at school. The carpentry students should get more guidance during the one day in the week that they are at school. If the teachers communicated with the students about problems the carpentry students face at school or work, the carpentry students might be better prepared for work. Furthermore, the carpentry students should reflect more on their performance. Reflection might give the carpentry student better insights in the key qualifications he needs to develop and/or acquire in order to perform well.

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Appendix 1: Organizational structure: partnership De Technische and ROC Nijmegen

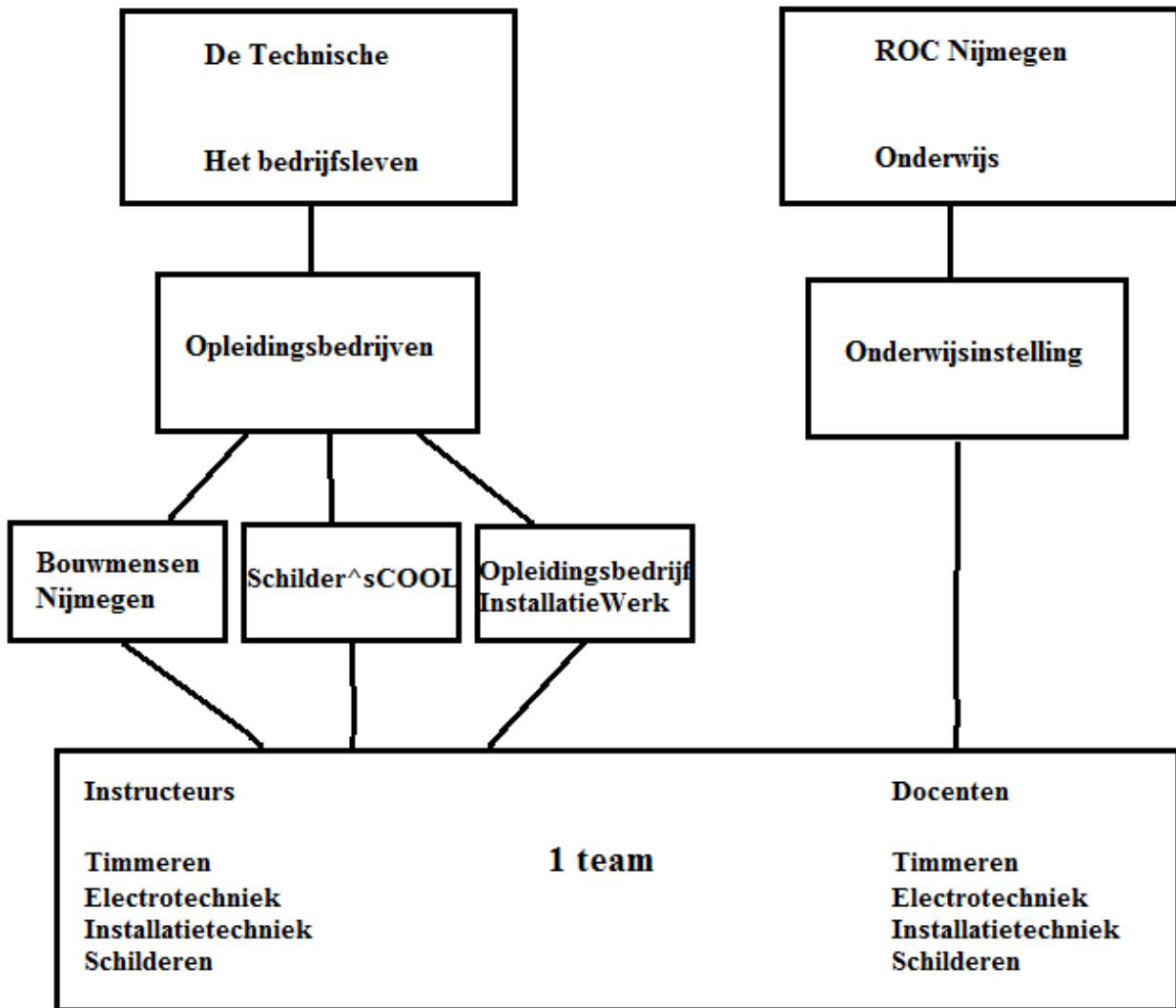


Figure A1.1: Organizational structure partnership 'De Technische' and the ROC Nijmegen

