



Journal of the International Society for Teacher Education

Volume 21 Issue 1

Emancipating and Transforming Teacher Education
For a Better Education System



Journal of the International Society for Teacher Education

Emancipating and Transforming
Teacher Education for a Better Education System

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ISSN 2521-6015 (online)
ISSN 1029-5968 (print)

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We are indebted to the following individuals who gave their time and expertise to review the manuscripts for this issue. We could not do this job without their reviews.

Anna Krulatz, Norwegian University of Science and Technology; Cornelia Brodahl, University of Agder, Norway; Jackie Chan, Hong Kong Baptist University, Hong Kong; Jacky Pow, Hong Kong Baptist University, Hong Kong; Karin DeJonge-Kannan, Utah State University, USA; Karen Bjerg Petersen, Aarhus University, Denmark; Kemma Tsujino, Joetsu University of Education, Japan; Lotte Rahbek Schou, Aarhus University, Denmark; Modupe M. Osokoya, University of Ibadan, Nigeria; Nuray Senemogly, Hacettepe University, Turkey; Peggy Saunders, Weber State University, USA; Penee Stewart, Weber State University, USA; Sheryl Rushton, Weber State University, USA; Vera Lucia Fellicetti, Centro Universitário La Salle, Brasil. *Statistical consultants:* Tanya Kaefer, Lakehead University, Canada; Vera Woloshyn, Brock University, Canada. *English edit and final reviews:* Leanne Taylor, Brock University, Canada; Vera Woloshyn, Brock University, Canada

JISTE is an official, refereed publication of ISfTE. The goal of ISfTE is to publish six to eight articles in each issue. Using the seminar theme, articles in the first issue of each volume are based on papers presented at the previous seminar. Articles in the second issue are non-thematic or have special themes. Points of view and opinions are those of the individual authors and are not necessarily those of ISfTE. Published manuscripts are the property of JISTE. Permission to reproduce must be requested from the editor.

JISTE is issued twice yearly by the International Society for Teacher Education. The subscription price of \$75.00US is included in the annual membership fee. Institutional subscription to JISTE is \$95.00US per year.

JOURNAL OF THE INTERNATIONAL SOCIETY FOR TEACHER EDUCATION

Volume 21, Number 1

From the Editor
Karen Bjerg Petersen 5

Emancipating and Transforming Teacher Education for a Better Education System
 – about JISTE 21.1
Leanne Taylor, Vera Woloshyn and Karen Bjerg Petersen 5

Articles

Challenges University Students Face when Integrating New ICT Tools into their Learning:
 An Exploratory Study of a Social Annotation Tool
Jackie W.W. Chan, Miki Lau, Sandy C. Li, Jacky Pow, Gina Lai & Alpha Wong 7

Blended Education in Food and Health (Home Economics): Do We Need Campus?
Anne S. Ask, Margrethe Røed, Mona L. Omholt and Ingebjørg Aarek.....24

Mathematics Video Podcasts as Integrated Elements of Online Lessons in Further University
 Education: In-Service Teachers’ Flow Experiences
Unni Wathne and Cornelia Brodahl 33

Preparation of Student Teachers for Multicultural Classrooms: Reflections on the Danish
 Teacher Education Curriculum
Karen Bjerg Petersen 45

Differences Between Licentiate and Non-Licentiate courses: A Case Study of Students With
 and Without Prouni Scholarships in Brazil
Vera Lucia Felicetti..... 55

The Effects of the Niger Delta Crisis on Educational Resources, Attitude to Schooling,
 and Academic Achievement of Basic Science Students in Rivers State, Nigeria
Tamunosisi Furo Pepple and Gift A. Ogologo..... 67

Dietary Habits and Behaviour Problems at School Among Norwegian 14 Year Olds
Inger M. Western, Madelene Skårdal, Anne M. S. Ask and Nina C. Øverby77

School Development Planning: a Strategic Tool for Secondary School Improvement in
 Rivers State, Nigeria
Ugochukwu Kysburn Agi.....88

Publication Guidelines 100

Submission Requirements 101

Future Submissions 101

About the Universities on the Cover and JISTE Sponsorship 102

From the editor

As the editor of JISTE, I want to thank the associate editors, Vera Woloshyn and Leanne Taylor, for their immense work editing and reviewing the articles in this issue of JISTE. To English edit articles written by authors from all over the world whose first language is not English is challenging and time-consuming work. Concepts and terminology vary and often are used differently across international contexts just as educational policies, schooling processes, and teaching practices differ between countries. Words commonly used and understood in one part of the world may be unfamiliar in another part. Leanne and Vera have done a great job clarifying meaning in the articles featured in this issue of JISTE. In addition, they have taken on the role of reviewer by asking authors to clarify findings, revise, and rewrite their articles as necessary. The results of this work are evident in this issue which features a broad range of issues and research relevant to international teacher education. I also would like to acknowledge Tanya Kaefer, Associate Professor at Lakehead University, Canada and Professor Vera Woloshyn who have been JISTE's statistical consultants for this issue. Their time, expertise, and support is much appreciated.

Emancipating and Transforming Teacher Education for a Better Education System – About this issue

All of the articles in this edition were originally presented in paper groups at the 2016 Seminar of the International Society for Teacher Education, which was sponsored by the University of South Africa – UNISA, South Africa. The conveners of the South African seminar, held in Krüger National Park, were long-time ISfTE members, LDM Oupa Lebeloane, Mokhele Madise, and Fanie Pretorius from South Africa.

The focus of the 2016 Seminar is reflected in the theme of this issue entitled *Emancipating and Transforming Teacher Education for a Better Education System*. The authors in this issue address a variety of topics facing teacher education throughout the world.

ICT, blended learning and the use of digital media - all common concerns in teacher education - are addressed in three of the eight articles in this issue. The article *Challenges University Students Face When Integrating New ICT Tools into their Learning: An Exploratory Study of a Social Annotation Tool*, written by Jackie W.W. Chan, Miki Lau, Sandy C. Li, Jacky Pow, Gina Lai, and Alpha Wong documents how teacher trainers in Hong Kong encourage students to use new ICT tools in their individual learning processes. In the article *Blended Education in Food and Health (Home Economics): Do we need Campus?* the Norwegian researchers and teacher educators Anne S. Ask, Margrethe Røed, Mona L. Omholt and Ingebjørg Aarek explore how face-to-face teaching combined with online learning is perceived by students and teacher trainers in food and health education. The two other Norwegian authors, Unni Wathne and Cornelia Brodahl, investigate in-service teachers' experiences using video podcasts in math in the article *Mathematics Video Podcasts as Integrated Elements of Online Lessons in Further University Education: In-Service Teachers' Flow Experiences*.

Three articles in this issue are case studies and/or investigations of country-specific challenges in various parts of the world. In the article, *Preparation of Student Teachers for Multicultural Classrooms: Reflections on the Danish Teacher Education Curriculum* Karen Bjerg Petersen investigates how “strong political commitment” and distinct descriptions of key competences in mandatory modules are seen as ways to prepare future student teachers for diversity in

Denmark and Europe. Vera Lucia Felicetti from Brazil is the author of the article *Differences Between Licentiate and Non-Licentiate Courses: A Case Study in Brazil*. Her findings indicate that graduates with ProUni scholarship funding had a higher graduation rate and lower dropout rate than non-scholarship holders in both licentiate and non-licentiate courses. In their article, *Dietary Habits and Behaviour Problems at School among Norwegian 14 Year Olds*, authors Inger M. Western, Madelene Skårdal, Anne M. S. Ask, and Nina C. Øverby report that a high intake of soda with sugar and frequent consumption of take-away and fast food were significantly associated with increased behavioural problems at school.

Finally, two articles in this issue investigate the Nigerian Educational system. Tamunosisi Furo Pepple and Gift Allan Ogologo's article entitled *The Effects of the Niger Delta Crisis on Educational Resources, Attitude to Schooling, and Academic Achievement of Basic Science Students in Rivers State, Nigeria* concludes that the Niger Delta Crisis has negatively impacted students' academic achievement. In comparison, in the article *School Development Planning: A Strategic Tool for Secondary School Improvement in Rivers State, Nigeria*, author Ugochukwu Kysburn Agi explores the importance of school development planning as a strategic tool for the improvement of secondary education in Rivers State, Nigeria.

We hope that the readers will find interest and inspiration in this issue of JISTE.

Leanne Taylor, Vera Woloshyn and Karen Bjerg Petersen
Editors of JISTE

CHALLENGES UNIVERSITY STUDENTS FACE WHEN INTEGRATING NEW ICT TOOLS INTO THEIR LEARNING: AN EXPLORATORY STUDY OF A SOCIAL ANNOTATION TOOL

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Abstract: *To facilitate students' learning, teachers are keen to try out various ICT tools, recommend those they find useful to their classes, and even tailor-make tools for their classrooms with the assistance of engineers. However, students are not always eager to voluntarily apply these tools to their assignments. This paper reports on findings from a study that explored the introduction of a commercial social annotation application, Diigo, to university students enrolled in three different courses. All participating students were given a two-hour, in-class, face-to-face tutorial at the beginning of the semester. Diigo was expected to facilitate students' collaboration in collecting, sharing, analysing, and elaborating data while engaged in a group inquiry learning assignment. Seventeen students were invited to participate in individual interviews. Qualitative content analysis of transcripts was conducted to examine the challenges students faced when they decided to incorporate new technology into their studies. Findings indicate that although Diigo is helpful for data collection and sharing among students, students prefer Google Drive, an online file storage and synchronization service, for data analysis and elaboration. Interviewees pointed to the usability of the ICT tool, their motivation as students, peer influence, and the arrangement of the face-to-face tutorial as challenges associated with integrating the ICT tool. We argue that addressing these four areas of student concern is pivotal to the cultivation of a conducive atmosphere that encourages students to try out and integrate new ICT tools into their learning.*

Keywords: collaborative inquiry learning, higher education, ICT, social annotation

Introduction

Over the past decade, scholars have examined the challenges and effectiveness of student-centred approaches in enhancing the learning experiences of Asian students (Hallinger & Lu, 2011; Kember, 2000). It is anticipated that student-centred learning that prioritizes students' interests can help students achieve better learning outcomes (Hallinger & Bryant, 2013; Jones, 2007; Wright, 2011). Student-centred approaches, such as conducting inquiry-based learning and collaborative learning activities, encourage students to explore, acquire, and construct knowledge by themselves, as well as to reflect on and self-regulate their individual learning processes. Information and communication technology (ICT) has contributed to the important shift toward

student-centred learning by helping to scaffold students' exploration and management of knowledge while engaged in collaborative learning and inquiry-based learning (Henderson, Selwyn, & Aston, 2017). ICT also helps develop students' autonomy and independence by providing a virtual learning space that enhances students' learning experiences throughout the learning process (Aguti, Walters, & Wills, 2014). For example, at the beginning of a course, an instructor may illustrate different real-world situations via multimedia applications instead of lifeless verbal descriptions. Colourful photos and online videos help students develop a clearer picture of the situation. At the same time, students can make use of ICT to intensify group collaboration and facilitate

group projects. For example, Instant Messenger (IM) can help develop communication, and platforms like *Google Drive* can improve collaboration through on-line co-authoring in group-based projects.

Within higher education institutions in Hong Kong, instructors are eager to introduce new ICT tools to facilitate student-centred learning. However, these instructors find that when a new ICT tool is introduced in a voluntary adoption setting, students show little motivation to try out the new technology. This low willingness to incorporate the technology into their learning limits students' opportunities to learn with ICT (Lai, Wang, & Lei, 2012).

Literature Review

Collaborative Inquiry Learning

Collaborative inquiry learning (CIL) is a student-centred learning pedagogy (McLoughlin & Lee, 2007; Woolf, 2010) that has been described as a new and promising educational paradigm in contemporary higher education (Cober, Tan, Slotta, So, & Könings, 2015). CIL involves the integration of two learning methodologies: (a) collaborative learning and (b) inquiry-based learning (Bell, Urhahne, Schanze, & Ploetzner, 2010; Saab, van Joolingen, & van Hout-Wolters, 2007). Collaborative learning encourages students to interact with groupmates as they co-study through learning tasks (Dillenbourg, 1999). Inquiry-based learning requires students to identify investigation questions, conduct data collection, engage in data analysis and interpretation, and finally elaborate findings into conclusions that answer their investigation questions (Bell et al., 2010). In both methods, the instructor functions as a facilitator who provides guidance and advice in order to scaffold students' learning throughout the collaboration and inquiry process (Banchi & Bell, 2008; Reza,

Auldridge, & Rhea, 1998).

By incorporating the advantages of the two methods above, collaborative inquiry learning provides valuable opportunities to students, especially university students, to study as groups and investigate their inquiry question(s) through self-exploration and collaboration. In this learning method, students usually work in groups of three to five to determine their inquiry question(s) via discussion, then decide how they will collect and share information gathered from different sources. Students work collaboratively with the shared information as they analyse, interpret, elaborate, and debate the data and respond to their inquiry question(s). Throughout this process, each student is assumed to contribute his/her own resources, knowledge, and skills to the group in order to complete the learning tasks, which can diminish individual discrepancies often associated with independent inquiry-based learning (Trentin, 2009).

Social Annotation Tool

In the Web 2.0 era, web users are no-longer passive receivers of information. They can be content creators and contributors who are empowered to comment as well as interact and discuss with different users on the Web (O'Reilly & Battelle, 2009; O'Reilly, 2005). According to Mejías (2005) (as cited in McLoughlin & Lee, 2007, p. 666), social annotation tools can be categorized as distributed classification systems, or "folksonomies." Folksonomies are tools that allow users to assign multiple tag-words to any information resource. Users can rediscover all resources attached to a specific tag-word(s) (Peters, 2009). These tools are among the key applications and services of the Web 2.0 era. Estellés, Del Moral, and González (2010) introduced a number of existing social bookmarking and annotation tools which cater to various kinds of information and user needs. *Diigo*

was analysed in detail for its major functions for teamwork and applications for learning and research. Based on the comparison with other social bookmarking and annotation systems, *Diigo* was chosen in this study because it is used widely in academia to support collaborative inquiry learning (Gao, 2013; Huang, Shen, & Chang, 2011; Li, Pow, & Cheung, 2015; Lu & Deng, 2012). *Diigo* is also well developed for collaborative work with text-based content on the Internet (Estellés et al., 2010; Pytash, Annetta, & Ferdig, 2016).

Diigo is a commercial social annotation tool that describes itself as "... a multi-tool for personal knowledge management" (*Diigo*, 2017) that aims to improve users' workflow and productivity. It was developed in 2016 and is managed by *Diigo Inc.* The tool not only allows users to bookmark and categorize webpages as normal web browsers are able to do during web surfing and information searching but it also allows users to highlight, comment, share, and reply to web-based text content and PDFs for individual and group use on any computer with a web browser and Internet connection. Furthermore, it can archive the webpages highlighted by users and saved in *Diigo's* server so that the webpages can be retrieved even if the original webpage has been deleted (Blake & Morse, 2016; *Diigo*, 2016; McTighe & March, 2015; Millen, Feinberg, & Kerr, 2005; Padoa, Schneider, De Souza, & Medeiros, 2015).

Some educational scholars have found that this product is able to facilitate higher levels of cognitive and meta-cognitive activities among university students through group sharing and discussions with the information collected (Estellés et al., 2010; Johnson, Archibald, & Tenenbaum, 2010; Li, Pow, & Cheung, 2015; Yang, Yu, & Sun, 2013). As suggested by Castek, Beach, Cotanch, and Scott (2014), it is also suitable for middle school students to conduct collaborative annotation which assists their close reading

of science texts.

Our study focused on undergraduates since these students are often flooded with large amounts of information even when completing a single assignment (Maybee, 2006). When students work on individual or group assignments, they can be overwhelmed by the vast amount of information available from a variety of sources, such as webpages, books, and journal papers. As such, they might need assistance to organize this information. In light of this, the social annotation tool seems to be an appropriate solution to help students organize and process information pertinent to their collaborative inquiry learning assignments.

Since the first generation of the social annotation tools was applied in education (e.g., *Hy-Lighter*), several studies have evaluated their effectiveness and examined students' perceptions of using those tools (Johnson et al., 2010; Razon, Mendenhall, Yesiltas, Johnson, & Tenenbaum, 2012; Razon, Turner, Johnson, Arsal, & Tenenbaum, 2012). A number of researchers have focused on the recent well-developed product, *Diigo*, and, in particular students' collaboration when using the application (Curcher, 2011; Gao, 2013; Li, Pow, & Cheung, 2015). Im and Dennen (2013) found that students within a *Diigo* group contribute differently, with some being classified as web link contributors and some as commenters. Web link contributors are those who contribute more bookmarks than comments to their group. Commenters are those who commented more frequently than they bookmarked. McTighe and March (2015) suggest that *Diigo* would work better when students and teachers work and collaborate in the same group. The authors also showcased how teachers share information with all students through *Diigo* to foster discussions, comments, and evaluation in a short period of time.

