Narratives of Inquiry Learning in Middle School Geographic Inquiry Class

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This study aimed at modifying a teaching and learning model for a geographic inquiry to enhance both the subject-related skills of geography and so-called 21st century skills in middle school students (14–15 years old). The purpose of this research is to extend our understanding of the user experiences concerning certain tools for learning such as maps and information and communication technology when they are used alongside the inquiry learning model by examining the narratives produced by the students in one compulsory middle school geography course. The data comprised interviews with students from three different classes in the same school. The narrative of the "negotiating master of self-regulation" was identified as the dominant narrative of the experiences of the progressive inquiry model. This narrative depicts a learner who benefits from progressive inquiry and has the appropriate communication and collaboration skills to cope and succeed in the 21st century. Two counter-narratives—the "solo learner in need of support" and "solo master of self-regulation" narratives—in which the skills for self-regulated learning and negotiation varied from high to low, were also identified. The results also indicate experiences of under-using the available technological applications.

Keywords: collaborative inquiry learning; geographic inquiry; inquiry learning; narrative inquiry; progressive inquiry; technology enhanced learning

Introduction

One of the key features of geography as a school subject is that it provides content that can mediate attainment of the higher-order thinking skills such as analyzing, making synthesis, and problem solving (Leat, 1997; Nagel, 2008; Pauw, 2015), which have been considered to be among the skills that are mostly needed in a world of rapid technological changes and increased globalization of economies. For example, creativity, innovativeness, critical thinking, problem-solving, decision-making, and metacognition have been found to be the most essential 21st century skills of thinking, and communication and collaboration skills have been identified as the most necessary

working skills (Binkley et al., 2012; Pauw, 2015; Soulé & Warrick, 2015). Further, information literacy and information and communication technology (ICT) literacy have been found to be the most crucial skills relating to work.

Progressive inquiry is an inquiry learning approach to teaching and learning which is aimed at enhancing the subject-related skills and knowledge as well as the aforementioned 21st century skills (Hakkarainen, 2004; Muukkonen, Hakkarainen, & Lakkala, 1999). The aim of progressive inquiry is to introduce a new way of creating knowledge to learners that resembles the scientific inquiry process, hence it suggests that inquiry is a question-driven process of understanding that can lead to knowledge creation (Paavola & Hakkarainen, 2005). Progressive inquiry is based on the *knowledge-building theory* of intentional learning and expertise (Bereiter, 2002; Scardamalia, 2002; Scardamalia & Bereiter, 1994). It underlines the central role of the active learner and collaboration when directing one's behaviour in the inquiry process. Furthermore, the *theory of expansive learning* (Engeström, 1999), lies beneath the progressive inquiry model. The theory of expansive learning highlights the meanings of mediating artefacts, or tools, in learning, and learning is seen as an expansive process of activities that produce new activities.

Progressive inquiry is a nine-step process (Muukkonen et al., 1999), and in this study it was applied to a geographic inquiry. These steps include creating a context for learning, determining the research questions, constructing working theories, seeking and deepening knowledge, conducting a critical assessment of knowledge advancement, and sharing expertise. The manner in which these steps were applied in this study is described in detail in the section regarding the rationale behind the investigated geography course.

The aim of the present study was to extend the understanding of the strengths and weaknesses of the progressive inquiry teaching and learning model in a geographic inquiry. The conclusions regarding the feasibility of narrative inquiry for gathering information from adolescents are also presented. The research questions are as follows: (1) What kind of narratives of the progressive inquiry teaching and learning model are given by the students? (2) What characteristics and tools of progressive inquiry are beneficial for learning the geographical subject matter and skills, and the required 21st century skills?

Relevance of the Study

This study investigates adolescents' learning in the Finnish comprehensive school system, renowned for its success in Programme for International Student Assessment (PISA) investigations and belonging to the schooling tradition of the Nordic Countries. The concepts of inquiry learning and inquiry-based learning encompass progressive inquiry, and this approach to learning has been at the centre of recent educational reforms in Finland and many other countries since the 1990s (Finnish National Board of Education, 2015; Furtak, Seidel, Iverson, & Briggs, 2012; Kidman, 2012; Minner, Levy, & Century, 2010).

