

# Technical knowledge in Industrial-technology program as it emerges from three vocational teachers' life stories

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## Abstract

In this study, the focus is on three vocational teachers' stories of their lives and teaching experiences. The research method that I use in this study is life story and the teachers are Johnny, Oscar and Omed. From the teachers stories emerge the technical knowledge that they believe that their students should learn during their Industrial-technology education.

In terms of analytical method I focused on the stories content and I chose to do a thematic analysis of the stories, and through a holistic approach to see the different patterns which emerge from the stories. Based on Johnny's, Oscar's and Omed's stories about their lives and teaching experiences, various themes of knowledge which their students should learn, became apparent. These themes are: *knowledge about being a good citizen, knowledge of technology, knowledge about coping with life as an adult, knowledge which can be used in real life and knowledge which can lead to employment*. In the article, I even discuss how these prominent aspects of knowledge can be understood in relation to Aristotle's definition of the concept of knowledge Episteme, Techne and Phronesis.

Johnny's, Oscar's and Omed's life stories show even an important thing. It shows that the technical knowledge that teachers believe that their students should learn are contractions. In these contractions, technical knowledge "creates" in the interaction between teachers, students and their environment. In addition, in this interaction teachers' life experiences even have certain significance.

## Keywords

Technical knowledge, vocational teacher, life stories

## Bibliographical notes

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## **Introduction**

In this study the focus is on three vocational teachers' stories of their lives and teaching experiences. The teachers are Johnny, Oscar and Omed from three different schools in three different cities in Sweden. The teacher's stories are part of longer stories collected during Asghari's Doctoral dissertation *From growing up to the teacher act: A life story study with eight vocational teachers in the industrial-technology programme* (2014). In the dissertation, eight teachers talk about their meetings and teaching with their students. Johnny's, Oscar's and Omed's stories are, unlike the five other constituent teachers in Asghari's dissertation, focused on the technical knowledge that teachers believe that their students should learn during their upper secondary education. Upper secondary education in Sweden is three years. The students after completion of nine year primary school education may start their upper secondary education. Johnny, Oscar and Omed are teachers on an Industrial-technology programme that is like any other upper secondary programs three years long.

The research method that I use in this study is life story. Previous studies on vocational teachers and vocational teachers' teaching have been conducted worldwide in different ways and with different research methods (see e.g. Berner, 2010; Billett, 2003; Brown, 2000; Colley, James, Diment, & Tedder, 2003; Heikkinen, 1997; Lee, Wei, & Wang, 2013; Lindberg, 2003). However, I have not found any study that using life story as a method to gain understanding of what vocational teachers tell about their teachings, and what emerges from their stories regarding technical knowledge which are considered important for students on Industrial-technology programme.

## **Aim and research question**

The purpose of this study is, based on vocational teachers' life stories, to provide an understanding of what technical knowledge is of value for students to learn. The issue that can be based on the purpose be developed is: Which themes emerge from three Swedish teachers' life stories regarding which technical knowledge their students should learn during their Industrial-technology programme?

## **Choice of method and analysis concepts**

Early in my doctoral study I became familiar with Thomas and Znaniecki's (1918) classic study *The Polish Peasant in Europe and America*. Thomas and Znaniecki's research prompted me to use life story interviewing in my doctoral dissertation. I found narratives experiences as an interesting way to understand what vocational teachers in the Industrial-technology programme tell about their life experiences. My assumption was that the teachers had a great deal to tell and it was a great opportunity to share their life stories and understand better what they tell about their teachings, and what emerges from their stories regarding the concept of knowledge.

There is a great interest in life story content within the social science research tradition (Chen, 1997; Goodson & Sikes, 2001). Stories tell us something about human experience (Riessman, 2008). Life story interviews contribute to a greater understanding of society and the educational environment in which the interviewees and readers are situated (Chen, 1997; Goodson & Sikes, 2001). When Johnny, Oscar and Omed talk about their former lives, they link it inextricably to their current perspective and their professional knowledge and teaching. For Johnny, Oscar and Omed the events that occurred in the past are evident in their stories that they deliver in the present and dictate how they see the future (cf. Goodson & Choi, 2008; Hatch & Wisniewski, 1995; Langelier & Peterson, 2004; Mishler, 1999; Polkinghorne, 1995).

### **Life story analysis**

Since I wanted to get both a holistic perspective and see the different patterns in the stories I thought about what Johnny, Oscar and Omed told me and what the meaning of their stories were (cf. Goodson & Choi, 2008). Therefore, I chose to do a thematic analysis of the stories. In a thematic analysis, the researcher focuses on the story content. The researcher's focus is on "what" is told, rather than "how", "to whom", or "for what purposes" (Riessman, 2008). It is remarkable that I as a researcher have been an important role in analysis and in the construction of the stories during the analysis work (cf. Brockmeier & Carbaugh, 2001; Mishler, 1999). By this, I mean that the conducted interviews between me and teachers are a communal construction (cf. Mishler, 1995). My behavior affects what narrators tell and how and why they tell what they tell. I also construct the stories as a new narrator of the respondents' stories and I interpret the teachers' statements.