Research Objectives and Implications

In order to enhance students' learning experiences, some instructors are keen to test new educational applications and introduce the most useful ones to students. Some have even worked in cooperation with engineers to tailor software or applications that cater to students with different learning needs. However, when instructors introduce new ICT tools aimed at facilitating students' learning in a university context, not many students are willing to integrate the recommended technologies into their learning, particularly when the implementation is voluntary (Lai et al., 2012).

For this study, selected students from three courses were interviewed to learn about their perceptions about their learning processes and understand their experiences of being introduced to a new ICT tool. The following two research questions guided our study:

1. How and why do students incorporate new ICT tools in their learning process?
2. What are the challenges and concerns university students have encountered with the new ICT tools in their learning process?

Based on the findings of this study, educators and/or researchers should further investigate the benefits and challenges of integrating computer-supported educational tools in collaborative inquiry learning in a voluntary adoption setting. We provide recommendations intended to encourage students to make use of new ICT tools which are designed to assist their learning.

Research Design and Methodology

Our research study was a one-semester action research project at a university in Hong Kong and ran from January to June 2015. Students in two undergraduate-level courses (Course G, "CG" with 3 sub-

sections & Course E, "CE") hosted by the Department of Education Studies and another same level course (Course S, "CS", with 4 sub-sections) hosted by the Department of Sociology were invited to participate in data collection. These courses were chosen because they included collaborative inquiry learning assignment(s) (CILA). In total, there were 107 students studying in CG; 38 in CE; and 50 in CS (N=195). After eliminating students who withdrew from the courses and students who did not provide consent agreements, valid data for analysis included response from 180 students (n=180).

The Design of the *Diigo* Tutorial

At the beginning of the second semester (January, 2015), the commercial social bookmarking and annotation application, *Diigo*, was introduced to students of the three courses through a two-hour, in-class, face-to-face tutorial (total teaching hours of each course were: 39 hours for CG; 27 hours for CE; and 39 hours for CS). Researchers purchased the full function professional accounts for each student in the three courses, and students could use all functions provided by *Diigo*. In this tutorial, researchers aimed to fulfil three objectives: (a) introducing the basic functions of *Diigo*, (b) introducing the advantages of using *Diigo*, and (c) helping each group to setup a group folder for their future CILA collaboration.

In the first 45 minutes, researchers outlined the basic functions of *Diigo*, which included bookmarking a webpage, highlighting web content, commenting on the highlighted web content, sharing resources in a group folder and replying to their groupmates in the group folder. After that, a 45-minute in-class activity was assigned to the students which allowed them to have hands-on experience with *Diigo*. In the in-class activity, students were guided to install *Diigo*'s web browser extension, and then

they were asked to bookmark a webpage and share their bookmark with their groupmates in the group folder. Subsequently, students were required to browse and reply to the shared bookmarks in their group folder. In addition to the in-class tutorial, a set of digital (PDF) user manuals, written by the researchers, was sent to the students by their instructors as supplementary support after class.

The Requirements of the CILA

Immediately following the tutorial session, instructors introduced the details and requirements of the CILA. As part of the course, students were asked to spend 4 to 10 weeks to complete their CILA (10 weeks for CG; 4 weeks for CE; 10 weeks for CS). In CG and CS, students could voluntarily choose the ICT tool for their group project, while CE assigned collaborative tasks on *Diigo*. Students were free to decide mediums for communication and collaboration with groupmates. If students decided not to integrate *Diigo* in their CILA, they were asked to provide evidence that demonstrated their collaboration, as “collaboration” was one of the assessment requirements (about 5% to 10% of the whole assignment). Collaboration was graded according to how students actively contributed to the group and the fairness of the workload allocation in their CILA.

Purposeful Sampling on Interviewees According to Students’ Usage on *Diigo*

To answer the research questions, a qualitative research approach was adopted to explore how and why students integrated *Diigo* in their learning process and to identify challenges and concerns that arose when they integrated *Diigo* into their CILA. When students submitted their CILA at the end of the semester (between late April and early May, 2015), researchers calculated the frequency of students’ usage of *Diigo* for their CILA. Researchers invited students to

attend an individual interview based on the frequency of their usage of *Diigo*. Frequency was determined based on the number of students’ bookmarking, highlighting, commenting and replying behaviours. By counting the interactions in the same CILA group, researchers identified the most active and least active groups in each course. All students from the chosen groups were invited through email to participate in the interviews, but only a few students replied and attended the interview. To increase interview participation, researchers decided to invite the second most active and the second least active groups in each course to participate in the interview. All group members were invited to participate in individual interviews in order to triangulate the data and gain a larger picture of the process.

Students were invited to participate in a one-hour individual semi-structured interview between April and June 2015 after they submitted their CILA. There are two reasons for conducting a one-hour individual semi-structured interview. First, this format provided interviewees with plenty of time to describe their CILA. Each interviewee was asked the same questions to understand the whole working process within the group. This also helped researchers to understand students’ perceptions of using ICT tools in this CILA. Researchers were also able to ask follow-up questions to further explore the challenges and concerns students encountered while applying *Diigo* in the CILA. Second, the interview format helped students feel comfortable discussing their experiences. According to Gill, Stewart, Treasure, and Chadwick (2008), a setting in which students are alone and not in the presence of groupmates increases students’ comfort level and eagerness to share their perceptions with researchers.

In the first section of the interview, students were asked to list software and applications that had been applied in their CILA. It

followed with questions about the rationale for applying those technologies and their effectiveness. In the second section, reasons for integrating or not integrating the new ICT tool *Diigo* in the CILA project were solicited to tease out their perceptions of the social bookmarking and annotation tool.

All interviews were audio recorded with the consent of the interviewees. Interviews were then transcribed for analysis. Qualitative content analysis was adopted to code the interview transcripts and distinguish students' difficulties with and/or doubts about adopting *Diigo* in their CILA.

Findings and Discussion

In this study, there were 42 CILA groups in the three courses: 21 groups in CG; 8 groups in CE; and 13 groups in CS. Table 1 displays the calculated number of interactions between students on *Diigo* in

the three courses. Table 2 displays the number of interactions between students on *Diigo* in the invited CILA groups. Based on the purposeful sampling method described in the methodology section, 55 students in twelve groups (30 from CG; 14 from CE; and 11 from CS) were invited to take part in individual semi-structured interviews. In the first round of interviews, 1 out of 10 students from CG, 1 out of 9 students from CE, and 6 out of 8 students from CS participated in the interview. In the second round of interviews, 5 out of 20 students from CG, 2 out of 5 students from CE, and 2 out of 3 students from CS participated in the interview. In total, 17 out of 55 students attended the interview. The code for each interviewee included three parts (CX SX-A): CX indicated the course from which the interviewee came; SX indicated the code of the interviewees; and A/AI stood for the most active or least inactive group respectively.

Table 1
Number of Interactions Between Students on Diigo in the Three Courses

	Number of Interactions per Student on <i>Diigo</i>			
	Maximum interactions	Number of students who never used <i>Diigo</i>	M	SD
Course G (n=93)	65	71	3.03	10.08
Course E (n=38)	57	11	10.33	14.12
Course S (n=49)	181	15	25.64	41.05

Table 2

Number of Interactions Between Students on Diigo in the Invited CILA Groups

	Number of Interactions (Number of Group Members Interviewed)	
	Most Active Groups	Least Active Groups
Course G	Group 2G: 72 (0 out of 5) Group 3F ^{**} : 15 (2 out of 6)	Group 2F: 7 (1 out of 5) Group 1A ^{**} : 0 (0 out of 5) Group 3A ^{**} : 0 (3 out of 4) Group 2A ^{**} : 1 (0 out of 5) Group 7: 8 (1 out of 4)
Course E [*]	Group 6: 64 (0 out of 5) Group 5 ^{**} : 79 (2 out of 5)	
Course S	Group 6: 275 (4 out of 4)	Group 1: 0 (2 out of 4) Group 13 ^{**} : 9 (2 out of 3)
Total number of interviewees:		17 out of 55

Note.

^{*}Students in this course declined the interview invitation. Researchers decided not to invite the second least active group.

^{**}Group invited in the second round of interviews

The interview data shows two advantages of using *Diigo*: (a) facilitating data collection and data sharing among groupmates, and (b) transferring of highlighted notes to *Google Drive*, an online file storage and synchronization service, for further group analysis and elaboration. However, as students were making decisions about whether to integrate the new ICT tools introduced by instructors, they encountered four challenges: (a) low usability, (b) low motivation, (c) peer influence, and (d) limited tutorial training. These challenges discouraged students from adopting *Diigo* to assist their collaborative work in their CILA.

Advantages

Facilitating Data Collection and Data Sharing. Some interviewees from the most active groups stated that they did try to use *Diigo* for their data collection as a response to their instructors' recommendation. At the early stage of their CILA, they uploaded, highlighted and shared information collected from different sources with *Diigo*. Once a member highlighted and/or commented on a web-based text or PDF contents, the highlights of web and PDF contents were saved in *Diigo*. Interviewees

CSS5-A and CSS7-A expressed that their groupmates could easily grasp the important points through the highlighted sentences.

Transferring Information to Google Drive for Data Analysis and Elaboration. Some interviewees appreciate *Diigo's* transfer function which allows migration of their highlights and notes to *Google Drive* for further discussions, data analysis, and elaboration. Interviewee CSS6-A stated that they completed data analysis directly on the highlighted contents. Then, they simply created a *Google Drive* folder (*Google Docs*) in a face-to-face meeting and put their research questions in it. After that, they constructed the structure of the writing and divided the assignment into a few parts in the meeting that enabled them to work on their own part after the meeting. Later, they referred to the information on *Diigo* and put information in *Google Drive* according to their needs. Another interviewee expressed the importance of the face-to-face meeting before transferring information to *Google Drive*. This meeting allowed students to confirm the structure of the final text or presentation after they had conducted the background research on their CILA topic and after they had started working on their own parts in *Google Drive*.

Challenges

Low Usability. Low usability of *Diigo* is a key obstacle that discouraged interviewees from integrating this new ICT tool into their CILA. For example, CSS1-IA explained that she only experienced using *Diigo* during the tutorial. When she and her groupmates worked on their own, they were unsure about how to make use of *Diigo*. Because of this, she and her group were less willing to try new things and ultimately gave up using *Diigo*. Conversely, students who could manipulate the tool in a short period of time were less likely to give up quickly and more likely to continue using it. For example, a member from the most active group, CSS8-A, explained that she could follow the demonstration by the researchers and pick up most of the functions in the tutorial.

According to Bevan, Kirakowski, and Maissel (1991), the term *usability* is used to evaluate the ease of learning and using a software/application (App) and can be measured in terms of “mental effort” and “attitude of the users.” In this study, evaluation of the usability of a software/application focuses on three criteria, as noted by Nielsen (2012): (a) *learnability*, or how easily users accomplished basic tasks the first time when they were introduced to the software/Apps, (b) *efficiency*, or how quickly users learned to perform the tasks of the new software/Apps, and (c) *satisfaction*, or how pleasant it was for users to use the software/App.

In the case of using *Diigo*, user experiences were inconsistent with different digital devices. In this study, students had fully functioning professional *Diigo* accounts. Students were able to use all functions provided by *Diigo*, including: bookmarking, highlighting, annotating, and sharing web content with a web browser extension on their computers. However, they were only

allowed to read their annotations on smartphones and tablet computers. Although ubiquitous learning in the information age expects that many students would work with their mobile devices, the applications may not be fully accessible on mobile devices. For example, CGS23-IA explained that one of the major challenges she faced was the accessibility of the mobile version of *Diigo*. She stated that although *Diigo* has a mobile version, it includes less than 70% of the basic functions of the web-based version. This was not convenient for the students who preferred to work with their mobile devices. The student shifted to use *Google Drive*, claiming that most of the students could not get used to the software and found it inconvenient because it required access through a specific website with a separate login. CGS3-A also expressed that it would be great if the mobile App of *Diigo* could help her to bookmark and search the annotation. These functions would have allowed CGS3-A to perform all functions on her mobile device.

Apart from the availability of functions on different devices, users are required to install an extension on their web browser on their desktop computers before their initial use of *Diigo*, a requirement some interviewees found troublesome. Although it is a simple installation via *Google Web Store*, CGS3-IA and CSS9-IA found it inconvenient to install *Diigo* on the computers in the computer laboratory. They also needed to install it again on each of their own computers after the lesson. The inconvenience of using *Diigo* on multiple computers is that it takes about 10 minutes to download and install the extension on every new computer even if students only want to highlight one sentence of web content. However, students from the most active group did not express any inconvenience with the extension installation.

In addition, students need to go through

several steps in order to update their own and collaborators' annotations. When students want to read the most updated annotations of a webpage or a PDF, they need to visit that webpage or PDF through the URL bookmarked on *Diigo*'s library. By clicking the *Diigo* web extension, the web extension recalls all the annotations that were previously made. Users are now able to read the most updated annotations and can highlight, annotate and comment on their own. Overall, most of the interviewees criticized the tool's low usability and explained that using *Diigo* presented great barriers for them in their group work.

Low Motivation. Low motivation is another significant challenge when students decide to integrate a new ICT tool. Students were reluctant or even refused to use the ICT tool recommended in their studies. The reasons for interviewees' low motivation can be summarized as follows: (a) students were already satisfied with the existing ICT tools they were using and saw no need to learn a new tool, (b) students were hesitant to try out new technologies they were not familiar with, and (c) students were not willing to spend extra time exploring new ICT tools for their studies after the tutorial or lesson.

Interviews revealed that interviewees usually used *Instant Messenger* (IM) and social networking sites (SNS) to communicate and co-operate with group members on projects. In the Hong Kong context, students particularly favour *WhatsApp* and *Facebook Groups*, and work together on a collaborative platform, *Google Drive*, to share resources and co-author in groups. Almost all of our informants were already satisfied with these applications and did not see any need for substitutes. As CGS16-IA said, "I think *Google Drive* and *Diigo* are quite similar. If I have the choice to use *Google Drive*, why I should use *Diigo*? Both of them are platforms to work for group projects with others." Furthermore, both students from the most

active and least active group expressed that they were hesitant to try out unfamiliar software or applications because they are out of their comfort zone. Comments included: "I seldom use web applications (Apps) for doing assignments. I use *Microsoft Word*. I type with it and then send (the writing) out" (CGS21-IA); "I prefer using software I am using currently" (CSS5-A), and "I prefer using the software all groupmates are satisfied [with], such as *Google Drive*, instead of learning a new one that we may find challenges [with]." (CSS1-IA)

Some students explained that they were not willing to invest extra effort and time in exploring new ICT tools even though they recognized the benefits of enhancing their learning experiences. One student explained their difficulty using *Diigo* while working on their initial group topic, "We did try using *Diigo* to archive resources. After attempting to use *Diigo* for a short period of time, we still could not get used to this software. We foresee that this might cost lots of our time" (CGS11-IA). When CGS11-IA's collaborative group changed their assignment topic, they gave up using *Diigo* at the same time. Similarly, other students were concerned that their effort would not be reflected on their assessment if they voluntarily used the new ICT tools. CSS6-A, however, was motivated to learn new ICT tools because she was curious about the technologies and also recognized that future jobs might require candidates to know how to use unfamiliar software in a short period of time.

Peer Influence. Peer influence is a key factor affecting whether a group of students considers introducing new ICT tools into their CILA. An interviewee from the least active group shared that most of her groupmates were still in doubt after the tutorial. "By the time we completed the in-class task after the tutorial, we felt that this software was really complicated" (CGS11-

IA). Students also estimated that they needed to spend a couple of hours learning about *Diigo* before they could use it in their CILA. Although CGS11-IA was passionate about using new tools and tried to use *Diigo* in the afternoon after the tutorial, she was only comfortable using the tool if all members of the group were familiar with it. Because her groupmates were still hesitant after trying *Diigo* and could not get used to this new technology, the group decided to give up *Diigo* in this CILA and CGS11-A decided not to pursue using the tool.

In general, the main reasons why students resisted integrating the new ICT tool was because students felt unfamiliar with the tool and were concerned about spending extra time and effort learning a new tool. However, as CSS5-A explained, these two reasons can be offset by peer influence, as students will adopt a new ICT tool if the software is introduced by their peers, and if the ICT tool is widely used in the community.

Limited Tutorial Training. A two-hour, face-to-face tutorial was held in all participating courses. This tutorial aimed to familiarize students with *Diigo*, which was a new ICT tool for them. In the tutorial, researchers demonstrated the basic functions of *Diigo*, such as bookmarking a website, highlighting web content, and commenting on the shared web content of their groups. After the demonstration, students were asked to practise these functions with their groupmates. A number of interviewees from the least active group complained that the tutorial was too packed. They were unable to pick up all basic functions introduced by the researchers in the tutorial. CSS1-IA suggested that a one-time tutorial on a new ICT tool was not enough and suggested that this arrangement did not provide opportunities to continuously practice, learn, and integrate all of the functions of *Diigo*. She mentioned that she needed at least five to six lessons for learning new software in

her secondary school.