This study is the first part of a research project on students' motivation and cognition in classroom education when studying geography using progressive inquiry. In total, 314 students and 9 teachers participated in this research project. A practical objective was to propose a pedagogically meaningful teaching and learning model based on progressive inquiry that would introduce certain tools for learning Geography. The suggested model is based on the results of this and another related study.

The aim of this study was to describe and interpret the learners' experiences of the progressive inquiry and the specific tools used in geographic inquiry. This

complements the discourse provided by qualitative research about the meanings pupils have constructed in actual teaching situations thus contributing to evidence-based practice in the field of geography education (Roberts, 2010). Additionally, one objective was to test the narrative inquiry approach among middle school students. The narrative inquiry approach has not been applied much to study middle school education from adolescents' point of view, even though story-telling has been identified as a distinct feature of most human beings right from early childhood, when the first sentences are uttered (e.g., Abbott, 2008). The feasibility of the method was investigated by examining the level of narrativity (Fludernik, 2000, p. 282), and the adolescents' reliability to stick to their own experiences in the interviews (Abbott, pp. 70–77).

Motivation to Learn

To understand the differences between the narratives of progressive inquiry and develop the teaching and learning model further, the students' motivational aspects were investigated. The motivation to learn is a complex concept whose meaning has many different angles. One of the most recent syntheses of the research in this area suggests that there are three controversial key concepts to ponder when studying the motivation to learn: extrinsic motivation, intrinsic motivation, and freedom or autonomy (Ellett & Erickson, 2010, p. 347). Therefore, the narratives were scrutinized for depictions of the *value components* of motivation which involve learner goal orientation and the task value of learning (Pintrich & McKeachie, 2000). When learners are mostly internally goal-oriented, they experience curiosity, joy, and increased self-worth through learning. Those who are more externally goal-oriented are mainly motivated by good grades and rewards. The task value of learning describes the learners' perceptions of the importance of a task.

There are two kinds of *expectancy components* of motivation: control beliefs and self-efficacy beliefs (Pintrich & McKeachie, 2000). Learners who experience having control over their behaviour and the ability to influence their environment tend to achieve better learning outcomes than learners who do not believe that they have such control. The learners' self-efficacy beliefs consist of beliefs about performance capabilities when undertaking a certain learning task and beliefs about achieving grades. Both of these expectancy components positively affect the learners' performance via cognition, self-regulation, and metacognition. Both control beliefs and self-efficacy beliefs are linked to the skills of planning, monitoring, and regulating cognition.

Self-Regulated Learning Skills

Wolters, Pintrich, and Karabenick (2003) present a synthesis of the complex phases and areas of the self-regulated learning process. This constituted the theoretical background of the present study to scrutinize the adolescents' use of self-regulated learning skills when undertaking tasks of progressive inquiry during the geography course. The four phases that can occur in the areas of regulation are (1) forethought, planning, and activation; (2) monitoring; (3) control; and (4) reaction and reflection. This paper focuses on the third phase of regulation, control phase, and its three scales. The applied scales are as follows:

a. Cognition: Rehearsal, Elaboration, Organization, and Metacognitive Regulation

b. Motivation/Affect: Relevance Enhancement, and Situational Interest Enhancement

c. Behaviour: Effort Regulation, Time/Study Environment, and Help-Seeking

Cognitive strategies involve the memorization and retrieval of information, whereas metacognitive strategies are for planning, regulating, and modifying cognitive processes (Pintrich & McKeachie, 2000). Managing one's use of time is linked to the value

components of motivation, such as intrinsic orientation and task value, which affect the choice of behaviour, and thus the choice of activity. Another resource management strategy involves managing the physical studying environment. The third resource management strategy is effort regulation; this is considered one of the most important learning strategies, as it involves the learner's general self-management of effort and persistence. Learning how to seek and obtain help from peers or teachers is also an important resource management strategy. It is beneficial for the learners to recognize when they need help and must identify someone else as a provider of assistance.

Description of the Investigated Geography Course

Participants

This was a case study conducted in one comprehensive school in Central Finland. Three teachers of geography and their students took part in the study with the progressive inquiry teaching and learning model; the researcher/interviewer was one of these teachers. The average age of the 13 adolescents who participated in the interviews was 14.1 years, and the class sizes varied from 17 to 23 students. Typically, each interview lasted about half an hour. The teachers were interviewed after the course to gather additional information about the events that had taken place.