## Appendix 2: Operationalization of key concepts

Table A2.1: Operationalization key qualifications

Operational key-concept (operational definition)	Operational dimension	Indicators	Matching question	
<b>Key qualifications</b>  Refers to the knowledge, insight, skills and attitudes that are part of the permanent core of the carpentry occupation with the possibility of transfer to other, new jobs within the carpentry occupation, and of innovations within the carpentry occupation, which contribute to the development of a carpentry student's competence and facilitate transitions within his career	General-instrumental dimension:  Refers to the occupational knowledge and skills of the carpentry students that have fundamental or permanent character and that can be applied in many situations and the interdisciplinary knowledge of the carpentry students	<ul style="list-style-type: none"> <li>• Having basic skills</li> </ul>	<ul style="list-style-type: none"> <li>• Beschik jij over voldoende basisvaardigheden om je werk goed te kunnen doen?</li> </ul>	
		<ul style="list-style-type: none"> <li>• Ability to plan work</li> </ul>	<ul style="list-style-type: none"> <li>• Moet je veel plannen voor je werk?</li> </ul>	
		<ul style="list-style-type: none"> <li>• Ability to cope with basic technology</li> </ul>	<ul style="list-style-type: none"> <li>• Kom jij tijdens je werk veel in aanraking met technologie?</li> </ul>	
		Cognitive dimension:  Refers to the way that a carpentry student can think and act when performing during his period of work experience	<ul style="list-style-type: none"> <li>• Being able to identify problems</li> </ul>	<ul style="list-style-type: none"> <li>• Kom jij problemen tegen op je werk?</li> </ul>
			<ul style="list-style-type: none"> <li>• Being able to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>• Kan je deze problemen oplossen?</li> <li>• Leer je hoe je problemen op moet lossen?</li> </ul>
			<ul style="list-style-type: none"> <li>• Recognizes patterns</li> </ul>	<ul style="list-style-type: none"> <li>• Pas jij kennis die je leert toe tijdens je werk?</li> </ul>
		Personality dimension:  Refers to the individual behavior of a carpentry student when performing during his period of work experience	<ul style="list-style-type: none"> <li>• Has a sense of responsibility when performing during his period of work experience</li> <li>• Is accurate when performing during his period of work experience</li> <li>• Is confident when performing during his period of work</li> </ul>	Kan jij voor elke kwaliteit die ik opnoem aangeven of het: <ul style="list-style-type: none"> <li>• Belangrijk is in je werk?</li> <li>• Kom je het veel tegen in je werk?</li> <li>• Beschik jij over deze kwaliteit?</li> <li>• Heb je deze kwaliteit geleerd?</li> </ul> Kwaliteiten: Verantwoordelijkheid, nauwkeurigheid,

	<p>experience</p> <ul style="list-style-type: none"> <li>• Can make decisions when performing during his period of work experience</li> <li>• Shows initiative when performing during his period of work experience</li> <li>• Can deal with stress when performing during his period of work experience</li> <li>• Is creative when performing during his period of work experience</li> <li>• Shows perseverance</li> </ul>	<p>zelfverzekerdheid, beslissingsvermogen, initiatiefrijk, stressbestendigheid, creativiteit, doorzettingsvermogen</p>
<p>Socio-communicative dimension</p> <p>Refers to the way a carpentry student deals with communication and his ability to work together with others during his period of work experience</p>	<ul style="list-style-type: none"> <li>• Is able to express oneself in writing</li> </ul>	<ul style="list-style-type: none"> <li>• Moet je vaak verslagen maken?</li> <li>• Gaat dat je goed af?</li> </ul>
	<ul style="list-style-type: none"> <li>• Is able to express oneself orally</li> </ul>	<ul style="list-style-type: none"> <li>• Kan je aan je collega's op het werk goed duidelijk maken wat je wilt?</li> </ul>
	<ul style="list-style-type: none"> <li>• Is able to work together</li> </ul>	<ul style="list-style-type: none"> <li>• Is samenwerken belangrijk in je werk?</li> <li>• Kan je goed samenwerken?</li> <li>• Is er een verschil tussen hoe je met mensen omgaat op het werk of op school?</li> </ul>
<p>Socio-normative dimension</p> <p>Refers to the ability of a carpentry student to adapt to the corporate culture of the organization during his period of work experience</p>	<ul style="list-style-type: none"> <li>• Is able to identify oneself with the organization</li> </ul>	<ul style="list-style-type: none"> <li>• Voel jij je thuis in de organisatie waarin je werkt?</li> </ul>
	<ul style="list-style-type: none"> <li>• Has knowledge of the organization and rules</li> </ul>	<ul style="list-style-type: none"> <li>• Is het duidelijk aan welke regels jij je moet houden op het werk?</li> </ul>

Strategic dimension	<ul style="list-style-type: none"> <li>• Has a critical attitude to work and one's own interests</li> </ul>	<ul style="list-style-type: none"> <li>• Ben jij kritisch op je eigen werk?</li> <li>• Leer je op hoe je kritisch kunt zijn?</li> </ul>
Refers to the capability of the carpentry student to show emancipatory behavior during his period of work experience	<ul style="list-style-type: none"> <li>• Emancipatory behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Kom je voor jezelf op tijdens het werk als er iets gebeurd waar je het niet mee eens bent?</li> </ul>

Table A2.2: Operationalization motivation

Operational key-concept (operational definition)	Operational dimension	Indicators	Matching question	
<b>Motivation to perform</b>	Intrinsic motivation:	• Feels the need to perform for itself	• Vind je het belangrijk om te presteren op je werk?	
	Refers to the carpentry student performing during his period of work experience for itself, and the pleasure and satisfaction derived from it	• Having fun at work	• Heb je plezier op je werk?	
		• Gets satisfaction from his work	• Krijg je voldoening uit je werk?	
	Refers to the carpentry student to be moved to perform during his period of work experience	Extrinsic motivation:	• Is motivated by others to perform	• Word je gemotiveerd door anderen op je werk?
		Refers to the carpentry student performing during his period of work experience due to a trigger in his environment	• Awareness of factors that influence performance	• Presteer je beter als er een beloning tegenover staat?
	Amotivation:			• Komt het wel eens voor dat je geen zin hebt om je werk goed te doen?
Refers to the lack of contingency between the behavior of the carpentry student and the outcomes of his performance				