Conclusion and Implications

In this study, researchers introduced a new ICT tool, *Diigo*, to students in three undergraduate courses. It was expected that *Diigo* could facilitate students' collaborative inquiry learning assignment (CILA). At the beginning of the semester, *Diigo* was introduced and demonstrated to students through a two-hour face-to-face tutorial before introducing the CILA in the three participating courses. Students were encouraged to integrate this ICT tool to assist collaboration in their CILA. Use of the tool was voluntary, although collaboration was part of the assessment criteria. *Diigo* was expected to assist students in data collection, data sharing, data analysis, and data elaboration. However, findings showed that most of the interviewees refused to use *Diigo* and few of them adopted the tool to facilitate their data analysis and evaluation.

To answer our research questions, researchers observed that university students mainly applied *Diigo* in the early stage of their CILA. Researchers also discovered four types of challenges students faced in their CILA. In the early stage of their CILA, students tried to use *Diigo* in their data collection, mainly for highlighting, commenting, and sharing information among the groupmates. However, students reported that they readily gave up using the new ICT tool once they ran into challenges. Students subsequently returned to using their favoured platform, *Google Drive*, to continue their work on data analysis and evaluation. Interviewees described that *Google Drive* was a form of ICT that was in their comfort zone as most of them had been using the tool since they began their studies at university. Also, they found *Google Drive* useful since each group member could monitor others' updates in real time.

From the interviews, students faced four challenges when they met a new ICT tool like *Diigo*. The four challenges were: (a) low usability, (b) low motivation, (c) peer influence, and (d) limited tutorial training. In what follows, we draw upon these challenges to provide recommendations for educators who wish to effectively introduce new ICT tools to their students.

Usability ICT Tools

Enhancing the usability of ICT tools is one way to encourage students to integrate a new ICT tool in their studies. When students recognise a new tool is complicated to use, they may revert back to using more familiar tools. In order to successfully introduce a user-friendly ICT tool to the students, instructors should choose, design, and test the tool carefully. A user-friendly software or application also should be accessed easily and effectively (ISO 9241-11, 1998). Other factors that also should be taken into consideration include: (a) the complexity of performing specific functions, (b) the similarity between the interface and different platforms, and (c) the preparation work required before using the software.

To evaluate the complexity of performing specific functions, instructors should test and evaluate the tool to determine whether students may find it difficult to use. When instructors want to introduce a new ICT tool to their students, they should first practice the functions of the ICT tool (software or App) that students are expected to use in their assignment. Instructors can estimate whether students can handle and use the new ICT tool. Furthermore, if instructors realise that the tool is too complicated for students, instructors should replace the tool with another one or decide not to introduce any tool at all. Moreover, when instructors have solid experience using a new ICT tool, they can more effectively guide their students in the use of the tool and its functions.

To examine the similarity of the interface on different platforms, instructors should try out the ICT tool on different platforms (i.e. *Windows* and *Mac OS* on computers, and *iOS* and *Android* on mobile devices). It is important to ensure the similarity of the user interface and user experience on different platforms so that students do not need to adjust their using habits when they switch between platforms.

To examine the preparation work before students can use the ICT tool on their devices, instructors should be aware of the complexity of the preparation work (such as installation) of the ICT tool on different devices. Students can be easily discouraged by the complicated set-up procedure, which can include installing once on each device or requiring pre-requested software and/or updates. In the new version of *Google Chrome* browser, newly installed extensions will be automatically synchronized on all computers logged in with the same *Google* account. Because of this, students do not need to install the same tool on each computer once they login with their *Google* account. This update can minimise the preparation work required to use the new ICT tool.

In conclusion, usability of an ICT tool is critical when students decide to integrate it into their learning. Instructors should consider the recommendations provided here when they introduce the tool or develop a new ICT tool for their students. When tools have increased usability, students are left with a good impression of the tool and are more likely to integrate it into their learning.

Students' Learning Motivation

Stimulating students' motivation to learn and use a new technology is challenging but crucial when integrating a new ICT tool. There are two possible ways to enhance

students' motivation to learn the new ICT tool: (a) describe the relationship between the new ICT tool and their learning and (b) describe how the new ICT tool can enhance their learning process compared with existing tools.

It is important to describe the relationship between the new tool and student learning. In this study, students could not see how the new tool could be used for their learning. In the interviews, few students mentioned how to integrate this tool into their CILA. Researchers also reflected that they seldom connected the advantages of *Diigo* with their CILA in the tutorial. Accordingly, students did not realise how the new ICT tool could be used for their CILA and failed to associate and mention how the new ICT tool could facilitate their management of information and diverse resources collected for their CILA. Without a sense of these connections, students were less motivated to learn and integrate new ICT tools into their CILA.

Instructors need to explain how the new tool can enhance their learning process, particularly when students are satisfied with similar existing tools. Students mentioned that they were satisfied with the ICT tools they previously were using for their learning, which is one of the major reasons students had a low motivation to learn and adopt *Diigo*. Furthermore, students believed that the new ICT tool was not a necessary or irreplaceable tool for their learning. For example, with *Google Drive*, not only did it fulfil most of the needs of students' CILA, but students learned to use the tool by themselves or from peers in high school. This made it very difficult to stimulate students' motivation to learn and adopt the new ICT tool.

To summarise, it is very important to clearly explain the benefits and demonstrate the functions of the new ICT tools to the students in order to help them realise the

possible advantages of learning and adopting the new tools. Instructors should not only demonstrate the functions of the new tool, but they should also emphasize the relationship between the new ICT tool and their learning to increase motivation to learn and use the tool.

Peer Influence

According to the interviewees, peer influence impacted whether they considered integrating a new ICT tool in their CILA. If one group member was in doubt of using the new tool, other members tended not to integrate the new ICT tool into their learning process. Therefore, instructors should prepare sufficient technical support or tutorial materials to support students to pick up the new ICT tool during and following the tutorial.

Previous literature suggests that a self-learning package should be prepared and provided to students to allow them to learn how to use the tools by themselves. A self-learning package may accommodate different students' needs, including fast and slow learners, by providing them with plenty of time to try out or attempt to learn how to use the new tool (Fitts & Posner, 1967). The self-learning package should contain a series of short videos or screen captures to learn the basic functions of the software or application. The short video or screen capture can include a step-by-step procedure on how to perform a particular function. Students may feel more comfortable learning the new tool when using the package. As more students learn and become familiar with the new tool, peer resistance to the new tool can be reduced.

Tutorial Training

In this study, we prepared a one-time two-hour tutorial for all participating students. This may not be the best tutorial arrangement for introducing a new ICT tool.

When instructors want to introduce a new ICT tool in their course, they may decide to divide the tutorial for the tool into multiple tutorial sessions. In the interviews, students from the least active group expressed that the two-hour tutorial did not provide sufficient time for them to learn the functions of the ICT tool. They also expressed that they missed how to use some important functions. To ensure all students understand how to use the functions, instructors may split the tutorial into two or three sessions together with in-class and after-class activities. This arrangement may have two possible advantages. First, students have time to revise the functions introduced between tutorials. Using *Diigo* as an example, in the first tutorial, students new ICT tool. Second, instructors should include tutorial tasks related to their assignment in the tutorial. The tutorial tasks should not only allow students to use the new tool, but also let the students prepare some preliminary works (e.g., search information related to the ideas on their inquiry question) for their assignment with the new tool. In the after-class activity of the first tutorial, instructors may encourage

learned hands-on how to bookmark a website, highlight web content, and comment on the highlighted web content through in-class activities. Before the second tutorial, students can be asked to explore their inquiry questions and put related information on *Diigo* as an after-class activity. With this arrangement, students have more time to learn and revise how to use the new ICT tool, even though students cannot catch up in the tutorial. In the second tutorial, instructors can introduce how to share annotations to a CILA group folder and comment on others' annotations. Because of this tutorial arrangement, two tutorials can be linked up to allow students to have longer exposure to the

students to explore information in those areas that may possibly become inquiry questions for their CILA. When students start to use the new tool in the early stages of their assignment, there will be more information accumulated in the new tool, increasing their success using the tool throughout the assignment.

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BLENDED EDUCATION IN FOOD AND HEALTH (HOME ECONOMICS): DO WE NEED CAMPUS?

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Abstract: *Blended education, or on-line education in combination with face-to-face education, is becoming more relevant in postsecondary education. The University of Agder offers blended education in food and health. In this study, we explored the advantages and disadvantages of providing blended education in food and health compared to providing on-campus education. The study focused on differences in student satisfaction for practical and theoretical education, as well as ICT and administrative support. Questionnaires were sent to students enrolled in two blended food and health education courses and to students enrolled in two on-campus courses. In-depth interviews were conducted with randomly selected students. Student evaluations and final reports for the different groups were studied. The findings indicated that both groups had high satisfaction scores for the theoretical and practical lectures. Students in blended learning courses indicated higher satisfaction for theoretical lectures and ICT and administrative support, but not for practical skills teaching.*

Keywords: blended learning, satisfaction, food and health, home economics, teacher education, practical skills.

Introduction

Personal computers, internet, smartphones, and other forms of communications technology (ICT) have changed our world. Our personal lives and jobs, and the way we manage our knowledge and time efficiently and effectively also have changed. We can communicate with colleagues and friends all over the world through e-mail and teleconferencing. It is possible to study from our dining room tables and use the e-library for research purposes. Because of the ICT development, blended education is becoming more relevant. New and better technologies provide for more possibilities for on-line education in combination with face-to-face education (i.e., blended learning: Graham, 2013). This combination has the possibility to provide different educational experiences, both outside and inside the classroom (Dziube, Hartman, & Moskal, 2004).

Vo, Zhu, and Diep (2017) completed a

meta-analysis on the effects of blended learning on student course performance in higher education. They divided the students into two categories. The first group was students in the field of Science, Technology, Engineering, and Mathematics (STEM) or hard-disciplines. The second group was students in the non-STEM disciplines described as the soft-disciplines. Even though food and health was not mentioned, we interpret that the division would place it in the non-STEM category. The study showed that blended learning can result in better learning outcomes for higher education students and that the effects of blended learning on student performance in STEM disciplines was significantly higher than that of non-STEM disciplines. Teachers in non-STEM disciplines therefore must pay greater attention to the ways their courses are constructed. This study explored whether it is possible to provide students with good practical education in food and health mainly through an online program.

Sinclair (2011) reviewed 34 papers of student satisfaction to identify determinants recognized as important to students' perception of their learning experiences. He concluded that student satisfaction involves both enjoyable and successful experiences. Wu, Hsia, and Tennyson (2011) define learning satisfaction as, "the sum of student feelings and attitudes that results from aggregating all the benefits that a student hopes to receive from interaction with the blended e-learning system" (p. 224). Naaj, Nachouki, and Ankit (2012) consider student satisfaction as an important factor in measuring the quality of blended learning.

In a study at Queensland University of Technology, 23 master students were asked about their blended learning experiences. Students were positive about online learning, but also appreciated the face-to-face interaction with teachers and peers (Waha & Davis, 2014). A literature study on blended learning indicated that teachers continue to play an important role and are not replaced by technology. Teachers still have a central role in learning and course design (Gerbic, 2011).

Pizzi (2014) indicated that it is important that lecturers are familiar with and capable of using the technology. His experience suggested that if instructors spent time preparing for the term well, the term was better organized for both students and staff. He also claimed that students found learning to be fun and interesting when using technology that was familiar to them. In blended learning, the information is readily available and can be repeated whenever the students want. This may increase students' learning outcome. Internet self-efficacy is an important part of online learning (Chang et al., 2014) and helps students transform motivation into learning action.

Sadeghi, Sedaghat, and Sha Ahmadi

(2014) found that students attending a blended learning course were more satisfied than on-campus students. Buchanan and Palmer (2017) compared online courses with face-to-face courses and found that learning outcomes were roughly similar, but that the face-to-face students were more satisfied.

Some negative aspects concerning blended learning also have been discussed by Wu, Hsia, Liao, and Tennyson (2008). They mention lack of peer contact and interaction, high costs for preparing, maintaining, and updating multimedia content and learning materials, as well as the need for flexible tutorial support.

It has been difficult to find relevant research on blended learning in food and health (home economics) or other practical subjects. Thus, it is difficult to compare blended learning outcomes to studies completed in theoretical subjects. Research in this area is just beginning.

Competence in practical skills is very important in food and health. We had many questions when developing the first blended course for teachers in food and health at the University of Agder in 2013-2014. Is it possible to learn this online in combination with a few face-to-face meetings on campus? Do students reach the same level of competence with online education as with on campus learning? Student evaluations, together with discussions with the students, gave us feedback indicating that both student groups are in general satisfied with their educational experiences. However, we needed more information to answer our question: Do students differ in their satisfaction for practical and theoretical education, and ICT and administrative support? The aim of the research is to explore student satisfaction with blended education in food and health compared to on-campus education.

Food and Health in Norway

In 2006, the Ministry of Education and Research introduced a new curriculum plan for all subjects in primary and secondary education in Norway. Home economics was renamed food and health and the focus and content of the subject changed from traditional home economics to food and health. The subject concentrates on food from three different perspectives:

- Food and lifestyle
 - Food and consumption
 - Food and culture
- (Utdanningsdirektoratet, 2011).

In Norway, less than half of the teachers in food and health have education in the subject (Lagerstrøm, Moaf, & Revold, 2014). Only a few universities and university colleges in Norway offer education in food and health. Many teachers have difficulties in coming to campus to take further education because of family commitments, economic constraints, and long distances. Blended learning opens up possibilities for more teachers to engage in further education in food and health.

Method

Food and Health at the University of Agder

The University of Agder offers on-campus courses in food and health to teacher education students in the fourth year of their education. The students can choose between courses over one or two terms, earning either 30 or 60 ECTS (European Credit Transfer System). In addition, the university offers part-time, blended food and health courses (30 or 60 ECTS) over two or four terms.

Participants

On-Campus Students. The students who completed food and health courses (30 ECTS) on campus received two days with four lectures of practical work in the kitchen and six theory and didactic lectures every week for one term. In addition, they did practical teaching in schools one day per week. Both the practical work in the kitchen and the practical teaching in schools had 100% compulsory attendance as practical skills and practical teaching are learned best through live practice. The on-campus students were mainly students who had completed all of their education in Norway. Over 90% of the campus students were in their twenties.

Blended Learning Students. The blended learning students received two lectures online every week (*Adobe Connect*), and came to campus for face-to-face sessions over three days twice per term. All the on-line lectures were recorded, and it was possible to repeat the lectures several times. Students received 30 ECTS over two terms. The blended learning students had the same number of projects to hand in as the on-campus students, but their projects were more comprehensive. The majority of these students were immigrants who had completed their education outside of Norway. They lived and worked in Norway between 5-to-25 years and spoke and understood Norwegian. Only 4% of the blended learning students were in their twenties, with almost half being in their forties (46%).

Data Collection

We used two methods to ascertain the value of the students' experiences: (a) a closed-form survey (*SurveyXact*), and (b) in-depth interviews with one student from each course. In addition, we studied student evaluations and final reports from all the courses.

Closed-form Survey. The closed-form survey was sent by email to all students who participated in the blended learning courses held in 2013-14 (total of 5 students) and in 2014-2015 (total of 31 students) and to all students who participated in the on-campus course held in fall 2013 (total of 36 students) and fall 2014 (total of 43 students). A total of 115 students received the questionnaire, with 66 responding (57%). The response rates were 69% (25 respondents) from the blended learning course and 52% (41 respondents) from the on-campus course. According to Jacobsen (2010), the response rate was satisfactory.

The questionnaire included demographic questions about age, work, domicile and study program, with students' responses being anonymous. The respondents also were asked how satisfied they were with the practical and theoretical lectures, and how satisfied they were with ICT and administrative support. For these three questions a 7-point Likert scale was used, where 1 indicated complete disagreement, and 7 indicated complete agreement. There also was an option to answer, "Don't know/No experience." These responses were reported as missing in the analyses. In this way, the respondents indicated what level they agreed or disagreed with the statements (Befring, 2007).

All statistics were performed using *SPSS Version 23.0*. As the data was not a normal distribution, non-parametric analyses were used. We compared participants' satisfaction scores between the two groups using the Mann-Whitney *U* test (Nachar, 2008). Descriptive statistics included median and interquartile scores. The statistical significant level was $p < 0.05$.

In-depth Interviews. To gain a deeper understanding of the value of food and health in teacher education as well as possible course improvements, we conducted an in-depth interview with one

student from each of the four groups. The students were selected randomly. One interview took place face-to-face, the other three by *Skype for Business* (online). The interviews lasted for approximately 30 minutes and were audio recorded. Information relevant for the research study was extracted from the interviews.

The interview started with an open question about the advantages and disadvantages in offering food and health in teacher education. The in-depth interview was based on students' responses to the questionnaire, with students asked to elaborate their responses further.