The aim was to recruit adolescents based on their freewill. The ethical dilemmas of participation were considered, including the fact that the researcher was a teacher of some of the informants, and the informants' young age, and the rationale for the investigation was sent to the Ethics Committee of the Tampere Region for revision. The committee gave consent for carrying out the investigation as planned. No differences were found between the narratives of researcher's students compared to the student narratives of other teachers.

The Rationale for the Geography Course

The researcher and teachers jointly planned the events of the geography course, and the objective was to perceive the following key elements of geographic inquiry in European context: (1) the human and physical phenomena and their associated relations, (2) the geospatial reference systems such as events, places and regions, (3) the spatial perspective, and (4) geographic vocabulary (Favier, 2011, p. 100). Progressive inquiry was applied to a geographic inquiry approach in order to investigate the geographical phenomena by collecting, processing and understanding the data (Chang et al., 2012). Data comprised of texts, animations, maps, and diagrams.

The events were designed to take place as follows. The teacher would present the outline of the course including its main contents, objectives, and assessment. Then each student would be asked to choose one European country for his or her project work, and the students with the same country would form a pair. Next, each pair would write down what they already knew about the country and why they had chosen it, and develop a study plan with questions. The digital learning platform Moodle would be used for writing the study plans, commenting on them, asking questions, and disseminating the best information sources to other peers. The project work would proceed progressively by searching for information by seeking answers to the questions in the study plan and inventing new questions. The project work on European countries would involve a task to draw maps of certain geographical topics, such as topography and livelihoods, and write down how the map relates to other maps and phenomena.

In addition to their progressive investigation, the adolescents would have to design simple digital games for their peers about two different topics. Their peers would then play each game by solving the geographical dilemmas. The teacher would use an interactive whiteboard during the geography course, and the students would use it when playing the interactive game.

At the end of the course, a tourism fair would take place in the classroom. Half of the student pairs would first play the role of experts advertising their country to the visitors, and then they would switch roles. Maps and diagrams would be presented at the fair with drawings, pictures, or souvenirs that the students would choose to display. The students would be guided to compare their original study plans to their project work outcomes in order to make the learning visible.

Narrative Inquiry as a Research Approach

A narrative inquiry approach was chosen for this study because it underlines the process of gaining an in-depth understanding of the events (Abbott, 2008) that take place in the classroom from the students' point of view. Moreover, according to constructivism, knowledge is created subjectively as an interplay between one's prior experiences and conceptions and new ideas; hence, one's conceptions of oneself and of the surrounding world are always changing (Bakhtin, 1986; Guba & Lincoln, 2005), thereby constructing a constantly transforming narrative. Knowledge can be seen as a network of these narratives. The orientation of the study was cross-sectional, as the aim was to investigate how the interviewees, which are referred to as informants, would narrate their experiences in the interviews.

The autobiographical approach was chosen because the focus lies in the events of the story—in other words, what happened and why—rather than investigating the structures and forms of these narratives using a more linguistic approach (Abbott, 2008). Therefore, the scientific classical realistic paradigm and constructivist interpretative paradigm are intertwined.

Not all talk is narrative, and oral and written language can be categorized into narrative, argumentative, instructive, conversational, and reflective macrogenres (Fludernik, 2000, p. 282). A narrative is not merely stating facts; it always encompasses

personal experiences and involvement (Abbott, 2008). Experiences are reconstructed into new narratives every time they are narrated; moreover, a narrative is first reconstructed according to the interpretation of the researcher, and then according to the interpretation of the reader.

Narrative Interviewing as a Means for Investigation

All qualitative interviews are based on conversation (Kvale & Brinkmann, 2009), where the epistemology of the qualitative interview is more constructionist than positivist (Holstein & Gubrium, 1995), and the participants are seen more as active meaning-makers than as passive transmitters of knowledge. Interviewing an under-aged person is an interactive process just as interviews with adults are (Eder & Fingerson, 2001).