Table A2.3: Operationalization opportunity

Operational key-concept (operational definition)	Operational dimension	Indicators	Matching question
<p><b>Opportunity</b></p> <p>Refers to the factors in the work environment of a carpentry student which can either be a support mechanism or a barrier to perform during his period of work experience</p>	<p>Job-related information</p> <p>Refers to the perception of the carpentry student of the availability of information he needs to do his job</p>	<ul style="list-style-type: none"> <li>• Receives clear information about the job</li> </ul>	<ul style="list-style-type: none"> <li>• Krijg je genoeg informatie om je werk goed uit te kunnen voeren?</li> </ul>
		<ul style="list-style-type: none"> <li>• Is informed about which procedures belongs to the job</li> </ul>	<ul style="list-style-type: none"> <li>• Krijg je duidelijke instructies over hoe je je werk moet aanpakken?</li> </ul>
	<p>Tools and equipment</p> <p>Refers to the perception of the carpentry student of the availability of equipment and machinery he needs to do his job</p>	<ul style="list-style-type: none"> <li>• Has access to the tools and equipment which are needed</li> </ul>	<ul style="list-style-type: none"> <li>• Heb je toegang tot al de benodigde gereedschap en machines die je nodig hebt om je taken uit te voeren op het werk?</li> </ul>
	<p>Materials and supplies</p> <p>Refers to the perception of the carpentry student of the availability of materials and supplies he needs to do his job</p>	<ul style="list-style-type: none"> <li>• Has access to the materials and supplies which are needed</li> </ul>	<ul style="list-style-type: none"> <li>• Heb je toegang tot alle materialen en goederen die je nodig hebt wanneer je iets moet maken?</li> </ul>
	<p>Help from others</p> <p>Refers to the perception of the carpentry student that he receives help from others to do his job</p>	<ul style="list-style-type: none"> <li>• Receives support from others to do the job</li> </ul>	<ul style="list-style-type: none"> <li>• Krijg je ondersteuning van je baas/collega's/school om je werk goed te doen?</li> </ul>
	<p>Task preparation</p> <p>Refers to the perception of a</p>	<ul style="list-style-type: none"> <li>• Is prepared at school to do a certain task</li> <li>• Is prepared at work to do a</li> </ul>	<ul style="list-style-type: none"> <li>• Leer je op school hoe je bepaalde werkzaamheden uit moet voeren?</li> <li>• Leer je op je werk hoe je bepaalde</li> </ul>

carpentry that he has acquired sufficient knowledge and skills learned at school to do a task at work	certain task at work	werkzaamheden uit moet voeren?
Time availability Refers to the perception of a carpentry student of available time to do his job	• Receives enough time to do his job	• Krijg je voldoende tijd om je werkzaamheden uit te voeren?
Work environment Refers to the perception of carpentry students of the physical aspects in the work environment to do his job	• Is not disrupted by environmental influences	• Kan je ongestoord je werk uitvoeren?

Table A2.3: Operationalization ability

Operational key-concept (operational definition)	Operational dimension	Indicators	Matching question
<p><b>Ability</b></p> <p>Refers to the perception of the carpentry student concerning the knowledge and skills he needs to perform during his period of work experience</p>	<p>Level of self-regulation</p> <p>Refers to the perception of the carpentry student of the level of control he has on itself</p>	<ul style="list-style-type: none"> <li>• Capable to control emotions</li> </ul>	<ul style="list-style-type: none"> <li>• Heb jij tijdens je werk te maken met emoties?</li> <li>• Kan je omgaan met deze emoties?</li> </ul>
		<ul style="list-style-type: none"> <li>• Capable to deal with changes</li> </ul>	<ul style="list-style-type: none"> <li>• Heb je weleens te maken met veranderingen op je werk?</li> <li>• Kan je omgaan met deze veranderingen?</li> </ul>
	<p>Task effectiveness</p> <p>Refers to the perception of the carpentry student of the psychological and cognitive capabilities he needs to perform a task effectively</p>	<ul style="list-style-type: none"> <li>• Can produce the intended outcome of a task</li> </ul>	<ul style="list-style-type: none"> <li>• Ben je in de gelegenheid de taken die je krijgt goed uit te voeren?</li> </ul>
	<p>Experience in the work field</p> <p>Refers to the perception of the carpentry student of the influence of work experience on his performance</p>	<ul style="list-style-type: none"> <li>• Uses experience to perform</li> </ul>	<ul style="list-style-type: none"> <li>• Krijg je de gelegenheid om de ervaring die je hebt opgedaan toe te passen in je werk?</li> </ul>
	<p>Carpentry knowledge</p> <p>Refers to the perception of the knowledge that the carpentry student has about carpentry</p>	<ul style="list-style-type: none"> <li>• Is confident about knowledge of the carpentry occupation</li> </ul>	<ul style="list-style-type: none"> <li>• Heb je er vertrouwen in dat je jouw kennis over timmeren toe kunt passen tijdens je werk?</li> </ul>
		<ul style="list-style-type: none"> <li>• Level of knowledge about carpentry occupation is sufficient</li> </ul>	<ul style="list-style-type: none"> <li>• Vind je dat je voldoende kennis hebt om je vak uit te oefenen?</li> </ul>

## Appendix 3: Interviewvragen voor de studenten (in Dutch)

### **Introductie**

Voorstellen: Claudia Meeuwsen, ik studeer Bedrijfskunde aan de Radboud Universiteit in Nijmegen, momenteel ben ik bezig met mijn afstudeeronderzoek.

Doelstelling: inzicht geven in de wijze waarop de motivatie, kansen/gelegenheden en het vermogen/kundigheid van tweede- en derdejaars timmerleerlingen invloed hebben op hun werkprestatie en hoe dit in relatie staat met de kwalificaties gevraagd in de markt. Aansluiting onderwijs-werk.

Procedure: toestemming vragen aan de leerling of het interview opgenomen mag worden, anonimiteit verzekeren, duur van het interview toelichten (maximaal 60 minuten), daarna stellen van de interviewvragen.

### **Introductievragen**

1. Zou je mij kort wat over jezelf kunnen vertellen (naam, leeftijd, schooljaar, werkgever)?
2. Waarom heb je voor de opleiding timmeren gekozen?