Evaluations and Final Reports. As part of mandatory mid-term and final evaluations, the students were given a list of questions to discuss without the lecturer present. The questions were the same for all courses and covered infrastructure, ICT-support, course content, and instructor performance. The class representative wrote a summary after the discussion and conveyed students' opinions to the lecturer. After each term, the lecturer wrote a final report based on the students' evaluation, and published it on the university's learning platform.

Results

Questionnaire

Information on students' satisfaction scores for practical and theoretical lectures as well as ICT and administrative support are listed in Table 1. Two of the participants (on-campus students) did not answer any of the three questions. Eleven of the on-campus students answered, "Don't know / No experience" for the last question, with their responses recorded as missing.

Both groups of students were generally satisfied with the practical and theoretical lectures and ICT and administrative support (Table 1). The satisfaction scores

for the practical lecture did not differ between blended learning (Mdn = 7) and on-campus learning (Mdn = 6), $U = 390$, $p = 0.139$. Students in the blended learning had significantly higher satisfaction scores for the theoretical lectures (Mdn = 6), than the on-campus students (Mdn = 5), $U =$

260.5, $p = 0.001$. The blended learning students had significantly higher satisfaction scores for the ICT and administrative support (Mdn = 5), than the on-campus students (Mdn = 4), $U = 190$, $p = 0.003$.

Table 1
Median Satisfaction Scores for Practical Lecture, Theoretical Lectures, and ICT and Administrative Support

	N1	N2	Blended Learning Mdn (Q1, Q3)	On-campus Learning Mdn (Q1, Q3)	p
Practical Learning	25	39*	7 (6, 7)	6 (6, 7)	0.139
Theoretical Learning	25	39*	6 (5, 7)	5 (5, 6)	0.001
ICT & Administrative Support	25	28**	5 (4, 6)	4 (3, 4)	0.003

Notes. N1=Blended learning, N2=On-campus Learning *Two of the on-campus students did not complete the survey. ** Eleven of the on-campus students answered, “Don’t know / No experience” on the ICT and Administrative Support question, with their responses reported as missing. Mdn=Median, Q1=25th Percentile, Q3 =75th Percentile

In-depth Interviews

In the in-depth interview with the blended learning students, both respondents commented that it was useful to be able to watch the theoretical lectures several times. This was especially useful for the blended learning students for whom Norwegian was a subsequent language. They also pointed out that screen recording, as feedback on written projects, was a very good way of receiving feedback. Students indicated that it felt like receiving direct or face-to-face feedback.

The blended learning students made it clear that blended learning was a better alternative for them than studying on campus, but that it is still essential with face-to-face lectures in a subject like food and health.

Days on campus are important for sharing knowledge and experiences, and especially

for gaining practical skills. The practical projects at home also contributed to improved practical skills. Students indicated that they would like more videos showing different practical procedures. While it is not necessary to present traditional theoretical teachings during campus gatherings, it was important that on-campus gatherings provided an arena for questions, processing theory, and summarizing information posted on the learning platform. The students claimed that the course provided them with sufficient knowledge and practical skills to teach the subject.

The two on-campus students held differing opinions about the course. One student felt that the amount of theory was too low, and also believed that blended learning students should have a higher level of practical skills when starting the course than the on-campus students. This student would prefer to complete the on-campus

course, especially because of greater time used for practical skills training. The other student was satisfied with the level of practical and theoretical lectures. Students believed that the course provided a very good basis for teaching food and health.

Course Evaluations & Final Reports

In the course evaluations, blended learning courses using *Adobe Connect* in real time and with recording were emphasized as very good. Although the students followed the lecture in real time, they requested that it should be recorded so that they could repeat it whenever they liked. They also commented that on-line lectures that began with a reflective question, where the students could think and reflect about the question and provide their comments on the lecture log, was a good way to start a lecture.

The students also proposed that the first face-to-face meeting at the university should take place before the on-line lectures began. Any student, who is not familiar with on-line learning, could then receive necessary help. The students came from different parts of the country, and they commented that exchanging experiences during the day at the university was very valuable and educational.

Practical projects were seen as central. The lecturers also regarded this as important, because the blended learning students received little experience in the university's teaching kitchens. If students were unable to attend one gathering on campus, they lost 50% of the practical lectures for the term. Even though they need to complete the same tasks at home, they may be disadvantaged in terms of acquiring critical skills, and receiving instructional feedback and insights. Not acquiring critical skills is a vulnerable situation.

Discussion & Conclusions

All students in the study had very high satisfaction scores for the theoretical and practical lectures. The blended learning students reported a significantly higher satisfaction score for the theoretical teaching than did the on-campus students. Both groups of students reported higher than average satisfaction with ICT and administrative support, with the blended learning students having a significantly higher score than their on-campus peers. In general, the blended learning students seemed to be more satisfied than the campus students. This difference may stem from differences between the groups as age and cultural differences might influence self-reported satisfaction.

Practical Skills

Little research has been done investigating practical skills and blended learning. The blended learning students in our study expressed that they were satisfied even though they received considerably less teaching of practical skills. There may be several reasons for this. Many of the students were mature students and had more experience with practical skills and teaching. The fact that the students were satisfied however does not mean that they gained high or sufficient competence. They often expressed that they understood, however, there were some language challenges. In the in-depth interviews, the blended learning students expressed a wish for more videos showing practical procedures. As teachers in a non-STEM discipline, we must pay more attention to the way the course is constructed in order to provide the students with good practical skills (Vo et al., 2017).

Theoretical Skills

Blended learning students were significantly more satisfied with the theoretical teaching than were the on-

campus students. The reason for this may be that the lectures were recorded so that they could watch them several times. This coincides with the findings of Pizzi (2014) and the results from the in-depth interviews. Gatherings at the university were important for processing theory. The students preferred more active work methods and discussions with fellow students and lecturers.

Strengths and Limitations

We collected data in three different ways, and at different times: closed-form survey in-depth interviews, and course evaluations and final reports. This may be a potential strength of the study as the participants had the chance to reflect on the course several times.

The study also has some limitations. The groups were small, ranging from 5-43 students, and differed in age, cultural, and linguistic backgrounds. This may have influenced the results. In-depth interviews could have been conducted with more than one person from each group.

Further Research

All students in the study had very high satisfaction scores for the theoretical and practical lectures. The blended learning

students reported a significantly higher satisfaction score on the theoretical lectures than the on-campus students. Both groups of students demonstrated above average satisfaction with ICT and administrative support, with the blended learning students having significantly higher scores than their peers.

Not much research has been done in this field, especially within food and health. The experience gained from two years of blended learning can be used in the development of new courses. The students suggested that practical procedures should be filmed. Introductory films of practical procedures and methods should be produced for blended learning courses. These films can also be used for on-campus students who can watch them to refresh procedures that they have tried in the kitchen.

There is a great need for more research on blended learning both in food and health and in other practical studies in higher education. Further research is needed to explore the levels of competency that blended learning students acquire in practical skills. The results from this study indicate that blended learning in food and health is possible, but we still need campus.

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MATHEMATICS VIDEO PODCASTS AS INTEGRATED ELEMENTS OF ONLINE LESSONS IN FURTHER UNIVERSITY EDUCATION: IN-SERVICE TEACHERS' FLOW EXPERIENCES

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Abstract: *This case-study examined in-service teachers' perceptions of learning by means of online mathematic lessons consisting of a mix of text and video podcasts. The investigation is part of further university education directed at practicing teachers in lower secondary schools. The course was a distant education course, with in-service teachers learning online only. The research, based on a series of questionnaires and follow-up interviews, examined whether in-service teachers perceived that video podcasts embedded in online lessons fostered their learning compared to reading similar material. The study focused on efficiency, enjoyment, and concentration as perceived conditions for learning in conjunction with flow theory.*

Keywords: design principles, distance education, flow theory, video podcasts

Introduction

The case study is part of a research and development project aimed at offering video podcasts with mathematics education and mathematics academic content. Subjects were in-service teachers of a further university mathematics education program for teachers in lower secondary schools. The program was offered to teachers who might not otherwise have the opportunity to engage in education on campus.

Video podcasts were integrated in multimodal online lessons where the majority of text was used to reinforce subject content rather than provide a complete presentation of material. Podcasts were recorded and edited with screencasting software, and designed upon research-based principles and recommendations consistent with how the human mind works, as well as, presentation of stimulating and emotionally compelling information.

Encouraged by in-service teachers' positive feedback (Brodahl & Wathne, 2016) claiming that learning with video podcasts is better than learning from text only, and that they wanted more of this type of instruction, the goal of this paper was to investigate why efficiency, enjoyment, and concentration were perceived to be central conditions for learning mathematics through integrated video podcasts in online lessons. The paper is structured as follows. First, the research questions are presented. Second, the theoretical framework is described and a literature review provided. Third, the methodology is explained. Then, the results are presented, analyzed, discussed, with future directions proposed.

Research Questions

This work examined in-service teachers' perceptions of learning by means of online lessons where text and video podcasts were the main carriers of educational content. The videos were developed following research-based instructional design principles and models. The investigation is

part of a university continuing education program directed towards students who already work as teachers. The course was delivered entirely online, and in-service teachers, enrolled as students, learn fully online at a distance.

The purpose of this study was to address participants' learning with video podcasts as integrated parts of online lessons, and to identify the video elements that they perceived fostered learning. Accordingly, two specific research questions were addressed:

- 1) What conditions for learning are crucial for in-service teachers' experiences with video podcasts as integrated parts of online lessons?
- 2) What roles do these conditions play in-service teachers' perceptions of the learning process and learning outcome?

Theoretical Framework and Literature Review

The use of instructional videos is gaining ground in university level courses. While the study of the efficacy and effectiveness of video podcast is still in its infancy, with results of some scientific studies seemingly inconsistent, there also is evidence of their effectiveness within different domains including mathematics (Fernandez, Sallan, & Simo, 2015), and among different learners including in-service teachers (e.g., Brodahl & Wathne, 2016; Hsin & Cigas, 2013; Kay & Kletskin, 2012; Lloyd & Robertson, 2012; Loch, Gill, & Croft, 2012) that warrant optimism. The theoretical framework for this study was drawn mainly from cognitive theory of multimedia learning and flow theory in instructional design, with implications for the use of video podcasts as educational tools drawn from each theory.

Cognitive Design Principles. How can video podcasts be optimized to allow for deeper learning? Information first enters

the learners' cognitive processing system through the two senses of sight and sound, and then enters working memory where only a limited amount of information can be stored and handled at one time. Mayer (2001) established the cognitive theory of multimedia learning (CTML). CTML is an evidence-based theoretical framework explaining how multimedia benefits learners that is based in classical research of human memory (e.g., Baddeley & Hitch, 1974; Miller, 1956) and dual coding (Paivio, 1986). Mayer's research examined boundary conditions of multimedia learning and found that the use of two or more modalities (e.g., text, image, sound) is better than the use of one, but can become ineffective if the instructional design includes redundant or transient materials, or splits learners' attention. The use of two or more modalities also may be ineffective when learners possess high levels of prior knowledge.

CTML research established design guidelines for educationally effective multimedia materials, including providing coherent verbal and pictorial information, guiding the learners to select relevant words and images, and reducing the load for a single processing channel (Mayer, 2014). Furthermore, having learners produce oral explanations in their own words concurrently while viewing images is superior to viewing images with an accompanying text explanation (Mayer, 2014). CTML principles about how to reduce extraneous processing, manage essential processing, and foster generative processing are research-based and provide guidance about how to design multimedia messages consistently with how the human mind works.

Flow Experience. Efficiency, enjoyment, and concentration are perceived as central conditions of learning with video podcasts during online lessons (Brodahl & Wathne, 2016). These also are important elements within flow theory (Csikszentmihalyi,

1990), where flow is defined as a state of consciousness experienced by people involved in an enjoyable activity. While the factors and measurement of flow used in specific empirical studies differ, they can be divided into four categories (Ho & Kuo, 2010). The first, autonomy, includes a sense of control; the second, concentration, comprises concentration on the goals and tasks at hand; the third, stimuli, includes curiosity and extrinsic enjoyment; and the fourth, genuine motivators, embraces task interest and intrinsic enjoyment in accordance with task importance. Furthermore, flow defines a difference measure between skill and challenge. Hence, researchers consider a good flow experience to be based on a balanced ratio of these factors (Csikszentmihalyi, 1990). This balance is considered to work in a positive way for individuals in carrying out target tasks (Shin, 2006).

Of the various models and measures of flow experiences proposed in the literature, this study adapts Trevino and Webster's (1992) classification using four factors, which correspond with Ho and Kuo's (2010) categories of feeling in control (autonomy), focusing attention on activity (concentration), feeling curiosity (stimuli), and having intrinsic interest (genuine motivators) with feelings of efficiency and intrinsic enjoyment included in the latter. The term flow as used in this paper refers to a certain positive experience that in-service teachers may have while engaging in online lessons that consist of a mix of text and video podcasts (Shin, 2006).

Methodology

Case Study

This case study explored in-service teachers' perceptions of mathematic video podcasts in a higher and distant education setting. It included a community of in-service teachers from across the country,

incorporated in a national program of further university mathematics education directed towards practicing teachers. The study was based on two research questions and used quantitative data from questionnaires and qualitative data from interviews conducted in the second semester of the study program.

As Anderson (2011) cautioned, any study of the impact of podcasting on learning should start with the design of high-quality podcasts. Accordingly, this study included the successive production of 46 podcasts, guided by 10 features:

- Video clips were kept at a minimal length, usually lasting no longer than 15 minutes.
- Visuals and animations were used with synchronized narration.
- Layout and dynamics were spatially planned and organized.
- Narration was relaxed, relatively fast paced, and dialect unspecific.
- Learners were addressed in a personal and conversational style, with energy and enthusiasm.
- Learners' attention was guided visually to important elements and content relations.
- Context was explained and connected to previous mathematical knowledge and key concepts.
- Content was weeded and unnecessary information eliminated.
- Content was presented in a step-by-step fashion, with key elements explained briefly.
- Captures were post-edited and audio-visual distractions removed.

These features were based on research-based principles for effective multimedia design, with most of them drawn from the CTML framework (Mayer, 2014). Other features were derived from non-cognitive considerations about how to make instructional videos more sensorially and emotionally interesting (e.g., Guo, Kim, & Rubin, 2014; Hibbert, 2014). These

features are described in more detail in a prior study conducted in the first semester of the study program (Brodahl & Wathne, 2016), with findings from this prior study informing the development of high quality video podcasts.

Videos were recorded using the screencasting software *Camtasia* and media-rich *PowerPoint* slides, with recordings edited before uploading on a course web page. Each podcast was developed as stand-alone instruction, created for and implemented into a particular online lesson, and accompanied with a PDF-copy of the *PowerPoint* slideshow.

The research was conducted in two steps. First, in-service teachers were asked to rate samples of videos, reflecting on how studying each video fostered their learning compared to reading similar material. Questionnaires were based on the responses given in the first semester (Brodahl & Wathne, 2016). Second, in-service teachers were interviewed. The interviews drew on in-service teachers' responses to the questionnaires.

Participants

The analysis included data from 14 in-service teachers (7 males and 7 females), over the course of half an academic year (2014). The participants were teachers (mainly from grades 8-10), and all had teaching certificates. Participants were enrolled in *Calculus (15 ECTS)* as the second part of a one-year mathematics course, delivered entirely online. Their ages ranged from 26.8 to 56.1 years ($M=42.2$ years).

Setting

The online environment for the course was considered the setting for the investigation. The course was delivered using the university's learning management system

[LMS], *Frontier*. Content and activities were presented through online lessons, with each online lesson provided as a multimedia module. Each module included an introduction, table of contents, learning goals, and chapters about different topics in the subject area. A digital text-video format (Engebretsen, 2006) was chosen with clickable video thumbnails integrated into the body of the text in a tabloid fashion. Chapters included tasks and exercises, quizzes and surveys created in the LMS test tool, and links to external resources.

Data Collection

The study used questionnaires and interviews for data collection. A series of seven weekly questionnaires were conducted, each of which assessed a subset of videos (usually one of two) from the current lesson. Four statements reflecting the research questions were posed for each sample video. Respondents were asked to indicate their level of agreement by selecting the category on a seven-point Likert scale that best represented their experience with the video (i.e., Strongly Agree, Agree, Slightly Agree, Neither Agree nor Disagree, Slightly Disagree, Disagree, Strongly Disagree). Statements regarded participants' perceived efficiency, enjoyment, concentration, and learning outcomes respectively.

Survey participation was voluntary and by informed consent. Responses were not anonymous in order to facilitate follow up interviews. However, responses were anonymized after final data collection. The LMS test module was used for collecting and processing responses.

Semi-structured interviews were chosen as the primary source of data for this study, since conditions for learning identified in the questionnaires were not directly observable. The interview focus involved in-service teachers' perceptions about the

roles of these conditions. The interviews were intended to clarify and gain further insights about participants' questionnaire responses. The participants received the interview guide prior to the interviews. It detailed 20 questions, half of them taking the form of statements (e.g., "In the questionnaire, you answered...") seeking in-service teachers' explanations for their answers. The main focus of the questions involved perceived efficiency, enjoyment and concentration, and learning outcomes related to using video podcasts. Other questions concerned the intensity and use of video podcast use, the role of video podcasts in the lessons, and perceived benefits of the video podcasts.