### **The concept of experience**

The concept of experience we can understand in two ways, a way based on the Dewey (1934) with a focus on meaning of experience and a way based on Bruner (1986) and Freeman (2010) with a focus on told experiences in the interview situation.

Dewey (1934) argues that experience is the result of acquired knowledge and skills over a lifetime. Experience is the product of a continuous interaction between the individual and his environment. Dewey (1933) divides experience into 'primary' and 'secondary', and he believes that primary experience is experience gained through direct contact with people or objects. Secondary experiences are accessed through other people's perceptions of events, people or objects, i.e. what people learn from others' experiences. As a researcher I cannot access Johnny's, Oscar's and Omed's primary and secondary experiences, but I can access their experiences which they tell me, and those experiences we can understand from Bruner (1986) and Freeman (2010).

Based on Bruner (1986), we can understand the teachers' told experiences in this way that when Johnny, Oscar and Omed tell me about their experiences of life lived they

construct their stories through their previous experiences and based it on what they remember of a variety of events at different times and places. This means that I, as a life story researcher, distinguish between physical experiences, i.e. the experiences which according to Dewey (1934) occur as a continuous process throughout the life course and the experiences which according to Bruner (1986) the teachers remember of their lives. The teachers reflect on their experiences and construct them again during the interview situation. Freeman (2010, p. 4) call these reflections which the narrators do on their previous experiences when they talk about the experiences “narrative reflection”. Those reflected told experiences can be told in various versions (ibid.). This means that Johnny, Oscar and Omed reconstruct their primary and secondary experiences and they transform them into life told experiences, that is to say that the experiences that I can access are the experiences gained in the narration and are constructed in the encounter between vocational teachers and me during the interview situation.

### **The concept of knowledge**

Knowledge is also defined by Aristotle in Episteme, Techne and Phronesis (Dunne & Pendlebury, 2003; Gustavsson, 2000). Episteme is theoretical and scientific knowledge, linked to the skills and to the practical work. Techne is practical and productive knowledge, and it is based on what we do, and takes a starting point in our acts. Techne is a form of knowledge that is related to professionalism. We use such knowledge (Techne) when we produce a craft, when we give expression to an art or when we develop some object. Practical knowledge is part of the technological knowledge. The term “technology” comes from Aristotle’s Techne that means hands productive knowledge or handicraft knowledge. Fronesis is a form of knowledge that is related to good practical wisdom and good capacity of discernment. We can through practical wisdom create a better and more comfortable life for us (ibid.).

From a social constructionist perspective, which is consistent with the methodological perspective this study has, all knowledge, including the most basic knowledge of everyday life is constructed through social interactions (Berger & Luckmann, 1966). Berger and Luckmann write that knowledge is a phenomenon that is a continuously constructed process and they consciously develop this in social situations, in cooperation with others and through their interpretations of the world. Burr (2003) argues that knowledge is a historical, social and ideological construct, and it is tied to space and time. Knowledge is constructed by people, through their language and through their cooperation with each other (ibid.). Knowledge is bound to its context, and knowledge is produced and constructed in different ways and at different times. It is why “true knowledge” does not exist (cf. Berger & Luckmann, 1966; Burr, 2003).

### **Vocational teachers’ stories**

I tell below vocational teachers’ stories about their lives and teaching experiences. From their stories, it emerges different themes about which knowledge the teachers

believe that their students should learn during their Industrial-technology education. I am going to show these themes in the section Results.

#### **Vocational teacher Johnny**

Johnny is 52 years old. He is a Swedish vocational teacher in the Industrial-technology programme and works at an upper secondary school in Sweden. Johnny was born and raised in a working class family in a small town in Sweden. Johnny says that his parents divorced when he was 16 years old and that he had a difficult childhood. He says: “I left home, when my parents separated, when I was 16. I couldn’t live at home any longer. I moved to a small flat with cold water and an outdoor toilet, it was no fun”. A few years later, he studied at a technical school to become a welder. He says he thanks to his technical knowledge that he learned in the technical school he could get work as a welder, pay taxes, be independent and manage in his life. Johnny says that when he was 32 years old he studied in adult education and received permission to enter university when he was 36 years old. He studied at the university, got a teaching degree, and now he teaches welding-technology. When Johnny talks about his teaching, he says that it is important for him that his students during their Industrial-technology education learn to manage their lives as good people, get a job, get a salary every month, pay taxes and be independent of social benefits. Johnny even says: “In my teaching, we’re not just talking about welding-technology [...], we very often talk about how they [students] should be good people. They should learn to help the needy people. They should not be egoists who want everything for themselves. They must also learn to share”.