### **Key-qualifications**

3. Beschik jij over voldoende basisvaardigheden die nodig zijn om je werk te doen?  
(voorbeelden van basisvaardigheden: iets kunnen timmeren, kunnen rekenen en schrijven ect.)
4. Moet je veel plannen tijdens je werk?
  - kan je goed plannen?
  - leer je op school om te plannen?
  - leer je op je werk om te plannen?
5. Kom je tijdens je werk veel in aanraking met technologie als bijvoorbeeld telefoons of computers?
  - kan je hier goed mee omgaan?
  - leer je op school hoe je met technologie om moet gaan?
  - leer je op je werk hoe je met technologie om moet gaan?
6. Kom je problemen tegen op je werk?
  - kan je deze problemen oplossen?
  - leer je op school hoe je problemen op moet lossen? Zo niet, is dat wel gewenst?
  - leer je op je werk hoe je problemen op moet lossen? Zo niet, is dat wel gewenst?
7. Pas jij kennis die je leert op school toe tijdens je werk?

8. Ik noem nu een rijtje met kwaliteiten die je nodig kunt hebben in je werk, ik vraag je om voor elke eigenschap aan te geven of het:

1) belangrijk is in je werk?

2) of je het veel tegenkomt in je werk?

3) of jij over deze kwaliteit beschikt?

4) heb je over deze kwaliteit op school geleerd?

- Verantwoordelijkheid (je voelt je verantwoordelijk voor je werk)

- Zelfverzekerdheid (je bent zelfverzekerd over je werk)

- Nauwkeurigheid (je bent nauwkeurig in je werk)

- Beslissingsvermogen (je kunt beslissingen nemen op je werk)

- Initiatiefrijk (je neemt initiatief tijdens je werk)

- Stressbestendigheid (je kunt goed omgaan met stress)

- Creativiteit (je bent creatief op je werk)

- Doorzettingsvermogen (je zet door als het even tegenzit in het werk)

Word je beoordeelt op deze kwaliteiten? Zo ja, wat wordt er met deze beoordeling gedaan?

9. Is samenwerken belangrijk in je werk?

- met wie werk je samen?

- kan je goed samenwerken?

- leren ze hoe je moet samenwerken op school?

10. Moet je vaak verslagen maken voor je werk?

- kan je dit?

- leer je op school hoe je verslagen moet maken?

- leer je op je werk hoe je verslagen moet maken?

11. Kun je aan je collega's op het werk goed duidelijk maken wat je wilt als je iets nodig hebt?

- leer je dat op school hoe je duidelijk moet communiceren?

- leer je dat op je werk hoe je duidelijk moet communiceren?

12. Is het duidelijk aan welke regels jij je moet houden op het werk?

- houd jij je ook aan die regels?

- gaat het je gemakkelijk af?

13. Voel jij je thuis in de organisatie waarin je werkt?

- zo niet, zou de school of de organisatie daar iets aan kunnen doen?

14. Lukt het je goed om met anderen om te gaan?

- is er een verschil tussen hoe je met elkaar omgaat op het werk of op school?

15. Ben je kritisch op je eigen werk?
- leer je op school hoe je kritisch kunt zijn?
  - leer je op je werk hoe je kritisch kunt zijn?
16. Kom je voor jezelf op tijdens het werk als er iets gebeurt waar je het niet mee eens bent?

### **Motivatie voor het goed presteren op je werk (motivation)**

17. Heb je plezier op je werk?
18. Krijg je voldoening uit je werk?
19. Vind je het belangrijk om goed te presteren op je werk?
20. Wordt je gemotiveerd door anderen op je werk zoals collega's of je baas?
21. Presteer je beter als er een beloning tegenover staat? (voorbeeld: salaris)
22. Komt het weleens voor dat je geen zin hebt om je werk goed te doen?

### **De kansen in jouw werkomgeving voor het goed presteren op je werk (opportunity)**

23. Krijg je genoeg informatie om je werk goed uit te kunnen voeren op je werk?
24. Krijg je duidelijke instructies over hoe je iets moet doen?
25. Krijg je ondersteuning van je baas om je werk goed te doen?
- zo nee, wat heb je nodig?
26. Krijg je ondersteuning van je collega's om je goed werk te doen?
- zo nee, wat heb je nodig?
27. Krijg je ondersteuning van school om je werk goed te doen?
- zo nee, wat heb je nodig?
28. Leer je op je werk hoe je bepaalde werkzaamheden moet uitvoeren?
29. Leer je op school hoe je bepaalde werkzaamheden moet uitvoeren?
30. Heb je toegang tot alle benodigde gereedschap en of machines voor je werk?
31. Heb je toegang tot alle materialen en goederen die je nodig hebt voor je werk?
32. Krijg je voldoende tijd om je werkzaamheden uit te voeren op je werk?
33. Krijg je voldoende tijd om je werkzaamheden uit te voeren op school?
34. Kun jij onverstoord je werk uitvoeren? (geen lawaai, geen tocht, genoeg ruimte ect.)

### **Om goed te kunnen presteren op jouw werk (ability)**

35. Heb je wel eens te maken met veranderingen op je werk?
- Kan je daar mee omgaan?
  - Heb je op school wel eens te maken gehad met veranderingen?

36. Heb je tijdens je werk te maken met emoties? (frustratie, verdriet, blijdschap ect.)
- kan je omgaan met deze emoties?
  - krijg je begeleiding die leert hoe je om moet gaan met deze emoties?
37. Ben je in de gelegenheid om de taken die je krijgt goed uit te voeren?
38. Krijg je de gelegenheid om de ervaring die je hebt opgedaan in je werk toe te passen?
- zowel op het werk als op school?
39. Heb je er vertrouwen in dat je jouw kennis over timmeren toe kunt passen tijdens je werk?
40. Vind je dat je voldoende kennis hebt om je vak uit te voeren?