Participants who engaged in the voluntary interviews consisted of two males and three females of varying ages (38-56 years) who resided in different parts of the country. Interviews were conducted by phone midway through the second semester. Informed consent was obtained and permission for audio-recording granted at the beginning of the interviews before collecting information. The interviews lasted about 15-22 minutes and were transcribed and anonymized. Questionnaires were written in Norwegian and the interviews were conducted in Norwegian. All questionnaire statements and interview comments presented here are the authors' translation or paraphrasing.

Data Analysis

Fixed-choice responses in questionnaires were exported to and organized in

Microsoft Excel. Interview transcriptions were coded, mainly guided by the research questions and questionnaires themes. Coding included identifying and classifying statements concerning the video podcast, in-service teachers' work modes and tasks, the process of learning by means of integrated video podcasts, and perceived learning outcomes, and recommendations. These organized lists were exported to *Google Drive* for further formatting, reading, and analysis.

Data from interviews were analyzed using a content analysis approach (Mayring, 2014). The researchers transcribed each recording by converting it to text data. Both researchers first performed data analysis independently, familiarizing themselves with the data. In an iterative process, themes and codes were identified and labeled using inductive and deductive approaches (Bryman, 2012). The researchers then exchanged codes and organized them in a coding structure, establishing a set of codes with themes and subthemes. Independently coding and recoding the data set, they compared and discussed coding until consensus was established.

Figure 1 illustrates the research framework of this study. Drawing on Shin's (2006) conceptual model of online learners' flow experience, it posits efficiency, enjoyment and concentration as central flow experiences of online video podcast learning, with learning outcomes perceived to be a consequence of flow.

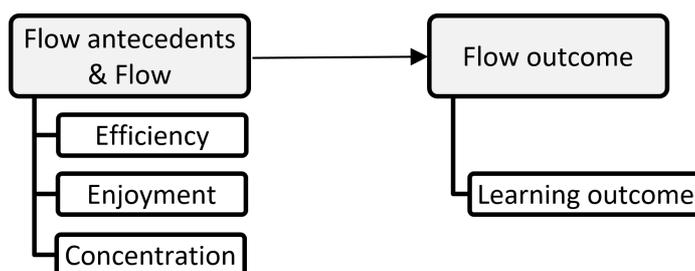


Figure 1. Online learner's flow experience.

Results

The results of the study were examined in two separate sections: questionnaires and interviews.

Questionnaires

The following statements were posed for 20 of the 46 videos offered during the course:

1. I am more concentrated watching a video like this as compared to reading similar material.
2. I enjoy watching a video like this more as compared to reading similar material.
3. I perceive more efficient use of time watching a video like this as compared to reading similar material.

4. I perceive better learning outcomes watching a video like this as compared to reading similar material.

The 14 participants provided responses for 20 sample videos, returning 238 fulfilled questionnaires. Hence the average response rate for each of the samples was 85%. Among those responding, 90.8% agreed that they were more concentrated when watching videos than when reading, 91.6% enjoyed watching videos more than reading similar materials, 90.3% perceived video podcasts to be a more efficient use of time versus reading materials, and 91.2% indicated that they experienced better learning outcomes when watching videos than when reading (Table 1).

Table 1
Participants' Perceptions of Watching Video Podcasts

Statement	Responses N=238									
	SA	A	SLA	N	SLD	D	SD	TA	TD	
Efficiency	95 <i>(39.9)</i>	90 <i>(37.8)</i>	30 <i>(12.6)</i>	19 <i>(8.0)</i>	3 <i>(1.3)</i>	1 <i>(0.4)</i>	0 <i>(0.0)</i>	215 <i>(90.3)</i>	4 <i>(1.7)</i>	
Enjoyment	93 <i>(39.1)</i>	96 <i>(40.3)</i>	29 <i>(12.2)</i>	18 <i>(7.6)</i>	2 <i>(0.8)</i>	0 <i>(0.0)</i>	0 <i>(0.0)</i>	218 <i>(91.6)</i>	2 <i>(0.8)</i>	
Concentration	90 <i>(37.8)</i>	102 <i>(42.9)</i>	24 <i>(10.1)</i>	18 <i>(7.6)</i>	1 <i>(0.4)</i>	2 <i>(0.8)</i>	1 <i>(0.4)</i>	216 <i>(90.8)</i>	4 <i>(1.7)</i>	
Learning Outcome	95 <i>(39.9)</i>	91 <i>(38.2)</i>	31 <i>(13.0)</i>	20 <i>(8.4)</i>	1 <i>(0.4)</i>	0 <i>(0.0)</i>	0 <i>(0.0)</i>	217 <i>(91.2)</i>	1 <i>(0.4)</i>	

Note. Response frequencies in bold, percentages italicized and parenthesized.

Key for Table 1: Strongly Agree (SA); Agree (A); Slightly Agree (SLA); Neither Agree or Disagree (N); Slightly Disagree (SD); Disagree (D); Strongly Disagree (SD); Total Agreement (TA); Total Disagreement (TD)

With regards to the length of a clip, in-service teachers' perceptions of efficiency, enjoyment, concentration, and learning outcome did not appear to differ substantially between short videos (1-5 mins) and moderately long videos (6-15 mins), with a slightly higher rating for moderately long videos. The only video classified as long (16:48 mins) received the

highest rating, with 92.3% agreement on concentration, 92.3% agreement on enjoyment, 100.0% agreement on efficiency, and 92.3% agreement on learning outcome.

Interviews

Interviewing five in-service teachers individually, the authors asked participants

to explain their reasons for strongly agreeing with statements as presented in the questionnaires. Participants' comments pointed to five factors (Table 2) that lead to video resources being preferred to reading materials: efficiency with respect to learning; enjoyment with respect to presentation format; concentration with

respect to the opportunity to use several senses; sense of control with respect to receiving explanations through multiple modalities and/or step-by-step narration. The most frequent comment was about subject content which referred to the precise presentation and explanation of mathematics or mathematic didactics.

Table 2
Factors Affecting Learning When Watching Instructional Videos

Factors	Sample Comments
Efficiency	It is faster to watch a video than read a text. You can follow the reasoning faster in a video. The videos streamline the entire training.
Enjoyment	Learning from video is simply nice...I am enjoying it. It's really fun to learn new subject matters that way. I think it was absolutely wonderful to hear southern intonation. I have enjoyed the videos very much, because they used animation, colours and arrows, and you've read at a decent pace, and they are short.
Concentration	A video makes me focus and forces me to pay attention all the time; otherwise I would miss out on something important. I have to hear, see and do. It sharpens all senses. I have to use multiple senses. I have to see, hear and energize all of me when watching a video. The explanations are given in both visual and auditory forms.
Control	I feel I have more control over what I should learn...[and] that what is shown is learned. I remember better when I see and hear. The step by step process in particular; having seen how to makes it much easier to practice.
Subject content	The main content is extracted and the substance more condensed in videos. [In a video] the job of picking out the most important subject content is [largely] done. [They] picked up the very essence, so reasoning gets easier for me. A precise explanation of the theory and substance. A video is often more specific on exactly that which I am wondering about.

When asked other questions about the characteristics of good video podcasts within online lessons, or how video podcasts contribute to lessons, in-service

teachers referred to their learning process as illustrated in sample comments below:

Efficiency: [A video] makes it easier to see connections and relations [in mathematical problems].

Enjoyment: The videos help make it fresh.

Concentration: [Videos should] make me focus....and force me to pay attention.

Control: A video helps to make things varied, and explains in a simple and straightforward way, making challenges smaller and problems easier to figure out.

Subject content: You get extra explanation on video. The videos explain further.

The in-service teachers expressed that videos provided a feeling of flow in their learning:

Watching a video energizes all of me....[as] explanations given [are] both visual and audible.

[Learning from video] is simply nice. It gives a feeling of attending a live lecture and having more control....[The] most important issues are extracted and [the videos] are very clear on what the objective is.... It makes learning fun and, in this way, facilitates learning.

Participants also commented that the use of videos made learning easier and helped in solving many of the (tasks and) math problems that they encountered. In this way, the interviewees related to learning outcomes directly as consequences of using videos as illustrated in sample comments below:

The videos streamline the entire learning process. It is far easier to learn new and partly difficult material.

A video offers several approaches to the subject matter. You are given several different approaches to the subject matter.

Variation in the presentations is useful. You remember better what is new, surprising, or different.

Discussion and Conclusions

Learning Conditions

Responses from the questionnaires suggest that flow experiences related to videos as vehicles for instruction. In-service teachers rated efficiency, enjoyment, and concentration highly for their learning processes (averaging Agree or Strongly Agree on a Likert scale). These results are in line with comments from the interviews.

In-service teachers perceived efficiency as the degree to which the presentation is efficient with respect to improving learning: "It is faster to watch a video than read a text," "You can follow the reasoning faster in a video," and "The videos streamline the entire learning process." In-service teachers perceived enjoyment as a pleasant feeling associated with watching a video podcast: "[Learning from video is] simply nice ... I am enjoying it," and "It's really fun to learn new subject matters that way." The video format is perceived to be enjoyable.

In-service teachers perceived concentration as maintaining focus on the video podcast: "A video makes me focus and forces me to pay attention all the time; otherwise I would miss out on something important." Concentration involved keeping the learners' focus on what was presented and eliminating distractions. In addition, in-service teachers appreciated that educational podcasts provided them with a sense of control through the inclusion of step-by-step, extensive, and easy-to-follow explanations, which made the podcasts flow-inducing.

In-service teachers' perception of efficiency, enjoyment, concentration, and control are consistent with some of the core characteristics of flow experience. Flow is a state of consciousness that is experienced by people who are deeply

involved in an enjoyable activity (Csikszentmihalyi, 1990). As such, there are signs of flow experience in the data, with participants reporting a state of consciousness with high concentration and involvement, clarity of goals, and intrinsic motivation. Whilst participants in this study appreciated videos as contributing to variety in content presentation, and as reassuring and clarifying learning goals, content characteristics are not largely addressed as antecedents of flow in the literature (Hoffman & Novak, 2009).

Learning Process & Learning Outcome

High questionnaire ratings for perceived learning outcome related to video podcasts is consistent with interview comments. The in-service teachers indicated that they kept their concentration and felt a sense of control over their learning process. Valuing step-by-step, extensive, and easy-to-follow explanations as part of video presentations is consistent with the literature (Kay, 2014).

The in-service teachers actually used the video podcasts and appreciated their use of multiple senses, “I remember better when I see and hear.” For this in-service teacher, visual and auditory aids were perceived as helpful. This belief is consistent with the multimedia principle (Mayer, 2014) that learning is improved with the use of words (spoken or written) and pictures versus words alone. Notably, the in-service teacher pointed out benefits of underlying design choices without being asked to do so. The contiguity principle (Mayer, 2014) proposes that the use of graphic information promotes interpretation processes, consistent with one participant’s statement: “I have enjoyed the videos very much, because they used animation, colors and arrows, and [the narrator has talked] at a decent pace, while they are short.” Moreover, the modality principle (Mayer, 2014) suggests that increased learning may occur with the addition of audio material to

text and is perceived to be important for in-service teachers’ learning processes. In addition, in-service teachers preferred videos to be kept to minimal possible length depending on their content, consistent with previous studies (e.g., Bergqvist, 2013; Guo, Kim, & Rubin, 2014).

Participants’ interview responses also support Mayer’s signaling principle, indicating that learning material should be organized with clear outlines and headings (“I prefer that it says in the beginning what the lecture is about,” “[The videos] are very clear about what the objectives are”), and the personalization principle indicating that conversational style is preferred to formal style (e.g., “I think it was absolutely wonderful to hear southern intonation”). Further, personalization and empathy may have triggered one in-service teacher’s perception of, “feeling that you are in contact with the teacher, by means of the videos.”

It also appears that the subject content in the video podcasts plays a major role in the in-service teachers’ perceptions of the learning process and outcome. In-service teachers appreciated the video podcasts because, “[They] picked up the very essence, so reasoning gets easier for me,” and “[In a video] the job of picking out the most important subject content is [largely] done.” These results are consistent with previous research on content weeding (e.g., Ibrahim, Antonenko, Greenwood, & Wheeler, 2012; Mayer & Moreno, 2003). Also, in-service teachers emphasized that the videos contributed to content. For example, one participant commented: “A precise explanation of the theory and substance,” which indicates that in-service teachers are sensitive to how the mathematical content is presented consistent with Bergqvist (2013).

The main purpose of this study was to address in-service teachers’ learning with

video podcasts as integrated parts of online lessons, and to identify why they perceive the videos to foster learning. In-service teachers perceived efficiency, enjoyment, and concentration as main conditions in their learning process. They spontaneously pointed out benefits of underlying design choices (e.g., use of multiple sensory modalities including graphic and audio information, length of the video podcasts). In-service teachers appreciated the video podcast format, and, the data indicates that the video subject content played a role in participants' perceptions of learning process and learning outcome.

The limitations of the work are associated around four issues: sample, reliability, validity, and time considerations. First, the study was conducted with a small convenience sample, with participants from one class only. While this does not invalidate the results, readers need to consider that replication studies with a larger population may confirm or question these research results. Similarities between our findings and previous studies (e.g., Andersen, 2011; Shin, 2006), support some degree of generalizability. Second, reliability is enhanced by a detailed description of population characteristics and research methodology, allowing for

the replication of the study. Third, quantitative survey questionnaires alone cannot accurately measure in-service teachers' perceptions of podcasts, with a higher degree of measurement validity gained through the triangulation of survey questionnaires and qualitative interviews. The fourth limitation is concerned with the respondents describing flow retrospectively versus during, or immediately after, video watching, which may have resulted in less accurate recall of their experiences.

Future Work

This study considered indicators of flow experience associated with perceived impact on the learning process and learning outcomes. Suggestions for future research on using mathematics video podcasts integrated into online lessons may include additional investigation of in-service teachers' experiences of control as emphasized by the interviewees who participated in this study. Finally, undertaking interviews immediately after in-service teachers engage with a lesson and complete a questionnaire may be considered as a means for reducing limitations associated with this work.

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PREPARATION OF STUDENT TEACHERS FOR MULTICULTURAL CLASSROOMS: REFLECTIONS ON THE DANISH TEACHER EDUCATION CURRICULUM

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Abstract: *Most European Union countries and members of the Organization of Economic Co-operation and Development (OECD) are facing increasing learner diversity in schools and are accommodating increasing numbers of children from ethnic minority and/or migrant backgrounds. International surveys from OECD indicate that teachers are in need of professional training to better prepare them for working in multicultural and multilingual classroom settings. The aim of this article is to briefly investigate how curriculum in the 2013 reform of Danish teacher education suggests that student teachers address classroom diversity.*

Keywords: diversity, multicultural classroom, teacher education preparation, Europe, Denmark

Introduction

Many European Union (EU) countries and members of Organization of Economic Co-operation and Development (OECD) are facing increasing learner diversity in schools and must address the needs of a growing number of children with an ethnic minority and/or migrant background [Eurostat, 2011; OECD, 2012; Public Policy and Management Institute (PPMI), 2017]. Data from PISA 2003, 2006, and 2012 (OECD, 2014a) on migrant children's achievement (Christensen, Egelund, Fredslund, & Jensen, 2014) indicated that "across all participating countries, native students perform better than both first and second-generation immigrants in mathematics" (Burns & Shadoing-Giersing, 2010, p. 24). In Denmark, this also applies to science and Danish language (Christensen et al., 2014).

On the other hand, Burns and Shadoing-Giersing (2010) emphasized that "in Australia, Canada and New Zealand

second-generation immigrant students perform as well as their native-born peers" (p. 24), suggesting that "it is not inevitable that first and second-generation students perform less well than their peers" (p. 24). International surveys indicate that teachers are in need of professional training to better prepare them for working in multicultural and multilingual classroom settings (OECD, 2014b). Although OECD investigations and the PISA reports (OECD, 2014a, 2014b) address the increasing classroom diversity internationally and the subsequent need for better teacher preparation, there has been less focus on how initial teacher education (ITE) programs within individual countries prepare student teachers to deal effectively with diversity in the classroom with respect to curriculum goals.

In 2016, a European survey and research project investigating the role of initial teacher education was carried out by 28 European member states (PPMI, 2017a, 2017b, 2017c). Petersen carried out

research and case studies in Denmark (PPMI, 2017b, pp. 38-42; PPMI, 2017c, pp. 23-28). The final report indicated that large variations in terms of approaches and policies existed across Europe (PPMI, 2017a). The authors of the report outlined that “strong political commitment constitutes one of the key success factors for the implementation of effective ITE based on key competences” (PPMI, 2017a, p. 54), with ITE in Denmark emphasized as an example (p. 54).