In order to diminish the teacher–student question–answer setting, a *one question narrative interview* (Rosenthal, 2003; 2004; Wengraf, 2001) was chosen as the interviewing method. This method accords more freedom of expression in one's own words. An open-ended question was first asked to guide the informants toward story-telling in their interviews. Next, informants were asked particularised questions. The last phase of the interview was devoted to asking questions which were of significance to the study, if these topics had not surfaced in the previous answers.

In this study, the interviewer started the interview by telling a story about certain events in her life. The purpose of this story was to guide the informants into a narrative way of thinking and thus entice them to produce narratives. Furthermore, to express the interviewer's wish to receive narratives, instead of short answers, she stated the following:

> I would like you to tell me your own story about this specific geography course. Tell me in your own words the events and experiences that you regard as the most important ones. You can start wherever you like and take all the time you need. I will first listen to

you without interrupting, and take some notes in order to ask you questions later.

Analysing Techniques

This study used narrative inquiry as an analysis technique in two different ways: (1) as an analysis of narratives and (2) as a narrative analysis (Bruner, 1986; Polkinghorne, 1995). In other words, the narratives were both the target and outcome of the investigation, as the aim was to identify different narratives (both dominant and counter-narratives) from the data, and analyse the themes within them.

The analysis followed an inductive–deductive procedure, where the basic logic of each interview was first defined to construct each informant's narrative. During this phase, the narratives of the positively and negatively experienced events during the geography course emerged. Next, the narratives were categorized according to what seemed to be the most influential characteristics of the stories; thus, a thematic analysis was conducted according to both direct and indirect story-telling. One dominant narrative was depicted among most of the informants (8/13) and was named the "negotiating master of self-regulation", and two counter-narratives which differed from the dominant narrative were identified. The first of the two counter-narratives was identified among minority of the informants (4/13) and was named the "solo learner in need of support", whereas the second one was identified in only one narrative and was named the "solo master of self-regulation". Subsequently, composite stories were constructed from authentic interview extracts in order to ensure analytic transparency.

In the interpretation process, the researcher engaged in a dialogue with the informants, the data, the theoretical framework, and her own thoughts (Riessman, 2001). Hence, the interpretation was occurring already during the interview and continued through every subsequent phase, from writing the narratives of each interview, coding the themes of the transcripts and narratives, categorizing the

narratives, and creating composite narratives.

In order to enhance the reliability of the thematic categorization, the transcripts were given to a senior researcher for thematic analysis. The two researchers discussed the discrepancies, and the number of themes for further investigation was reduced.

The Dominant Narrative: The Negotiating Master of Self-Regulation

The dominant narrative was named the negotiating master of self-regulation, as all informants depicted the atmosphere during the geography course as talkative, relaxed, and supportive. All of these informants (8/8) considered the talkative atmosphere, where they were able to ask questions and negotiate with their peers, as beneficial for their learning. They all managed to complete their project work in time and sensed ease in proceeding at their own pace. Most of them (7/8) enjoyed the freedom to make their own choices about when to work on which task. In other words, they composed a joint narrative of an ideal student with respect to the goals of 21st century working, communication, and collaboration skills. Furthermore, they were all able to plan, monitor, and control their learning process and react to any obstacles. The narrative is presented as a composite constructed from the interviews with these eight adolescents:

> I find the atmosphere more pleasant when people are talking to each other and it's not totally silent. --- I like it when you are given the responsibility for your own work; you get to search for information and learn according to your own activity. And, even though you are studying things independently, you get to check if you got things right, and if you don't know something, ask someone who knows better. --- When you have someone to talk to, you negotiate things and perceive multiple views on the matters in question. --- We shared the workload quite equally. It has been nice to work both at home and at school, and to decide for yourself how much you do at home. --- And we worked on the text together, shared ideas, and modified each other's texts into our own words, too.

They all indicate a high task value and a high general motivation level. They mentioned variation in studying methods (7/8), freedom of choice and getting to make your own decisions (7/8), digital games (6/8), working in teams (5/8), drawing maps (4/8), using an interactive whiteboard (4/8), the supportive and relaxed atmosphere in the classroom (3/8), writing notes in one's notebook (2/8), and using Moodle (2/8) as motivating factors. All who mentioned the interactive whiteboard as a motivating factor expressed how much they had enjoyed using it together with the whole class to solve digital games, as everybody participated.