#### **Vocational teacher Oscar**

Oscar is 21 years old, is a vocational teacher, and has two years of experience in teaching. He says that he grew up with the Internet and broadband, always was interested in computers and electronics. Oscar studied his upper secondary education at an industrial school. Oscar says that he became educated to a computer programmer during his upper secondary education. Since he was both a talented student and a polite student who always was on time to school, never had unauthorized absences, respected his teachers and his classmates, after his upper secondary education (which he studied for three years there) wants him to teach CNC-technology on an Industrial-technology programme. Oscar has no teacher education, but working as teachers on a temporary employment. Oscar says that one reason for his good rating on his technical education was his interest in modern technology. He always wanted to renew his knowledge in parallel with the development of technology. Oscar says his father always told him that he would learn what he could use in his real life. He says: “I think for example that it’s completely unnecessary to learn the ancient technique that was used ten years ago. What should I do with the old technology? I can’t use it in my real life”. When Oscar tells about his teaching, he says that it is important for him that his students learn the most modern technology available in the electronics and computer technology. Oscar says: “I always try to teach my students the technology which they can use in real life. Then they

have a greater opportunity to get a job after their education”. Oscar also says that he often tells his students that the secret to get a job and to keep it is two things. The first is a good knowledge of modern technology and the second is a good behavior. He says: “If they learn modern technology and proper behavior, and always thinking about those two things, they will surely get a job and keep it after secondary school, just as I did”.

### **Vocational teacher Omed**

Omed says he is forty-eight years old, was born and raised in Iraq. He says that he had always easy for mathematics, and he after finishing secondary education began studying mechanical engineering at a university in Iraq. He was 23 years old when he got his engineering degree, but he because of the war between Iran and Iraq left Iraq and moved to Sweden as a refugee. In Sweden Omed had difficulty getting a job as an engineer. He began instead to work as a taxi driver in a number of years. Omed says: “Employers find it difficult to hire academic refugees because they don’t know how much you can. They don’t know what you’ve read in your education in Iraq. Then it will be difficult for academic refugees to work within their university educations”. Omed says that he started a few years later to study at a Swedish university to become a teacher. Since he had technical knowledge from a university in Iraq, it was enough for him to study only pedagogy at the university and become a vocational teacher. He says that he received his teaching degree nine years ago. Now Omed works as a CNC-teacher at an upper secondary school. Omed says: “For me it isn’t important if my students can technical knowledge really good or less good. They’re going to learn technical knowledge in their future workplaces, much better than here in school. For me it’s important that they learn to be good people”. Omed also says that good people for him are those who care about human rights, those who respect people regardless of their color, religion, sex, sexual orientation. He also says that good people for him are those who understand that we humans have a common world and we must take care of our world, those who understand that we humans are dependent on each other, no matter where we come from and whether we are Swedes or immigrants, refugees, etc. Omed also says: “The good people care about each other and even about their community. They work, pay taxes and help with community building. Such things I want my students learn. It is more important than technical knowledge”.

### **Results**

Based on Johnny’s, Oscar’s and Omed’s stories about their lives and teaching experiences, various themes of knowledge which their students should learn, became apparent. These themes are: 1) knowledge about being a good citizen, and 2) knowledge of technology. But it emerges another three themes that may be viewed as inherent in the theme of knowledge of technology. These themes are: 2a) knowledge about coping with life as an adult, 2b) knowledge which can be used in real life, 2c) knowledge which can lead to employment. Below I will present these themes.

### **1) Knowledge of being a good citizen**

Knowledge of being a good citizen it emerges from the all three teachers' stories. Johnny says that he wants that his students learn to manage their lives as good citizens, helping the needy people, not being egoists, learning to share, getting a job, getting a salary every month, paying taxes and being independent of social benefits. And Omed says he wants to teach students to be good people who care about each other and their community. Omed who came as a refugee to Sweden even says that good people care about human rights. They respect people regardless of their colours, religions, sex, sexual orientations, or if they are Swedes, immigrants or refugees. Omed also says like Johnny that students should learn to work, pay taxes and help with community building. Even Oscar tells of good behaviour. As it emerges from Oscar's life story, the good behaviour for him can be; being polite, being on time, not doing absentee and respecting people. These things Oscar says he did when he was an upper secondary school student. Oscar says even students' good behaviour can help them get a job and keep it. The relationship between good behaviour and employability Oscar connects to his own life experiences and say "just as I did".