The purpose of this article is to investigate how curriculum within the 2013 reform of Danish teacher education suggested that student teachers address diversity in their classrooms (Executive Order No. 231, 2013). Based on a short introduction to the context in Europe and in particular Denmark, I introduce the concepts of diversity and multicultural education before investigating the Danish teacher education curriculum.

European and Danish Context

Over the past few decades, there has been increased migration to Europe. In countries like Germany, France, Spain, and Italy, the percentage of migrants and refugees living in these countries has increased from around 1-2% in the late 1960s to above 10% in 2010 (Eurostat, 2011). As a country member of the European Union (EU), Denmark is no exception. Since the 1970s, the percentage of migrants, refugees, and descendants in Denmark has increased from 1% in 1970 to 11.6% in 2015. Of the 11.6 % immigrants, 58% are considered persons from non-Western countries (Danish Statistics, 2015, p. 12). There also is extensive variation in the distribution of migrants in Denmark. While migrants represent 4.4% of the population in one rural part of Denmark, migrants represent 36.4% in a suburb of the capital Copenhagen. Furthermore, in the region of

Copenhagen, migrants and descendants make up 17.5% of the whole population (Danish Statistics, 2015, p. 7).

Migrant Children in Danish Primary and Lower Schools (2015)

In November 2015, 12% of all children in the Danish *folkeskole* (i.e., the Danish state primary and lower secondary school) were from migrant backgrounds (Danish Ministry of Education, 2015). The distribution of migrant children differs in various parts of the country. Most migrant children attended schools in urban districts, and in many school districts in which the migrants live, the concentration and percentage of migrant children in the schools was high (40% or more). The high percentage of migrant children in urban schools has been a common concern among politicians in recent years. The subsequent political response has been to close schools with a very high percentage of migrant children or by emerging several schools into one. In 2009 the number of schools in Denmark with more than 40% migrant children was 64, in 2015 the number decreased to 45 schools. The total number of municipal primary and lower secondary schools in Denmark in 2015 was 1290 (Ministry for Children, Education and Gender Equality, 2016).

Diversity and Multicultural Education

The concept of diversity has been developed and discussed in various contexts. In accordance with Burns and Shadoing-Giersing (2010), diversity is defined as “characteristics that can affect the specific ways in which developmental potential and learning are realized, including cultural, linguistic, ethnic, religious and socio-economic difference” (p. 21).

The degree to which countries and teachers

have responded to the growing diversity is partly historical and partly due to the challenge of diversity in the classroom (Burns & Shadoing-Giersing, 2010). The authors indicate that the presence of one student in the class who is “not fluent in the language of instruction” is “a very different issue for a teacher than five or ten” or even more students in the class “who not only do not speak the language of instruction but also may or may not share the same first language as each other” (p. 23).

The response to growing diversity in the classroom is often connected to the concept of multicultural education. Multicultural education grew out of the civil rights movement in the United States in the 1960s in response to widespread institutional racism and ethnic discrimination (Banks, 1999). According to Banks (2004), multicultural education is “an idea, an educational reform movement, and a process whose major goal is to change the structure of educational institutions so that male and female students, exceptional students, and students who are members of diverse racial, ethnic, language, and cultural groups will have equal chance to achieve academically in school” (p. 1). Banks continued,

The major goal of multicultural education is to change teaching and learning so that students of both genders and from diverse cultural, ethnic, and language groups will have equal opportunities to learn in educational institutions. This goal suggests that major changes ought to be made in the ways that educational programs are conceptualized, organized and taught (p. 13).

Banks (1999) identified different approaches to multicultural education including:

1. **Content integration** (i.e., including content about racial, ethnic, and cultural groups into the curriculum);
2. **Prejudice reduction** (i.e., reducing stereotyping, increasing inter-group relations by targeting students’ racial attitudes through teaching);
3. **Equity pedagogy** (i.e., using appropriate teaching strategies by recognizing diverse ways of learning and knowing);
4. **Knowledge construction** (i.e., viewing concepts, events and issues from the perspectives and experiences of a range of racial, ethnic and cultural groups, and understanding how different cultural frames of reference influence the construction of knowledge); and
5. **Empowering school culture and social structure** (i.e., examining and restructuring school culture and organization to foster equality and empowerment) (p. 53)

Other researchers have elaborated on the concept of multicultural education. Rios and Stanton (2011) outlined “that it is not who the teachers and the students are in a particular school but what they do that makes an education multicultural” (p. 4). In a similar way, Vranješević emphasized that “the aim of education for diversity is not to understand what is wrong with others who do not fit into the existing system (the deficit theory), but rather to understand the ways in which to transform the system so that differences become acceptable and all children have equal chances” (Vranješević, 2014, p. 475).

Rios and Stanton (2011) further stated the importance of identity as follows,

Importantly, multicultural educators also understand that identities are changing and developing (i.e., fluid and dynamic). They also understand that those within the same identity group do not all share

the same worldview....multicultural educators also assert that people do not have one identity but rather have many identities. Some of these identities are more important than others, often depending upon time and place (that is, context). They recognize that teachers and students also can make choices about which identities to emphasize, depending upon context (pp. 4-5).

Multicultural Education Revisited

Some researchers have discussed the multicultural education paradigm. For example, when discussing the rising and ebbing focus on multiculturalism within European countries, Kymlicka (2010) noticed that many countries interpret multiculturalism differently. He also noted that many European countries have critiqued multiculturalism as impossible to realise, and instead, have begun to impose assimilatory attitudes and politics. Others have emphasized that multicultural education provides an essentialist perception of culture that may reinforce students' cultural bias (Petersen, 2011).

Over the last decade in Europe, the notion of multicultural/intercultural education and diversity has been perceived as a problem rather than as a positive challenge. As Luciak (2010) suggests, the attitude in many European countries is that "diversity is still regarded as a problem much more frequently than it is perceived as a resource or as a right" (p. 56). Similarly, Alleman-Ghionda came to the following conclusion on intercultural education in various European member states,

In all member states, the implementation of intended policies tends to be difficult. One problem is the successful instruction and integration of migrant and minority pupils...The other problem is a contradiction between intercultural ideas and the national and mono-cultural

thinking as well as cultural prejudice present in societies and schools (Alleman-Ghionda, & Deloitte Consulting 2008, p. 56).

Accordingly, teachers are often left to themselves to develop methods for accommodating diversity in the multicultural classroom, and they "need to decide which model best addresses their students' needs, fosters their education, and has the potential to minimize social inequalities" (Luciak, 2010, p. 56).

The question that was explored here is how the 2013 Teacher Education Order in Denmark within the Teacher Education Institution at VIA University College in Aarhus was implemented in order to address challenges future teachers may face in the context of increasingly diverse and multicultural classrooms.

Investigation on the 2013 Danish Teacher Education Order

In 2013, the Danish Teacher Education Order was adopted which introduced a range of changes to former acts (Executive Order No. 231, 2013). Most prominent was the alignment with the European Credit Transfer System (ECTS) and a focus on skills requirements (Petersen & Carlsen, 2014). A number of mandatory and elective modules/courses also were introduced. The program is presented in Figure 1.

Basic teacher professional skills consist of two parts that are compulsory for all student teachers: Part A consists of general education/philosophy/ citizenship and religion (abbreviated as KLM), and Part B consists of four modules, including education of bilingual children, special needs education, and knowledge about teaching and student development. The Education of Bilingual Children (Basic Teacher Professional Skills Part B) and the

KLM module (general education, philosophy, citizenship and religion) are of particular importance with respect to how initial teacher education programs in

Denmark prepare student teachers to address diversity in the multicultural classroom (PPMI, 2017c, p. 23).

Modules	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8
Module 1 (Danish or Mathematics)	Basic 1	Basic 2			Basic 3	Basic 4		
Module 2		Basic 1	Basic 2	Basic 3				
Module 3						Basic 1	Basic 2	Basic 3
Specialized module			Specialized module	Specialized module				
A. Basic teacher professional skills: Philosophy/citizenship/religion (Danish: KLM)	KLM (5)	KLM (5)						
B. Basic teacher professional skills: 1. Student learning and development; 2. Teaching knowledge; 3. Special needs education; 4. Education of bilingual children - PL (Danish: LG)	PL (5)	PL (5)	PL		PL (5)	PL (5)	PL	PL
Optional module					Optional			
Practice (in-service training)	Practice			Practice			Practice	
Bachelor project					Bachelor (5)	Bachelor (5)		Bachelor
Total ECTS	30 ECTS	30 ECTS	30 ECTS	30 ECTS	30 ECTS	30 ECTS	30 ECTS	30 ECTS

Figure 1. Organization of the teacher education in Denmark according to the Executive Order No. 231 (2013). (Reproduced with permission from Petersen & Carlsen, 2014, p. 127).

Note. All modules are 10 ECTS credit points unless otherwise indicated in brackets

Education of Bilingual Children

The aim of the Education of Bilingual Children module is to prepare future teachers to teach bilingual children, to “identify educational challenges linked to second language in the teaching of subject knowledge and to favor bilingual pupils’ linguistic and academic development in linguistically diverse classrooms” (Order on Bachelor of Science for School Teachers, 2013). A detailed description of the module is presented in Figure 2.

The introduction of the compulsory course (10 ECTS) Education of Bilingual Children, was a new initiative in the 2013 Danish Teacher Education Order. All student teachers now need to complete this module.

In the previous Teacher Education Act from 2006, only those ITE student teachers who voluntarily chose the Danish as a Second Language module dealt with educating bilingual children (Act, 2006). In the 2006 Act, the Danish as a Second Language module covered the equivalent of 36 ECTS points. Thus, it may be seen as progress that all future student teachers must attend the compulsory Education of Bilingual Children course. On the other hand, it has been questioned whether a 10 ECTS point course can adequately address all the challenges future teachers will meet in increasingly diverse classrooms (PPMI, 2017c, p. 25).

Knowledge: The [ITE]student has knowledge about	Skills: The [ITE]student can
Second language acquisition, bilingual children's language development	Assess second language acquisition in children's practice
Interlanguage	Support interlanguage development in the bilingual child
Language and literacy in subject teaching in a second language pedagogy perspective	Plan teaching that encourages bilingual children's language and subject knowledge and development
Language diversity and bilingualism, and language's impact on identity formation	Involve bilingual children's linguistic abilities in the classroom
Research about second language pedagogy and language development	Identify second language pedagogy challenges to teaching
Legal framework, regulations, acts and the organization of the subject Danish as a second language in primary and lower secondary school (Folkeskole)	Cooperate with Danish as a second language teachers and other teachers of the class regarding the bilingual children's language and subject knowledge and development, and their academic and professional language development

Figure 2. Education of bilingual children module in the 2013 Danish Teacher Education Order (Adapted from the Executive Order No 231, 2013).

The following is an example of how VIA University College (2016) implemented the 2013 Teacher Education Order requirement that student teachers complete modules on the education of bilingual children:

Through lectures, group work, case studies, classroom discussions, hands-on techniques, the module focuses on the development of inclusive educational and didactic practice in which Danish as a second language is a dimension of the learning processes in all subject teaching in primary and lower secondary school education (p. 15).

In an interview carried out as part of a 2016 Danish research project and case study, a student teacher, who participated in the course emphasized that the module, "provided her with [a] huge learning outcome" and with "hands-on techniques, methods, training and practical knowledge about how to teach bilingual children" (PPMI, 2017c, p.25).

General/Education/Philosophy/ Citizenship/Religion (KLM)

General education/philosophy/citizenship and religion (KLM) is the second mandatory module of the Danish ITE program for the preparation of student teachers for diversity and multiculturalism. According to the Executive Order No. 231 (2013), the intention of the module is to prepare all future teachers in Denmark to address the general purposes of public school, develop professional ethics, and handle complex challenges in the context of cultural, values-based, and religious diversity. The module aims for future teachers "in a nuanced and reflective way...to relate to ethical, political, democratic and religious challenges associated with education, parent involvement and school in a globalized society" (Executive Order No. 231, 2013, Appendix 2).

The integration of the Teacher Education Order requirement into a teaching module

at the VIA University College (2016) including lectures, group activities, tutorials, and presentations is described as follows:

The module aims to introduce student teachers to “an analysis of democracy and citizenship in the history of ideas, the formation of theoretical and professional ethical perspective”. The module focuses on the students’ efforts to address the school’s values and relate them to the teaching profession with respect for cultural and religious diversity that currently characterizes the school and the community (p. 6).

The knowledge base of the module at VIA UC (2016) is outlined as follows:

Central to the module is philosophy, history of ideas, formation theory and religion. The module is located in the tension between different theories within the module's knowledge and skill. The module is based on national and international research and development, knowledge formation, democracy and citizenship, professional ethics and religion and cultural encounters (p. 6).

A Student teacher, who participated in both modules stated that this module “was fundamental in developing [herself] as a teacher being able to address diversity, cultural encounters, inclusive classrooms, cooperation with parents from various cultures, ethics, etc. (Interview with Student Teacher, PPMI, 2017c, p. 25).

As emphasized in the PPMI (2017c) report, the mandatory “Education of Bilingual Children module is important as all future ITE students must learn how to take into account the background (linguistically and culturally) of all children in the multilingual classroom” (p. 25). In comparison, the second module “prepares ITE students for

diversity in school in broad and general ways” (p. 25).

Discussion

The fact that the 2013 Danish Teacher Education Order evidences “strong political commitment” and distinct descriptions of “key competences” in mandatory modules as ways to prepare future student teachers for diversity is perceived as important and desirable for most European countries (PPMI, 2017a, p 54). There is no doubt that the introduction of mandatory modules on diversity and the teaching of bilingual and multilingual children in ITE in Europe and other places in the world are essential to prepare future student teachers for diverse and multicultural classrooms. At the same time, a closer analysis of the mandatory modules and the ITE program in Denmark reveal an ethnocentric bias. Bank’s (1999) description of the key elements of multicultural education including striving to achieve content integration, prejudice reduction, equity pedagogy, knowledge construction and empowering school culture and social structure are either absent or not emphasized in the Danish mandatory modules. The general module on philosophy, citizenship, and education, in its description of skills and knowledge outlines knowledge about Christianity as extremely important for future student teachers in Denmark. In the PPMI report, this is mirrored in the discussion about a limitation in the module “that individual teacher educators put less emphasis to diversity rather than to ethics and moral education, including Christianity” (PPMI, 2017c, p. 25).

Furthermore, recent education policy towards migrant and refugee children in Denmark and other European countries, such as refusing to offer all children mother tongue education and/or specific language and culture training, provide evidence of some of the complexities and challenges

facing diverse societies. To a degree these trends mirror ongoing discussions concerning recent European attitudes towards multicultural education and diversity where “diversity is still regarded as a problem much more frequently than it is perceived as a resource or as a right” (Luciak, 2010, p. 56).

Evidence indicates that the Danish initial teacher education program as outlined in the 2013 Teacher Education Order to a certain degree intends to prepare student

teachers to support bilingual children’s participation in a classroom in which the language of instruction may be challenging for them. Compared to former teacher education acts, all future teachers are now mandated to address issues of diversity in their classrooms. Despite these changes, much work remains to be done in order for future teachers to adequately and effectively address increasing diversity in Danish primary and lower secondary schools.

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DIFFERENCES BETWEEN LICENTIATE AND NON-LICENTIATE COURSES: A CASE STUDY OF STUDENTS WITH AND WITHOUT PROUNI SCHOLARSHIPS IN BRAZIL

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Abstract: *With increasing access to Brazilian higher education comes increasing dropout rates in both licentiate and non-licentiate undergraduate programs. This paper reports on a comparative study of licentiate and non-licentiate undergraduate programs that enrolled students who either had or did not have a University Program for All (ProUni) scholarship. The study, conducted in 2014, analysed data on freshmen enrolled in 2005 at a non-profit higher education institution (HEI) in Rio Grande do Sul, Brazil. The study used quantitative comparative methods including descriptive and inferential statistics to analyse the data. Results indicated that graduates with a ProUni scholarship had a higher graduation rate and decreased dropout rate in both licentiate and non-licentiate degrees, $p < 0.0001$.*

Keywords: higher education, licentiate/undergraduate degree, ProUni scholarship

Introduction

In June 2014, Brazil's National Education Plan made quality teacher education (licentiate courses) a priority for the next decade. In the Brazilian context, *non-licentiate* courses include: administration, agronomy, architecture and urbanism, social sciences, accounting, social communication, law, nursing, civil engineering, pharmaceuticals, physiotherapy, technology, veterinary medicine, nutrition, psychology, information systems, and business. *Licentiate* courses include: plastic arts, visual arts, biological sciences, physical education, history, Portuguese, mathematics, pedagogy, and P.F.P.S (teacher formation program).

Research into the differences between licentiate and non-licentiate courses contributes to a deeper understanding of the sociodemographic characteristics of a country. Educational quality in the Brazilian context also is associated with its professorship. Licentiate graduate professors are professionals who taught in the early levels of education before working in Higher Education Institutions (HEIs). The National Education Plan recognized that professors with this

background are useful in teacher education courses, as they are able to provide approaches to education that are relevant to and interconnected with teaching contexts outside HEIs.