According to their stories, all of these adolescents had positive and realistic self-efficacy beliefs concerning their ability to learn. Altogether, this narrative depicts learners who realize when they need help and act on it; thus, they control their behaviour well during their learning process. Other self-regulated learning skills that they revealed are effort regulation, time management, and controlling their study environment.

Most of the adolescents (6/8) considered drawing and interpreting maps as beneficial for learning the subject matter. They had realized that explaining in their own words enhanced their understanding of the subject matter; hence, their metacognitive learning skills were improved. Drawing and interpreting maps was a task which motivated the adolescents, as they perceived the task as important and of intrinsic interest. Moreover, it enhanced their learning through elaboration.

Counter-Narrative 1: The Solo Learner in Need of Support
The first of the two counter-narratives identified in the data was named "solo learner in need of support". There are three things that characterize this narrative: the adolescents preferred doing the project work alone to negotiating with peers, they would have liked more teacher-led lessons, and they struggled with the timetable. Three of them had a lot

of extracurricular activities, such as intense sport training four times a week or meetings for the student union; two of them had missed some of the geography lessons and failed in trying to fit all their activities into their timetable, causing them to fall behind in the studying schedule and the project work schedule with their classmates. The narrative is presented as a composite constructed from the interviews with four adolescents:

> Well, it's pretty hard work, as it takes a lot of time, and you need to do it at home as well. It's hard because I have physical training exercises four times a week, and yet I have to find time to study. --- I felt that time flew by mysteriously quickly. Sometimes it was very difficult to find information. --- I felt that the teacher wasn't present that much, like he was more of a bystander or an observer. We had so much individual work, instead of learning from the teacher. This way, we had to study everything too quickly and I was struggling to manage with the pace. --- As everyone is working with his or her own work, there are no unpleasant disputes, either. I couldn't enjoy doing it, really, because I always felt the pressure of having too little time for it.

In this study, some students (2/4) said that they had not done this kind of long-term project work before, and thus they had not had opportunities to enhance their collaborative skills. Both the students and the teacher need to gain experience of using different collaborative studying methods involving the delegation of tasks and different roles before the learning results can improve (Viilo, Seitamaa-Hakkarainen, & Hakkarainen, 2011). To enhance these skills, students need to be told the benefits of the applied collaborative studying method (Viilo et al., 2011). In this case, the teacher has failed to support the students' self-regulatory process through the clarity and pace of instruction, and by influencing the students' feeling of control over their learning (Loyens, Magda, & Rikers, 2008).

Unlike the learners in the dominant narrative, these four adolescents did not perceive the progressive inquiry model as beneficial for them. They seemed to have an

impersonal orientation (Deci & Ryan, 1985), which means that they believe their outcomes to be beyond their control, thus leading to a sense of helplessness and amotivation. In other words, they either felt incapable of coping with the forces in the surrounding world or the forces of drive and emotion. The impersonal orientation is generally linked with a high level of anxiety, which is evident in two of these narratives.

Counter-Narrative 2: The Solo Master of Self-Regulation

There was one interview that differed from all the others by depicting a learner who prefers to work alone and has high self-regulation skills. This narrative reaffirms that the experience of choice is a key factor of the autonomy orientation (Deci & Ryan, 1985). Autonomy-oriented people make choices and regulate themselves when they aim for self-selected goals. The motivation can be either intrinsic or extrinsic, but the behaviour is nevertheless self-determined if it is based on choice. This narrative starts with an example of situational interest enhancement, which is one way she controls her motivation. Composite narrative is constructed from one authentic interview transcript as follows:

> I like to do chores which involve organizing things and putting small pieces together, so I enjoyed the kind of work where I got to take care of the tiny details on each page, draw maps, and all. --- It isn't nice when the class is too loud, with everybody talking aloud, as I can concentrate better when it's absolutely quiet. --- It kind of bothers me in general to have someone else sitting next to me with all his or her stuff scattered around. --- I am able to concentrate better when working alone, just by myself. --- When you interpreted the maps that you had drawn, you both better perceived what the map was about and you learnt what those things really mean.