### **Afsluiting**

41. Zijn er nog dingen die je kwijt wilt waarvan je denkt dat ze bij kunnen dragen aan dit onderzoek?
42. Heb je verder nog vragen?

Bedanken en afsluiten.

## Appendix 4: Interviewvragen voor de vertegenwoordigers van de bedrijven (in Dutch)

### **Introductie**

Voorstellen: Claudia Meeuwsen, ik studeer Bedrijfskunde aan de Radboud Universiteit in Nijmegen, momenteel ben ik bezig met mijn afstudeeronderzoek.

Doelstelling: inzicht geven in de wijze waarop de motivatie, kansen/gelegenheden en het vermogen/kundigheid van tweede- en derdejaars timmerleerlingen invloed hebben op hun werkprestatie en hoe dit in relatie staat met de kwalificaties gevraagd in de markt. Aansluiting onderwijs-werk.

Procedure: toestemming vragen of het interview opgenomen mag worden, anonimiteit verzekeren, duur van het interview toelichten (maximaal 60 minuten), daarna stellen van de interviewvragen.

### **Startvragen**:

1. Kunt u misschien kort iets over uzelf en uw organisatie vertellen?
2. Hoe is uw organisatie verbonden met de Technische en het ROC Nijmegen?
3. Heeft u veel studenten van de opleiding timmeren binnen uw organisatie die werken op BBL-basis?

### **Prestatie op het werk (key qualifications)**

4. Welke basisvaardigheden hebben de studenten nodig om hun werk goed te kunnen doen?

- beschikken alle studenten over deze basisvaardigheden?
- leren studenten deze vaardigheden op school of op het werk?

voorbeeld: rekenen, lezen, taal

5. Is het voor het werk belangrijk dat de studenten goed kunnen plannen?

- zo ja, kunnen zij goed plannen?
- leren zij op school hoe ze moeten plannen?

6. Is het belangrijk voor het werk dat de studenten goed om kunnen gaan met technologie?

- zo ja, kunnen zij goed omgaan met technologie?
- leren zij op school voldoende over de technologie waar zij gebruik van maken?

7. Is het belangrijk dat de studenten problemen kunnen herkennen op het werk?

- zo ja, kunnen zij problemen herkennen?
- kunnen zij problemen oplossen? Leren zij op school voldoende om de problemen die voorkomen aan te kunnen pakken?

8. Passen de leerlingen veel kennis toe die zij op school hebben geleerd?
- Zo niet, passen zij dan kennis toe die zij leren in de praktijk (dus binnen de organisatie)?
9. Ik noem nu een rijtje met kwaliteiten op. Kunt u per kwaliteit aangeven of:
- het belangrijk is in het werk van de studenten
  - of de studenten beschikken over deze kwaliteit
  - hebben de studenten deze kwaliteit geleerd op school?
    - verantwoordelijkheid
    - zelfverzekerdheid
    - nauwkeurigheid
    - beslissingsvermogen
    - initiatiefrijk
    - stressbestendigheid
    - creativiteit
    - doorzettingsvermogen
10. Worden de studenten beoordeelt op deze kwaliteiten?
- zo ja, wat doen jullie met deze beoordelingen?
  - is er contact met de school over wat jullie verwachten van deze kwaliteiten?
11. Is het belangrijk dat de studenten iets op papier kunnen zetten (bijvoorbeeld een verslag maken)?
- zo ja, kunnen zij dit?
12. Is het belangrijk dat de studenten goed samen kunnen werken?
- zo ja, kunnen zij dit?
  - leren de studenten dit op school?
13. Kunnen de studenten duidelijk maken aan collega's of leidinggevenden wat ze nodig hebben (zijn ze communicatief vaardig)?
14. Is het belangrijk dat de studenten zich aan de opgestelde regels houden tijdens het werk?
- Zo ja, houden zij zich aan deze regels?
15. Is het belangrijk dat de student zich thuis voelt in de organisatie?
- zo ja, wat doen jullie er aan om de student zich thuis te laten voelen?
  - wat doet de school er aan om de student zich thuis te laten voelen?
16. Is het belangrijk dat de studenten kritisch zijn op hun eigen werk?
- zo ja, zijn de studenten kritisch op hun werk?
17. Komen de studenten voor zichzelf op tijdens het werk als er iets is waar zij het niet mee

eens zijn?

- leren de studenten om voor zichzelf op te komen?

18. Is er een verschil tussen de kwaliteiten waarover een student van de opleiding timmeren nu moet beschikken in vergelijking met vroeger?

- Zo ja, wat zijn nieuwe kwaliteiten?

19. Zijn er dingen die beter zouden kunnen als het aankomt op de aansluiting tussen onderwijs en werk als we kijken naar de opleiding timmeren?

### **Afsluiting**

20. Zijn er nog dingen die niet aan bod zijn gekomen, maar die u graag nog kwijt wilt?

21. Heeft u nog vragen over het onderzoek?

Bedanken.