This study explored the following questions: Are there differences between freshmen in licentiate and non-licentiate courses with respect to permanence and dropout, and which factors (i.e., gender, age, and scholarship status) influence these differences? Are the differences between licentiate and non-licentiate freshmen influenced by whether or not students received a ProUni scholarship? The research project was funded by a grant from Conselho Nacional de Desenvolvimento Científico e Tecnológico.

Literature Review

Comparative studies involving licentiate and non-licentiate courses are limited in the literature. Access to Brazilian universities has expanded and diversified over the years in an attempt to accommodate more students from a variety of ethnic, economic, and social backgrounds. Although these universities still have far to go, they are

beginning to recognize that social diversity at the university and increased knowledge and experience among new graduates, creates greater possibilities for social mobility and decreases the distance between social classes (Felicetti, Morosini, & Somers, 2013). On the other hand, as Felicetti et al. (2013) suggest,

When social diversity is not present in the academic environment, social differences continue to increase, since students from culturally affluent families have not had, and/or do not have, much influence over the cultural and social environment they are from, and have not reflected, and/or do not reflect, on significant changes in their family environment or among their friends – that is, they contribute indirectly to society maintaining a great distance between the social classes. (p. 411)

In other words, "education is the best way to achieve social balance" (Felicetti, 2011, p. 239). Achieving this balance requires investing in the needs of the Brazilian educational system at the elementary, middle, and higher education levels. In the case of higher education, access is influenced by different factors, including national and economic development, the need for skilled manual labour, and the availability of government programs aimed at supporting access to higher education.

Federal institutions have implemented programs designed to expand opportunities to access universities. For example, the *Support Program for Restructuring and Expansion of Federal Universities* (REUNI) has developed new campuses by creating new HEIs in interior states and through the Open University of Brazil (UAB) (Brazil, 2007). This expansion is in line with recommendations from the United Nations Educational, Scientific and Cultural Organization (2008) as it provides teachers already working with basic education opportunities to acquire formal teaching

certification. There are also subsidy programs and scholarship grants in private institutions of higher education, such as the *Student Financing Fund* (FIES) and the *University for All Program* (ProUni). FIES finances students enrolled in graduate courses at private institutions with no expectation to pay monthly fees (Brazil, 2001; Brazil, 2012). ProUni grants full or partial scholarships to students enrolled in profit and non-profit private institutions of higher education (Brazil, 2005).

ProUni was implemented as a Temporary Act on September 10, 2004. It was converted into law on January 13, 2005 under management of the Ministry of Education (Brazil, 2005). The ProUni candidate selection system is computerized, impersonal, transparent, and secure. Higher education institutions that adhere to ProUni are obligated to conform to affirmative action policies for disabled and self-declared Indigenous persons and those of African descent, as well as to ensure scholarships are divided proportionately across courses.

Student selection depends on the grade obtained in the Brazilian National Secondary Education Examination (ENEM), which is a unified selection process (Ministry of Education, 2009). Brazilians with no previous higher education may be awarded ProUni scholarships. Scholarships correspond with annual or semi-annual academic fees. Full scholarships are available to Brazilians who do not earn more than 1.5 times the minimum per capita wage. Partial scholarships (50%) are intended for those with a monthly family income of up to three per capita minimum wages. In addition, candidates need to: (a) have attended a public school or private school with a full scholarship; and/or (b) have a disability recognized under law. Students with disabilities have the right to the scholarship regardless of income, middle school quality, teacher credentials, or prior courses.

Method

This study provided a comparative mapping of students enrolled in licentiate and non-licentiate courses, and investigated differences among students with and without ProUni funding. The study is part of a larger project entitled *ProUni scholarship holders and non-holders enrolled in 2005 in an institution of higher education: Where are graduates and how are they doing?* The project was funded by the National Council for Scientific and Technological Development (CNPq).

The applied methodology was quantitative and comparative. It analysed the database of freshmen enrolled in 2005 in a non-profit Brazilian university in Rio Grande do Sul. This time period was chosen because 2005 was the year ProUni was introduced in Brazil. The database was provided by the institution's Academic Registrar which contained freshmen in graduate courses enrolled in all of its campuses in 2005. In 2005, there was a total of 3,936 freshmen enrolled at the university. The independent variable in this study was course type (licentiate or non-licentiate). The dependent variables included gender, age, scholarship status (funded and unfunded), and student status (graduate, dropout, or currently enrolled).

Filtering was carried out on higher education data based on student status as of June 2014 when we began this research project. Students were divided into three categories: (a) attending (those studying, registered and transferred to the university); (b) completed (graduates); and (c) dropout (those who did not complete and were no longer enrolled). Variables included in the dropout category are the same as those considered by the HEI in question.

Data were organized initially in an Excel spreadsheet and were imported to Stata/IC13.1-Statistics/Data Analysis in which statistical and inferential analyses were carried out. Distribution tables were constructed for funded and unfunded students in relation to whether they were enrolled in licentiate or non-licentiate courses. Chi-squares (χ^2) were calculated to test associations between belonging to licentiate or non-licentiate courses, as well as scholarship status (funded or unfunded), gender, and student status (graduate, dropout, or currently enrolled). Since the Brazilian education system allows students to access higher education at different ages, and because age can inform students' experiences (Felicetti, 2014; Felicetti & Fossatti, 2014), age was an important variable in this study. The mean age of licentiate and non-licentiate students was compared and tested using an independent sample *t*-test. Gender, age, and scholarship status across course type were considered as factors affecting dropout and were tested using logistic regression. Significance levels followed Bós (2004) guidelines, with less than 5% probability of chance ($p < 0.05$) being considered significant, and between 5% and 10% (0.05 and 0.10) being considered as approaching significance (Wood, Freemantle, King, Nazareth, & Irwin, 2014).

Findings

Of the 3,936 freshmen in higher education in 2005 at the HEI in question, 2,437 (61.92%) belonged to non-licentiate courses, and 1,499 (38.08%) belonged to licentiate courses. In non-licentiate courses, 91.92% were unfunded, while in licentiate courses 90.33% were funded (Table 1).

Table 1
Number of Funded and Unfunded Freshman by Program Type (2005)

Funding	Non-licentiate N(%)	Licentiate N(%)
Unfunded	2,240 (91.92)	1,354 (90.33)
Funded	197 (8.08)	145 (9.67)

Note. Database provided by the institution’s Academic Registrar.

Table 2 displays enrolment data from 2005 of freshmen in licentiate and non-licentiate courses, whether or not they were ProUni scholarship holders, and their classification by sex. The total female freshmen

percentage was 59.27%. This finding is in line with those presented by Sisprouni (2015), which indicated that female scholarship holders comprised 53% of funded students until the second half of 2014.

Table 2
Number of Funded and Unfunded Freshman by Program Type and Sex (2005)

Sex	Non-Licentiate		Licentiate	
	Unfunded N(%)	Funded N(%)	Unfunded N(%)	Funded N(%)
Female	1,134 (50.63)	125 (63.45)	971 (71.71)	103 (71.03)
Male	1,106 (49.38)	72 (36.55)	383 (28.29)	42 (28.97)

Note. Database provided by the institution’s Academic Registrar.

Table 2 also shows that the percentage of unfunded women in non-licentiate courses (50.63%) was lower than unfunded women in licentiate courses (71.71%). However, for women with ProUni funding the subtotal was 63.45%, meaning that the proportion of funded women in non-licentiate courses is 12.82% higher than those without funding for these courses. Accordingly, the percentage of funded men (36.55%) is lower than those not funded (49.38%). Among the licentiate courses the percentage of funded and unfunded men and women was similar with less than 1% difference (71.71-71.03=0.63).

The Chi-squared test of the results presented in the category of non-licentiate courses revealed statistical significance, $p = 0.0007$. As for licentiate courses, this association also was significant, $p = 0,0003$. Women (funded and unfunded) comprised the majority in licentiate courses. This shows more women students from minority groups. Felicetti and Morosini (2009) identified minority groups as those who experience disadvantages with respect to gender, socioeconomic status, race, culture, disability, place of residence, and age and those who enter courses that have typically been sought out by males (non-licentiate).

Table 3
Average Age of Unfunded and Funded Students in Licentiate and Non-licentiate Courses

Funding	Non-licentiate	Licentiate
Unfunded	24.4263	25.9911
Funded	20.1786	21.0966

Note. Database provided by the institution's Academic Registrar.

Students who received ProUni funding had the lowest average age in both the licentiate and non-licentiate categories (Table 3). Independent t-tests comparing mean age between funded and unfunded students in non-licentiate courses was 7.32 (df=2434), $p < 0.0001$. In the same test for licentiate courses the calculated t-test was 6.43 (df=1494), $p < 0.0001$. This finding suggests that younger people were able to access higher education through the *University for All Program*.

Table 4 presents the status of freshmen from 2005 in June 2014. Total percentage of graduates comprised 37.42% of the 3,936 freshmen. Among the graduates of non-licentiate courses, 32.28% did not have ProUni funding while 68.02% of graduates did have ProUni funding in these courses. In licentiate courses, 37.15% of graduates did not have ProUni funding and 77.93% had funding.

Of the total number of freshmen in 2005 only 1.45% were still attending college in 2014, with the highest percentage in the non-licentiate courses. Of these, 2.10% were unfunded and 0.51% were funded. In licentiate courses, 0.66% were unfunded while no ProUni funded students were still attending licentiate courses.

Students in the dropout category met HEI criteria but did not register or did not return after leaving or cancelling a course. The total number of dropouts was 2,406, which comprised 61.13% of the total freshmen in 2005. In non-licentiate courses, 65.63% of unfunded students dropped out compared to 31.47% of funded students. In licentiate courses, 62.19% of unfunded students dropped out compared to 22.07% of funded students. The percentage of funded graduates was higher in licentiate courses (77.93%) compared to non-licentiate (68.02%), with more students holding ProUni scholarships graduating in both course categories. Among funded students in non-licentiate courses, the percentage of graduates was 68.02%; among funded students in licentiate courses the graduate percentage was 77.93%. ProUni funded students dropped out less frequently than unfunded students.

The Chi-squared tests for graduation and dropout rates for funded and unfunded students were statistical significance for both non-licentiate and licentiate courses, $p = 0.0001$ ($\chi^2 = 101.7089$ for non-licentiate and $\chi^2 = 90.1239$ for licentiate courses respectively). This indicates that funded students graduate from higher education institutions at a higher rate and dropout less frequently than unfunded students.

Table 4
Status of 2005 Freshmen in June 2014

Status	Non-Licentiate		Licentiate	
	Unfunded N(%)	Funded N(%)	Unfunded N(%)	Funded N(%)
Graduate	723 (32.28)	134 (68.02)	503 (37.15)	113 (77.93)
Studying	47(2.10)	1(0.51)	9(0.66)	0
Dropout	1,470 (65.63)	62 (31.47)	842 (62.19)	32 (22.07)

Note. Database provided by the institution’s Academic Registrar.

Table 5 presents the logistic regression used to access the odds of being a drop out student according to sex, age group, course type and scholarship status. Age was grouped according to the National Education Plan (Ministry of Education/ Secretariat of Articulation with Teaching Systems, 2014). Females, students younger than 18 years old, non-licentiate, and unfunded students were used as reference levels; males’ odds were calculated compared to female students and all other groups were compared to students 18 years old in both licentiate and non-licentiate programs, and finally with and

without funding.

According to multilevel logistic regression that adjusted for each of the variables in the model (Table 5), men were 22.55% more likely to drop out than women, $p = 0.0040$. For age group, comparisons were performed using the younger group as reference. Thus, it is observed that all age groups older than 18 years had significantly greater chance of dropping out, with those in the 25-35 age group having the highest chance of dropping out.

Table 5
Multilevel Logistic Regression for Student Drop Out According to Gender, Age, Degree Type, and Scholarship Status

		Odds Ratio	Confidence Interval (95%)	p	
Sex	Female	1			
	Male	1.2255	1.067	1.4073	0.0040
Age	Less than 18	1			
	Equal to 18 and less than 25	1.8509	1.492	2.2960	<0.0001
	Equal to 25 and less than 35	2.3964	1.873	3.0660	<0.0001
	Equal to 35 and lower than 45	1.5846	1.192	2.1064	0.0015
	Higher or equal to 45	1.9409	1.287	2.9266	0.0016
Licentiate	No	1			
	Yes	0.8602	0.748	0.9885	0.0338
Funded	No	1			
	Yes	0.2473	0.192	0.3186	<0.0001

Note. Database provided by the institution’s Academic Registrar.

Licentiate course students were 14% less likely to drop out compared to non-licentiate students (Table 5). When comparing students who were funded with those who were not, it is clear that scholarship holders were 75% less likely to drop out, $p < 0.0001$.

Discussion and Conclusion

The following questions were investigated in this research study: (a) Are there differences between freshmen in licentiate and non-licentiate courses with respect to permanence and dropout, and which factors (i.e., gender, age, and funding) influence this difference? and (b) Are there differences between licentiate and non-licentiate freshmen and among funded and unfunded students with respect to permanence and dropout? The results indicated that the highest percentage of freshmen were in non-licentiate courses. These findings corresponded with recent Census data on higher education in Brazil (Sinopse Estatística da Educação Superior, 2013). This finding may be due to the increasing amount of non-licentiate courses being offered at universities in Brazil.

In 2005, 17 non-licentiate and nine licentiate courses were offered at the university. Each licentiate course had an average enrolment of 167 freshmen and each course was offered at the different campuses. For non-licentiate courses, there was an average enrolment of 144 students. Although the distribution of freshmen is not uniform between courses, it is evident that licentiate courses were in higher demand, as more freshmen were enrolled in physical education, pedagogy, Portuguese and biological sciences. In 2005, Census data indicates that the pedagogy course was among the most sought after in the field of education. Among non-licentiate courses offered in 2005, the courses with the highest number of freshmen were administration, law and accounting sciences. These data are in line with those presented in the 2005 Census on Higher Education, which

found that administration and law were the two most sought-after courses which was the same result in the 2013 Census (Sinopse Estatística da Educação Superior, 2005, 2013).

Despite a decline in the teaching profession over the years, the current study found that a higher number of students entered licentiate courses compared to other courses. The amount of ProUni scholarships was calculated according to the number of paying students enrolled in each HEI; Institutions that adhered to the *University for All Program* offered at least one full scholarship for every nine paying students enrolled at the end of the previous school year (Brazil, 2005). Given this stipulation, the percentage of funded students in this HEI is close to the maximum 10% allowed by law. Thus, vacancies occupied by ProUni scholarship holders are in alignment with vacancies offered.

Data shows that freshmen in 2005 at this HEI had a greater number of women enrolled at this level of education. These findings are supported in Brazilian statistics (Sinopse Estatística da Educação Superior, 2013). In recent years, women's participation in higher education has increased. This increase is related to shifts in female representation in Brazil (Romanelli, 2010) that have provided women with greater opportunities to participate in the labour market, in politics, and in other fields that demand higher qualifications, including university education (Aguilar et al., 2011).

Analyses presented here related to sex also show that in non-licentiate courses, while the difference between non-scholarship holders was 0.25%, the difference between scholarship holders was 12.79%. These findings suggest that the provision of ProUni scholarships increased the representation of

women in courses traditionally attended by men.

The average age of freshmen who were enrolled in non-licentiate and licentiate courses in 2005 differed significantly by category, indicating that the *University for All Program* facilitated the entry of younger people in higher education. These data are consistent with those presented in the Higher Education 2013 Census, which indicates that most freshmen are under 25 years old. In addition, these data meet Target 12 of the National Education Plan (PNE), approved on June 25, 2014, which aimed to increase the gross enrolment rate in higher education to 50% within the next decade and increase the net rate of 18- and 24-year olds attending university to 33% (Brazil, 2014).

Graduates with scholarship funding represented the highest percentage of graduates in both licentiate and non-licentiate courses. Studies by Regueyra (2013), Vitelli (2012), and Castaño, Vásquez, Gallón, and Gómez (2012) found that having some financial aid during graduation contributes to academic success.

Funded students had a lower dropout rate and higher graduate rate than unfunded students in both licentiate and non-licentiate courses. These data are in line with a study conducted by Felicetti and Fossatti (2014) who found a lower dropout rate among those with ProUni scholarships than those without scholarships in licentiate courses. The findings of this study also indicated that men were more likely to drop out than women, which is consistent with findings reported by Burillo, Arriaga, Carpeño, and Casaravilla (2011). Age was also related to dropout, with younger students less likely to leave school than older students. Studies by Fiori and Ramirez (2013), Burillo et al., (2011), Oloriz and Fernandes (2013), and Vitelli (2012)

also indicated higher risk of dropout for older students.

Students in licentiate courses were also less likely to dropout than their colleagues in other courses, a finding consistent with research by Felicetti and Fossatti (2014). The results of this study suggest that at the university in focus non-licentiate courses were more diverse, but the demand was higher for licentiate courses. The demand for licentiate courses raises several questions including: Has teaching devaluation influenced course choice by the time of university entrance? What factors guide students' course choices? Moreover, as dropout was higher among freshmen in non-licentiate courses, it is appropriate to ask: Why is drop out in those so called prestigious courses (non-licentiate) higher than in licentiate courses? These questions can be considered as recommendations for new research projects.