Drawing maps with different themes was a task which clearly stimulated the informant to use elaboration as a metacognitive skill, and it induced creative reasoning when she was understanding and explaining the geographical phenomena. She also used a certain

city as a reference point to determine how far north or south the phenomena were situated; thus, she used organizing subject matter as a metacognitive skill to learn.

This informant displayed creative and flexible self-determined behaviour, which is more creative than control-determined behaviour, and its perceived locus of causality is usually internal, while perceived competence is high (Deci & Ryan, 1985). She managed to control her cognition, motivation, and behaviour well, even under challenging conditions.

Narrated Experiences of Educational Technology

In most of the narratives (12/13), the learners experienced creating and solving digital games as beneficial for learning the subject matter. The idea of learning the subject matter and collaborative working skills while creating something together (Paavola & Hakkarainen, 2005) was fortified by these informants. This learning task was valued the most in the dominant narrative and the second counter-narrative, and viewed as less beneficial in the first counter narrative. This is congruent with the fact that the narrators in counter-narrative 1 did not consider negotiating as beneficial to their learning.

The learners did not use Moodle's digital learning environment as planned. They wrote down questions in the field of geography and commented briefly on what they already knew about the country that they were about to investigate. However, they did not comment on each other's plans, and they did not compare the final outcomes of the project work with their original ideas and study plans; hence, they did not realize how much they had learnt. Some explanations emerged from the data, such as a lack of time, lack of familiarity with using Moodle, or experiencing its use as difficult, clumsy, or time-consuming. The students preferred to use their mobile phones to send each other information, such as pictures of maps.

Further, they did not use the interactive whiteboard for interactive activities other than playing the digital games together with the whole class. Both the students and teachers seemed to need more guidance and time to learn different ways of using Moodle and the interactive whiteboard, and information on why it was being used.

Feasibility of Narrative Inquiry Approach When Investigating Adolescents

Narrativity was found in every interview, and only a few (2/13) wanted mostly to be asked specific questions. The same adolescents also changed their perspective on whose experiences were being shared, thus distancing themselves from the events. All in all, the majority (9/13) used narrativity as the dominant macrogenre or as much as the argumentative or conversational macrogenre, and gave narratives from their own point of view. Although the involvement varied from medium to high, none of the stories was told entirely from an outsider's perspective. To summarize, the narrative inquiry approach undertaken with one question narrative interview proved suitable for investigating these 14–15 year-old adolescents.

Conclusions and Discussion

The results of this study are well in line with positive findings regarding the use of inquiry learning in geography education (e.g., Chang et al., 2012; Kidman, 2012). Most of the study participants (8/13) depicted the events of the geography course, which was run using a progressive inquiry teaching and learning model, as beneficial for their learning both the subject matter and subject-related skills, as well as some of the so-called 21st century skills (Table 1). Their stories were identified as the dominant narrative, named "negotiating master of self-regulation". It seems that learners with positive and realistic self-efficacy beliefs and good self-regulated learning skills benefit from the progressive inquiry learning model, where matters are negotiated with a peer

and the learners are given high autonomy and freedom of choice. Nevertheless, these students, like every student, also need support from their teacher to steer their learning process to some extent (Winne, 1995).

[Table 1 near here]

A few adolescents (4/13) were identified according to their narratives as "solo learners in need of support", and they were learners who did not benefit from the progressive inquiry learning model. On the contrary, they were struggling to complete their project work on time, as they lacked skills of effort regulation and time management. Moreover, they did not sense any benefits of working with a peer. These results indicate a need to rehearse self-regulated learning skills, as they are not fixed characteristics in a person and thus need to be strengthened repeatedly (Winne, 1995). In addition, more practice with collaboration is required to gain the necessary skills for working in the 21st century. These learners were not intrinsically motivated; therefore, they would have benefited from extrinsic support (Deci & Ryan, 1985), and they highlighted their need for the teacher's guidance and support. Especially the students who have poor time and effort management skills need practice to strengthen their self-regulatory skills. For example, teacher's enthusiasm and fairness, along with showing positive expectations of the students' capacities, can improve the self-regulated learning process (Boekaerts & Cascallar, 2006).

There was one narrative identified as the "solo master of self-regulation" depicting a learner who is highly skilled in all four levels of self-regulated learning and has good metacognitive learning skills, but lacks social skills. Yet progressive inquiry suited her well, as she benefited from learner autonomy and freedom of choice.