### **2) Knowledge of technology**

As it emerges from the teachers' stories, the technical knowledge is important for students because they can get employment through this knowledge. The interesting thing is that the teachers have different views on how important technical knowledge is. For Johnny and Oscar it seems that technical knowledge are a complement to knowledge of being a good citizen. In other words, it seems that for both Johnny and Oscar what their students should learn during their Industrial-technology programme in upper secondary schools is both knowledge of technology and knowledge of good citizenship. It shows when Johnny says: "we're not just talking about welding-technology [...] very often talk about how they should be good people". Or when Oscar says: "If they learn modern technology and proper behaviour [...] they will surely get a job". For Omed situation seems to be different. He prefers the knowledge of good citizenship before knowledge of technology. It shows when he says that the students will learn technical knowledge in their future workplaces better than in school and for him it is important that "they learn to be good people".

### **2a) Knowledge of coping with life as an adult**

Knowledge of coping with life as an adult it emerges from Johnny's story when he says that he managed his life after his parents' divorce through learning welding and work as a welder in a number of years before he began to study at university to teacher. When he talks about his teaching he even says that it is important for him that his students can manage their lives after finishing secondary school.

### *2b) Knowledge which can be used in real life*

Knowledge, which can be used in real life it emerges from Oscar's story when he talks about his childhood that he developed his technical skills in parallel with the development of technology. The theme also emerges when Oscar says that it needless to learn the technique that used ten years ago and that his father told him that he would learn what he can use in real life. Knowledge, which can be used in real life it even emerges from Oscar's story when he says that he always tries to teach his students the techniques they can use in their real lives (their future works).

### *2c) Knowledge which can lead to employment*

Knowledge, which can lead to employment, emerges from all three teachers' stories but in different ways. In Johnny's case, his welding knowledge helped him to get a job after his parents divorced. In Oscar's case, his good technical knowledge also helped him to get a job as a teacher in an upper secondary school. The situation is different for Omed who came as a refugee to Sweden. His engineering skills in Iraq did not lead to any employment as an engineer, but his technical knowledge combined with his pedagogical knowledge led him to get a job as a vocational teacher at an upper secondary school. Knowledge, which can lead to employment even emerges when teachers tell about their teaching. All three teachers say for them it is important that their students get a job after completing secondary school. Johnny says that knowledge should help his students getting jobs, getting salary every month and paying taxes. Oscar says that knowledge should give the students a greater opportunity to get a job after their education, and Omed says that his students should get a job, pay taxes and help with community building.

## **Discussion**

Goodson and Sikes (2001) argue that if life story researcher wants to find out life's experiences, this is only possible through the life story interviews by asking the interviewee; tell me about your life! Then the interviewee will construct to researcher about selected parts of his/her life that he/she has experienced. In this context, I was also interested in teachers' lives, but with a special focus on the knowledge, which they believe that their students should learn during their technical education. The knowledge which students in a technical education have to learn, can based on Aristotle's description of knowledge (cf. Dunne & Pendlebury, 2003; Gustavsson, 2000) be understood as an interaction between episteme, techne and phronesis. When teachers tell about their teaching, it emerges that the knowledge, which students should learn during their technical education consists of both technical knowledge and social knowledge (to be good citizens). Episteme can in that case be theoretical and scientific knowledge, linked to the students' technical skills and their civic knowledge. Techne can be the students' practical and productive knowledge that is based on both the products that the students produce and the behaviors that the students show in their community and in the meeting with society members. And Fronesis can be the student's

good capacity of discernment when it comes to the understanding of technology and to the understanding of civic duty.

Based on the social constructionist perspective on knowledge the result shows that the teachers in relation to their own life experiences construct the technical and civic knowledge that students should learn during their education. For example for Johnny who has had difficult childhood, his welding training was an important turning point in his life that gave him a job. When Johnny talks about his teaching, the knowledge that can give the students a job after their technical education is again important. The important knowledge that can give the students a job after their education is both knowledge of good citizenship and knowledge of technology. Even the definition of knowledge of good citizenship can also be understood in relation to Johnny's life story. Johnny who in his childhood moved to a small flat with cold water and an outdoor toilet says that his student should learn to not be egoists, learn to share and learn to help the needy people. For Oscar who was a talented and polite student his good technical knowledge, his interest for developing of his technical knowledge parallel with the development of technology, and his good behavior were the reasons that gave him the work as a teacher. When Oscar talks about his teaching, he tells about the importance of modern technical knowledge that are used in today's technical productions. Similarly, I see a relationship between what Oscar says about coming to school on time, never being absent, and respecting teachers and students and what he says about his students' good behavior. For Omed who experienced the war, came as a young engineer and as a refugee to Sweden, got no engineer jobs and worked as a taxi driver in a number of years the knowledge of being good people is more important than technical knowledge for his students. They should learn human equality. Teacher's life stories show even an important thing. It shows that both knowledge of being a good citizen and technical knowledge are contractions and knowledge "creates" in the interaction between teachers, students and their environment. In addition, in this interaction teachers' life experiences even have certain significance.

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