Appendix 5: Code trees and list of codes

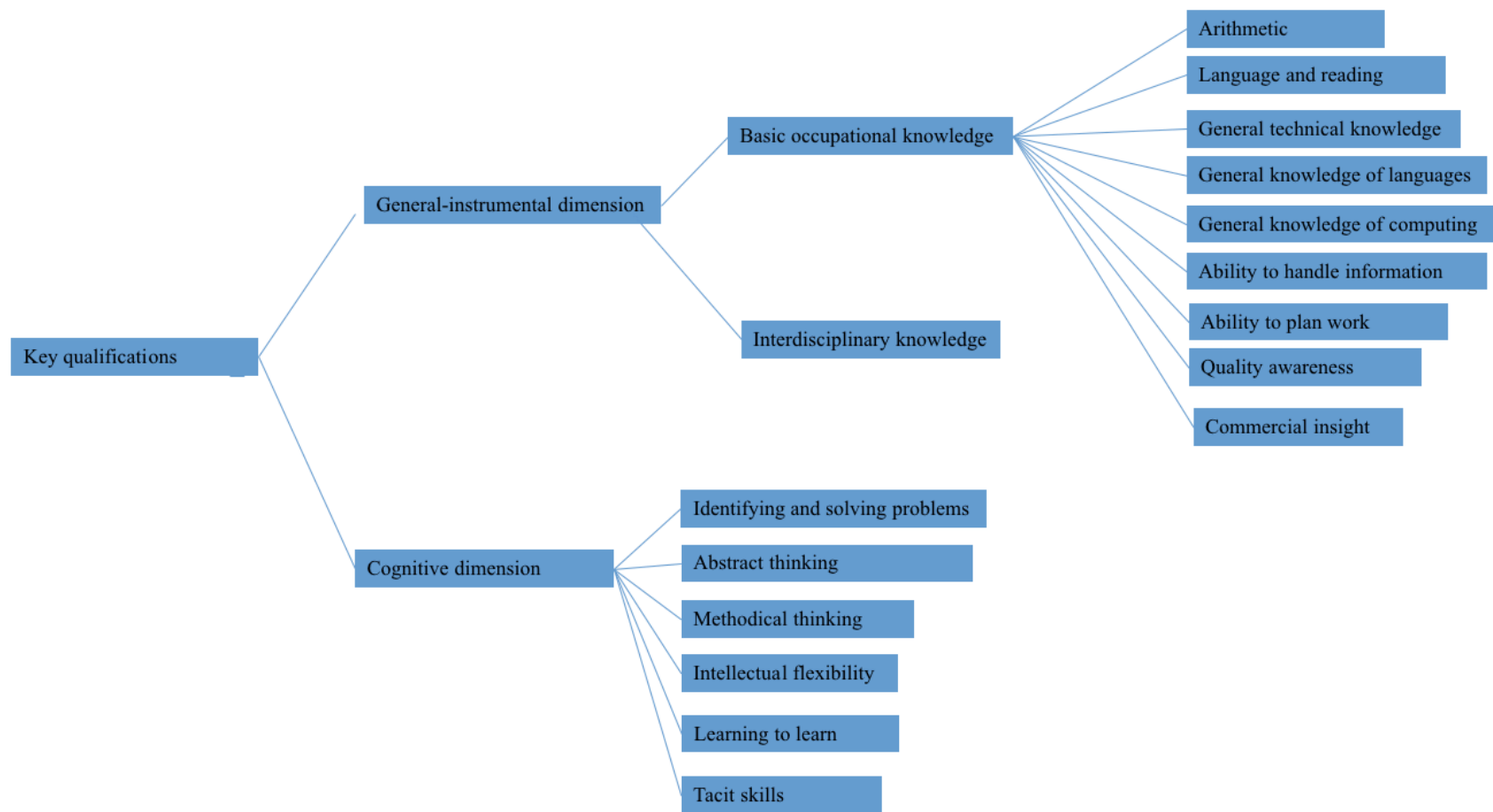


Figure A5.1a: First part code tree key qualifications

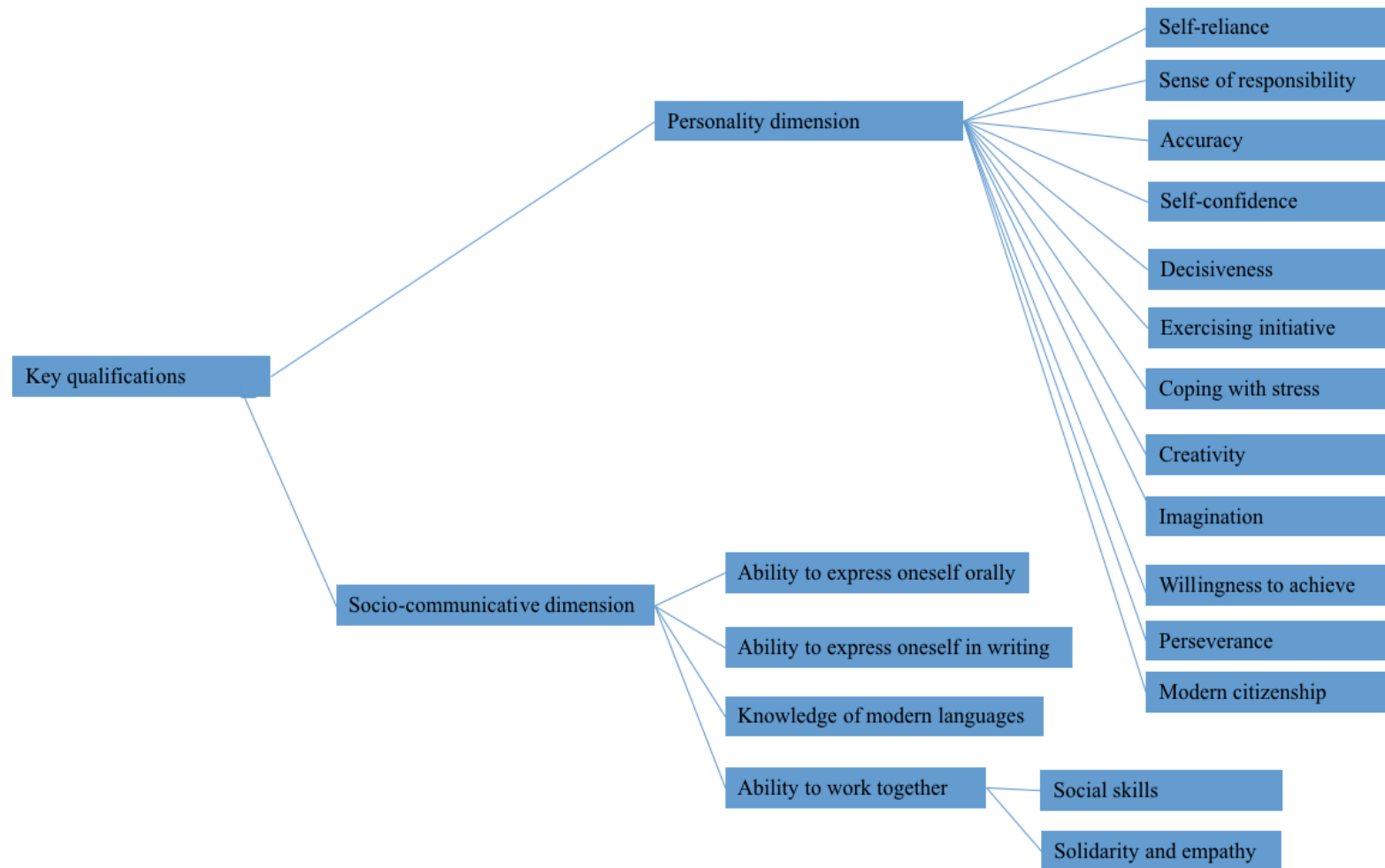


Figure A5.1b: Second part code tree key qualifications

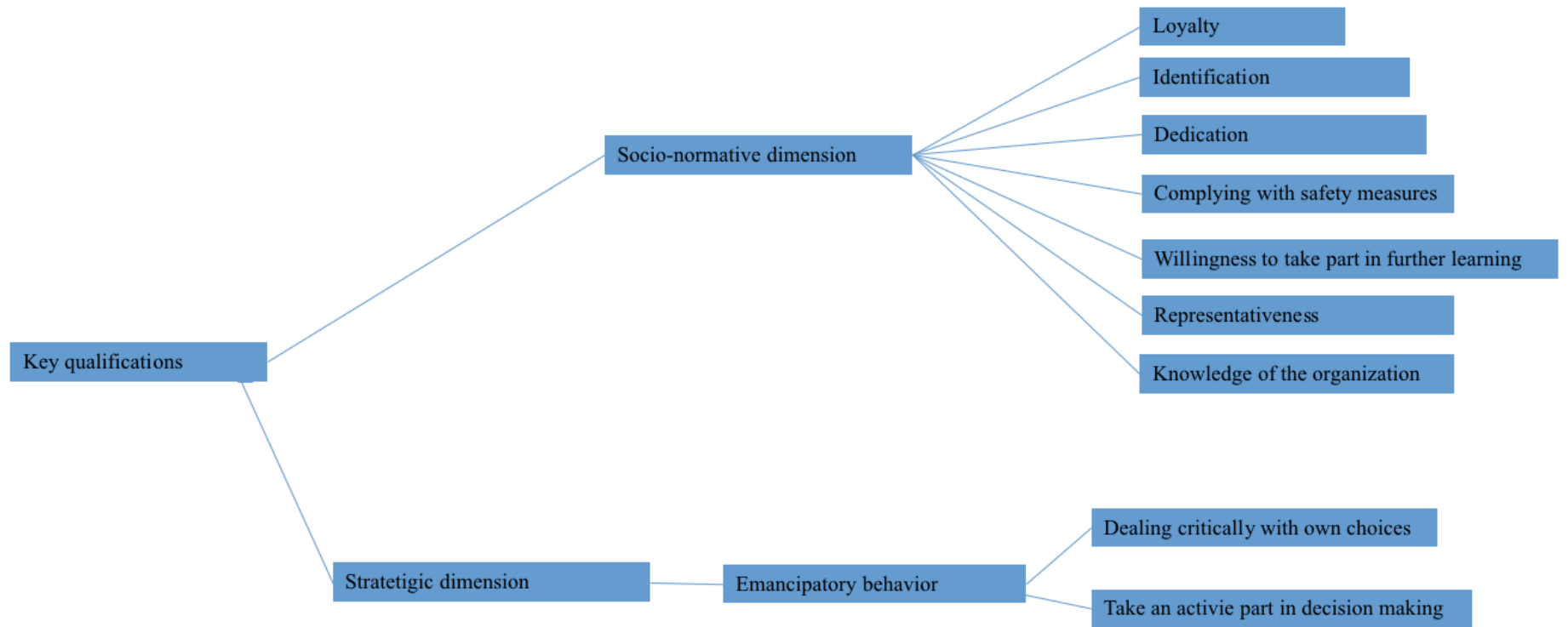


Figure A5.1c: Third part code tree key qualifications

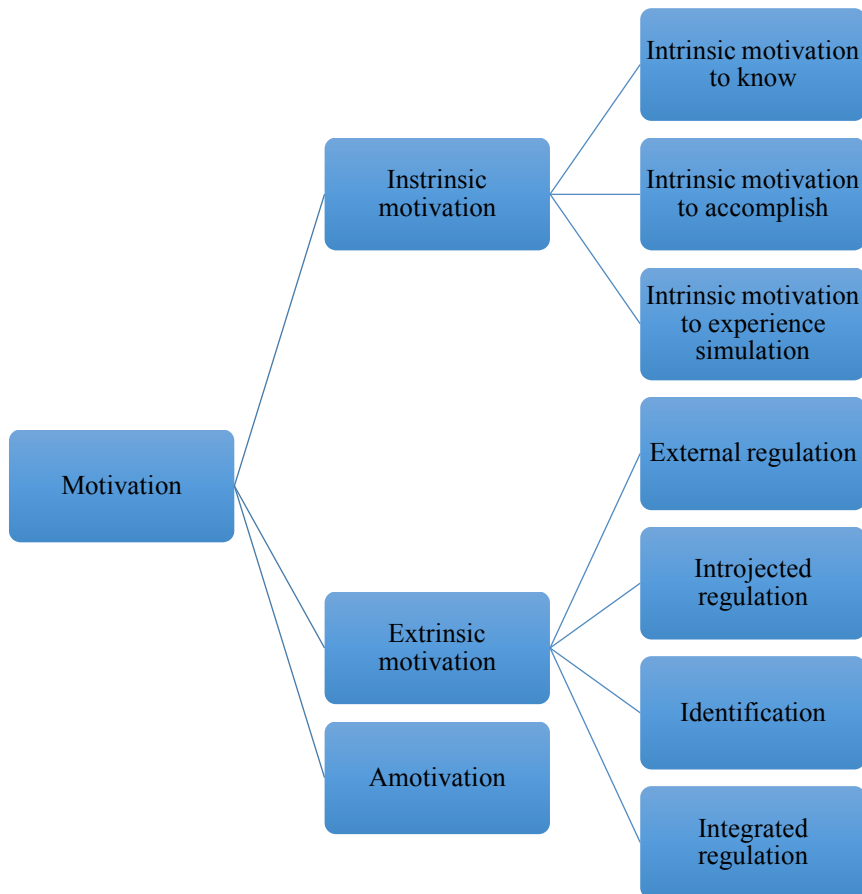


Figure A5.2: Code tree motivation

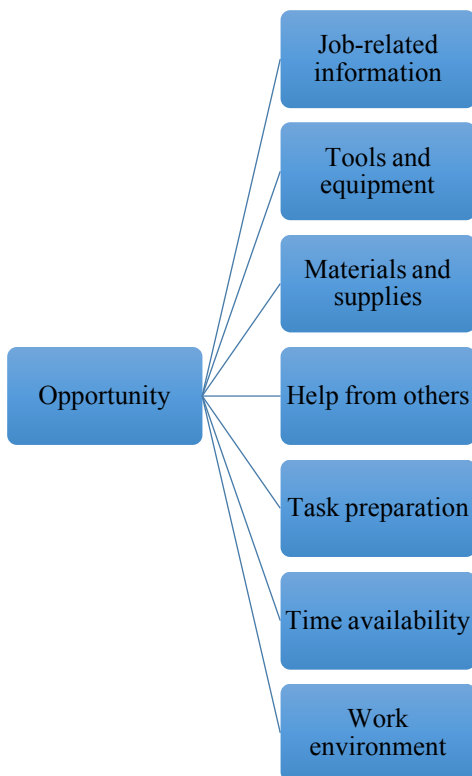


Figure A5.3: Code tree opportunity

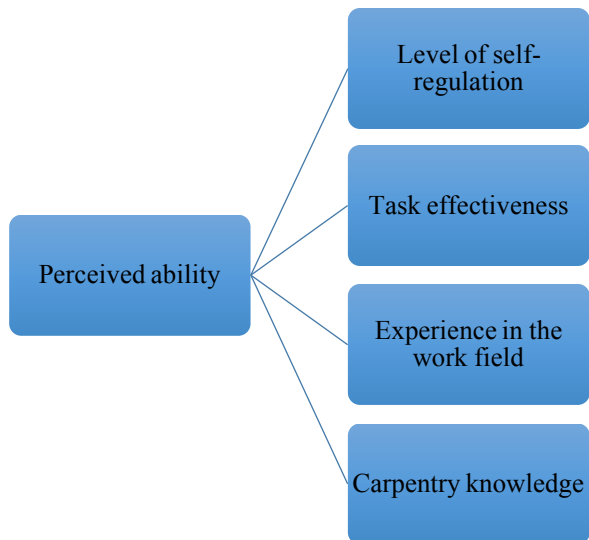


Figure A5.4: Code tree ability

Table A5.1a: List of codes part 1: AMO

Key concept	Codes
Ability	Level of self-regulation Task effectiveness Experience in the work field Carpentry knowledge
Motivation	Intrinsic motivation Extrinsic motivation Amotivation
Opportunity	Job-related information Tools and equipment Materials and supplies Help from others Task preparation Time availability Work environment

*Table A5.1b: List of codes part 2: key qualifications*

<b>Key concept</b>	<b>Codes</b>
General-instrumental dimension	Arithmetic Language and reading General technical knowledge General knowledge of languages General knowledge of computing Ability to handle information Ability to plan work Quality awareness Commercial insight Interdisciplinary knowledge
Cognitive dimension	Identifying and solving problems Abstract thinking Methodical thinking Intellectual flexibility Learning to learn Tacit skills
Personality dimension	Self-reliance Sense of responsibility Accuracy Self-confidence Decisiveness Exercising initiative Coping with stress Creativity Imagination Willingness to achieve Perseverance Modern citizenship
Socio-communicative dimension	Ability to express oneself orally Ability to express oneself in writing Knowledge of modern languages Ability to work together
Socio-normative dimension	Loyalty Identification Dedication Complying with safety measures Willingness to take part in further learning Representativeness Knowledge of the organization
Strategic dimension	Dealing critically with own choices Take an active part in decision making