Inquiry learning, such as progressive inquiry, can be embedded in the classroom practices with or without ICT. Although, when ICT is used to provide tools for inquiry learning, it should strengthen the learners' abilities for scientific research and their collaboration skills (Banchi & Bell, 2008; Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). In this case study, drawing and interpreting maps and creating digital games served as tools for learning, as the progressive learning model and knowledge creation metaphor suggest (Engeström, 1999; Paavola & Hakkarainen, 2005), but Moodle and the interactive whiteboard were under-used as such learning tools. This result indicates the challenges posed by the unpredictable evolution of ICT for both teachers and students, and the hardships that they struggle with (Cerratto-Pargman, Järvelä, & Milrad, 2012; Chang et al., 2012). Teachers tend to share the misunderstanding that because many learners are familiar with new technologies, they can learn different ways of utilizing them by themselves (Cerratto-Pargman et al., 2012). Instead, the teacher's role is even more important for scaffolding the students' thinking and supporting them in acquiring information and ICT literacy. On the other hand, it was interesting to notice that the lack of using the suggested ICT tools did not inhibit the students from carrying on with their geographic inquiry. It seems that the middle school students are able to come up with alternative solutions for achieving their learning goals, and especially the way they use mobile devices for sharing information and help-seeking when studying with geographic inquiry would be an interesting topic for further investigation.

This study provides evidence that can be used in geography education by suggesting that given adequate support, progressive inquiry can enhance motivation and the acquisition of both geographical skills and knowledge, and 21st century skills. Special attention is needed to guiding the students' learning process (1) at the beginning of the course, for writing down the study plan, (2) during the course, to remind about

giving feedback via Moodle, (3) at the end of the course, to compare the outcome with the original perceptions of the subject in order to make learning visible.

Progressive inquiry requires tremendous effort from both the teacher and the students, and what this study adds to the model is the notion that there are different kinds of learners, who can be identified by their self-efficacy beliefs and skills in self-regulated learning, and their need for support from the teacher differs greatly. Teachers and teacher educators should take this finding into account and focus on supporting the students with poor effort regulation skills and poor time management skills, when teaching with progressive inquiry. With these notions in mind, the cyclical learning process of progressive inquiry can be applied in geographical inquiry to transform a schooling culture into resembling a scientific inquiry culture, thus enhancing the skills that are required in a knowledge society.

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Tables with captions

Table 1. Juxtaposition between the dominant and counter-narratives for self-regulated learning skills, negotiation skills, self-efficacy beliefs, and motivation.

	Self-regulated learning skills	Negotiation skills	Self-efficacy beliefs	Motivational factors
The Dominant Narrative: *The Negotiating Master of Self-Regulation* Learner with high self-regulation skills and high negotiation skills	Planning, monitoring, controlling, and reacting phases took place, and cognition, motivation, and behaviour were controlled; maps enhanced metacognitive skills (elaboration) and the learning of the subject matter	Experienced the talkative atmosphere as a positive factor, negotiated matters actively	Positive and realistic	General motivation level high, task value got higher due to sensed freedom of choice, team work, and variation in studying methods
Counter-Narrative 1: *The Solo Learner in Need of Support* Learner with poor time management skills and poor effort regulation skills	Planned, but did not stick to the plan or did not plan; instead, drifted along and, hence, did not get the work done	Experienced talkative and noisy atmosphere as highly disturbing, did not consider negotiating matters as beneficial	Overly positive and unrealistic: half of the maps needed to be finished in one weekend's time, or poor beliefs	This course was hard work, with a lot of struggling; contextual motivation was low, progressive inquiry was not beneficial
Counter-Narrative 2: *The Solo Master of Self-Regulation* Learner with high self-regulation skills, poor negotiation skills, and poor social skills	Planning, monitoring, controlling, and reacting phases took place, and cognition, motivation, and behaviour were controlled; maps enhanced metacognitive skills (organizing and elaboration) and the learning of the subject matter	Experienced the talkative atmosphere as a negative factor, did not negotiate matters	Positive and realistic, overly positive about social skills	General motivation level high, task value got higher due to the ability to make one's own choices