Although ProUni has worked to increase overall graduate percentages and decrease overall dropout percentages at the university explored in this study, the question of dropout remains a concern. Dropout rates were found even among students with a scholarship. In summary, disregarding the fact that only 1.45% of students who enrolled in 2005 remained by the time of this research, it is observed that more than 60% of freshmen dropped out of the HEI. This finding highlights the need for the institution to develop studies that address the factors that contribute to dropout at both the HEI and in higher education broadly.

Acknowledgements. This research was funded by the Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq [National Council for Scientific and Technological Development-CNPq].

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THE EFFECTS OF THE NIGER DELTA CRISIS ON EDUCATIONAL RESOURCES, ATTITUDE TO SCHOOLING, AND ACADEMIC ACHIEVEMENT OF BASIC SCIENCE STUDENTS IN RIVERS STATE, NIGERIA

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Abstract: *This study investigated how the Niger Delta crisis affected students' access to educational resources, attitude to schooling, and academic achievement in basic science. An ex post facto design was used for the study. Participants included 400 students and 16 principals from 16 secondary schools drawn from four local government areas of Rivers State, two of which were affected by the crisis and two of which were unaffected. Purposive and random sampling techniques were used for participant selection. Three research instruments were used for data collection: Availability of Educational Resources Checklist (AERC), Students' Attitude to Schooling Questionnaire (SASQ), and the Basic Science Achievement Test (BSAT). The test-retested method was used to establish the reliability of the BSAT, with an estimated reliability coefficient of 0.86. Descriptive statistics and t-tests were used for data analysis. Four null hypotheses were formulated and tested at significant levels of 0.05. Although schools from the unaffected locations descriptively received higher scores than their counterparts in the affected locations for availability of educational resources, there were no significant differences between schools in affected and unaffected areas, $t(14) = -2.09$, $p = 0.05$. Basic Science I (Grade 7) and Basic Science II (Grade 8) students from the unaffected schools performed greater on the measures of basic science achievement than their peers from affected areas, $t(398) = -26.73$, $p < 0.05$. Students from affected and unaffected schools did not differ significantly in their attitude to schooling, $t(398) = -1.01$, $p = .125$. The findings indicated that there were no significant differences in educational resources and attitude to schooling within affected and unaffected schools, but significant differences in students' science achievement in Rivers State due to the Niger Delta crisis.*

Keywords: Niger Delta crisis, Basic Science I and II, school resources, science achievement, school attitude

Introduction

The Niger Delta region is made up of the nine States of the Nigerian Federation. These states collectively consist of a population of about 20 million people. The Niger Delta consists of diverse ethnic groups speaking about 250 dialects across approximately 5,000 communities. Given this ethnic diversity, the Niger Delta was often referred to as a minority region in Southern Nigeria. Although the Niger Delta has been marked by

underdevelopment, it has recently transformed because of oil production. It is now popularly known as the "oil producing states" (Olorode, 2000). The oil rich Niger Delta region has been embroiled in crisis between the government forces and some militant elements that are aggrieved over certain fundamental issues affecting the region. In the last few years, militants have fought with government forces, sabotaged oil installations, taken foreign oil workers hostage, and carried out lethal car

bombings amongst other acts of violence. At the root of the problem is a crisis of under-development. The crisis has been exacerbated by emergent issues of a gross distortion of Nigerian federalism in respect to resource control, citizenship rights, and environmental degradation (Ejibunu, 2007).

There is a growing body of evidence that violent political and military attacks on education have occurred in dozens of states over the past decade and have significantly intensified in many of the worst affected countries within recent years (Pepple & Ogologo, in press). The attacks are carried out against students, teachers, academics, and education personnel including support staff (e.g., transport drivers, caretakers, night-watchmen), education officials, trade unionists, and aid workers. The attacks include killing, injuring, abducting, kidnapping, forced military service and labour, illegal detention, torture, and sexual violence. They also include the damage or destruction of education buildings and facilities including transport, occupation of education buildings and facilities for military/security purposes, and violent attacks on the education process (e.g., convoys carrying examination papers).

Unlike major cities and towns like Port Harcourt, Warri, Yenagoa, Sapele, and Igbokoda, the Niger Delta consists of many villages situated along creeks and difficult waterways. In many riverine communities, there are no primary and secondary schools. The long distances along these waterways to schools make it difficult for the children in these rural communities to have access to the universal basic education, infringing on children's fundamental human right. While discussing the implication of crisis in Somalia, Liberia, and Sierra-Leone, Obanya (2011) posited that education will be negatively affected since there can be

no meaningful education in warring societies. Obanya recognized the topography of the Niger Delta as one obstacle to the realization of the Education for All (EFA) goal in the crisis ridden Niger Delta.

According to Ibukun (2006), Education for All is an integral objective of the Millennium Development Goals. The question arises as to whether Nigeria can meet the deadline of eradicating illiteracy by the year 2020 in the Niger Delta, if most rural communities in the riverine areas do not have access to education for their children. Another challenge is that youth in the area no longer value education due to the activities of those who are involved in the illegal bunkering and refining of crude oil locally known as "kpom fire". The lifestyles of their contemporaries in the oil and gas sectors have caused many youth to desire luxurious lives. Thus, the access to guns and ammunitions has resulted in criminal behaviour (Amaechi, 2008). Youth who benefit handsomely from the proceeds from ransom and other illegal activities do not value or see the "idea of beauty" (Amaechi, 2008, p. 18) in education.

During the Niger Delta crisis, some youth who were prevented from going to school no longer valued school and became dropouts. Thus, the position of IRIN (2007) that the conflict in Northern Kenya "has prevented thousands of children from enrolling in school" is also true for some youth in the Niger Delta (p. 32). IRIN went further to report the sad consequences of such crisis on these school dropouts, explaining that non-enrolment in schools made youth "more likely to commit acts of violence" (p. 41). Thus, the state of militant youth's operation in the Niger Delta is a result of exposing youth to violence during the crisis. Even those youths who attained basic education were not prepared to be self-employed. Thus, many of them were

not qualified to work in oil and oil serving companies because they lacked the skills needed to enter such work. Yet, they desired what those working in such blue-chip companies (multinational oil companies) enjoyed. So, engaging in an armed militancy was the only way by which these youths could obtain money that could enable them to survive in life.

With the amnesty programme, the Niger Delta crisis has taken a new dimension from militancy to illegal bunkering and refining of crude oil. This is a dangerous trend which spells doom for the educational future of this region. The youth have found it very lucrative to engage in illegal bunkering and refining of crude oil, where they make quick money and live like their counterparts in the oil companies. Many youth are therefore not interested in going to school. This has negatively impacted on the value placed on education.

Attitude to Schooling

Attitude is a central part of human identity. Everyday people love, hate, like, dislike, favour, oppose, agree, disagree, argue, persuade etc. All of these are evaluative responses to an object. Hence attitudes can be defined as, “a summary evaluation of an object of thought” (Bohner & Wänke, 2002, p. 20). They are inclinations and predispositions that guide individuals’ behaviours (Rubinstein, 1985) and persuade them to actions that can be evaluated as either positive or negative (Fishbein & Ajzen, 1975). Attitudes develop and change with time (Rubinstein, 1985). According to the multicomponent model of attitude (Eagly & Chaiken, 1993), attitudes are influenced by three components: cognitions (e.g., beliefs, thoughts, attributes), affects (e.g., feelings, emotions), and behaviours (e.g., past events, experiences) (Maio, Maio, & Haddock, 2010).

Loftus (1982) viewed attitude as a relatively enduring organization of feelings, beliefs, behaviours, and tendencies towards persons, groups, ideas or objects. She implied that individuals are not born with attitudes but learn them. From early childhood, individuals begin forming their attitudes through direct experiences and indirect observations. Through social contacts, children acquire attitudes by watching and imitating parents, siblings, friends, teachers, and peers. Children also can develop attitudes through operant conditioning, where adults reward them for expressing certain views. It is on the basis of operant conditioning that the relationship between students’ attitude to school and academic achievement can be explained (Lassen, Steele, & Sailor, 2006). If students with positive attitudes towards school demonstrate significantly better academic achievement than their counterparts with negative attitudes towards school, then positive attitudes towards school are reinforced according to operant conditioning theory of learning (Shah, 2009). According to Candeias and Rebelo, (2010), attitudes toward schooling is a psychological construct that depicts individuals’ behaviours, feelings, expression of favourable or unfavourable affection, and judgments for school and school experiences.

Attitude towards school, like other constructs, is intrinsically related to a number of other psychological traits such as students’ interests, competencies (often seen as a result of previous academic achievement), and motivation. For instance, attitude towards school has been found to be influenced by gender among Portuguese students. While girls tended to have more positive school attitudes, boys were less motivated and held more negative attitudes toward school (Candeias & Rebelo, 2010; Houtte, 2004). Results of these investigations further showed that girls did not require more time to study,

engaged less often in misconduct and disruptive behaviours, had less absenteeism, held more expectations about the future, and were more enthusiastic about further studies than boys. On the contrary, boys were less committed to studies and school, and give up more readily, particularly when popular teen or peer role models did not necessarily require good grades and total dedication to school as preconditions for success. In relation to parental socio-economic level, male students from families with high socio-economic status were more satisfied with school and demonstrated better attitudes to schooling that tended to guarantee them significantly better academic achievement than their counterparts from families with low socio-economic status. Low socio-economic status was closely associated with less access to school resources, computers, and negative attitudes toward school, and consequently, with poor academic performance (Linnehan, 2008).

Availability of Education Resources

Availability of suitable and varied instructional resources is essential in education, and is especially crucial for the achievement of curriculum objectives. A solid foundation for integrated science depends upon adequate provision of instructional materials in the teaching-learning process. Maduabum (1998) suggested that teachers' teaching objectives may be influenced or limited in some instances by the teaching and learning resources available to them. Although many teachers are willing to be tutored in the use of instructional resources, they may be handicapped in integrating them in their lessons if resources are not readily provided to them for utilization in schools (Onasanya & Adegbija, 2007). Okebukola (2000) agreed that the lack of resources for effective practical and engaging work in science teaching and learning could result in poor

student achievement in science. Further, Mkpa (2002) reported that even when instructional materials (resources) are available in schools, most teachers still do not use them in teaching.

Okafor (2006, cited in Victoria, 2009) stated that one of the most cited problems of integrated science teaching has been the use of inadequate strategies for understanding difficult concepts. This challenge arises, in part, as a result of the inability of secondary school teachers to use appropriate resource materials for the meaningful understanding of difficult concepts in integrated science. Okafor added that this led to poor student performance in the Senior Secondary Certificate Examination (SSCE) and to limited scientific and technological advancement in the nation.

Ajaja and Kpanbagan (2004) commented that the availability and use of instructional materials had positive effects on students' achievement. They identified the absence of instructional materials as among the main factors mitigating students' performance. They argued that an adequate supply and effective use of educational resources would improve students' performance by raising the quality of learning activities. But when educational resources that are vital for academic achievement are not adequately available in schools, students' academic achievement is affected negatively. This is the case of the Niger Delta region where most of these educational resources that would have enhanced students' academic achievement were destroyed, vandalized, and looted by those involved in the bunkering and refining of crude oil and other illegal acts during the Niger Delta crisis, causing students not to have access to these resources and thereby negatively affecting their academic achievement.

Statement of the Problem

During the Niger Delta crisis (NDC), school buildings, facilities, and instructional materials were destroyed and the lives of teachers were lost. Some students and teachers were displaced and those who returned to school after the NDC did so with mixed feelings. After the crisis, youth were no longer interested in schooling. This change from positive to negative in students' attitude toward schooling brought about very poor academic performance in these schools (Pepple & Ogologo, in press). The aim of this study was to investigate the effect of the Niger Delta crisis on educational resources, attitude to schooling, and academic achievement of Junior Secondary School 2 students in Rivers State.

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H₀1: There is no significant difference in the educational resources between the affected and unaffected secondary schools in Rivers State.

H₀2: There is no significant difference in Basic Science II (Grade 8) students' academic achievement between the affected and unaffected secondary schools in Rivers State.

H₀3: There is no significant difference in Basic Science I (Grade 7) students' academic achievement between the affected and unaffected secondary schools in Rivers State.

H₀4: There is no significant difference in the students' attitude to schooling between the affected and unaffected secondary schools in Rivers State.

Method

An ex post facto research design was used here. In ex post facto designs, at least two different groups are compared on a

dependent variable or measure of performance (i.e., the effect, criterion variable, or outcome) as the independent variable (i.e., Niger Delta crisis) has already occurred or cannot be manipulated. The target population was all the students and principals of the Grades 7 and 8 (Junior Secondary School Students 2) classrooms in Rivers State. A sample size of 400 students and 16 principals was used for the study. Purposive sampling technique was used to select four local government areas (LGAs) out of the 23 LGAs in Rivers State. Two of the selected areas were affected by the Niger Delta crisis (NDC) and two were not affected by the crisis. Random sampling was used to select 2 junior and 2 secondary classes from each of the 4 LGAs, comprising a total of 16 junior secondary schools. Proportionate stratified random sampling technique was then used to select 400 students, 25 from each of the affected and unaffected secondary schools. Random sampling was used to select Basic Science I and Basic Science II teachers of each of the selected classes for participation in the study.

The instruments used for the study included:

Basic Science Achievement Test (BSAT). The BSAT is a 30-item multiple choice basic science test with four options per item prepared by the researcher. The instrument has a reliability estimate of 0.86.

Availability to Educational Resource Checklist (AERCL). The AERCL is a 25-item instrument used to measure principal ratings for adequacy of the availability of educational resources. The instrument was based on the 4-point Likert scale where 4 = Very Adequately Available (VA), 3 = Adequately Available (AA), 2 = Not Adequately Available (NAV), and 1 = Not Adequately Available (NA). The instrument has a reliability estimate of 0.81.

Student Attitude to Schooling

Questionnaire (SASQ). The SASQ is a 20-item instrument used to measure the student attitude towards schooling. The instrument is based on a 4-point Likert scale where 4 = Strongly Agree(SA), 3 = Agree(A), 2 = Disagree (D) and 1 = Strongly Disagree (SD). All the items are positively skewed and do not require any reversals during scoring. The instrument has a reliability estimate

of 0.74.

Findings and Discussion

Null Hypothesis 1

There is no significant difference in educational resources between the affected and unaffected schools.

Table 1
Means, Standard Deviations, and t-test for Educational Resources

Group	N	M	SD	Mean Difference	t-value	p
Affected	8	7.37	3.81			
Unaffected	8	11.25	3.57	-3.87	-2.09	.05

Schools from the affected location had a mean score of 7.37 on the *AERCL* while non-affected students had a mean score of 11.25 (Table 1). While schools in unaffected locations had descriptively higher resource ratings than schools in affected locations, the schools did not differ statistically, $t(14) = -2.09$, $p = 0.05$. Accordingly, the null hypothesis that there is no significant difference in the

educational resources between the affected and unaffected secondary schools in Rivers State was not rejected.

Null Hypothesis 2

There is no significant difference in Basic Science II students' academic achievement between the affected and unaffected secondary schools in Rivers State.

Table 2
Means, Standard Deviations, and t-test for Basic Science II Students' Achievement Scores

Group	N	M	SD	Mean Difference	t-value	p
Affected	200	18.15	4.99			
Unaffected	200	27.50	4.14	-9.35	-20.39	.000

Schools from affected locations had a mean score of 18.15, while non-affected students had a mean score of 27.50 (Table 2). Basic Science II students from unaffected locations performed significantly better than their peers from affected locations, $t(398) = -20.30$, $p = 0.001$. Thus, the null hypothesis was rejected, with findings indicating that there was a significant difference in academic achievement between the two groups

(affected and unaffected) in Basic Science II students in secondary schools in Rivers State.

Null Hypothesis 3

There is no significant difference in Basic Science I students' academic achievement between the affected and unaffected secondary schools in Rivers State.

Table 3
Means, Standard Deviations, and t-test for Basic Science I Students' Achievement Scores

Group	N	M	SD	Mean Difference	t-value	p
Affected	200	20.84	3.88			
Unaffected	200	30.93	3.66	-10.09	-26.73	.000

Basic Science I students from affected locations had a mean score of 20.84, while non-affected students had a mean score of 30.93 (Table 3). Differences in students' achievement scores was statistically significant, $t(398) = -26.73$, $p = 0.001$, with students in unaffected areas performing better than those in affected areas. Thus, the null hypothesis was rejected indicating that there was a significant difference in academic

achievement between the two groups (affected and unaffected) in Basic Science I students in secondary schools in Rivers State.

Null Hypothesis 4

There is no significant difference in students' attitude to schooling between the affected and unaffected schools in Rivers State.

Table 4
Means, Standard Deviations, and t-test for Students' Attitude to School

Group	N	M	SD	Mean Difference	t-value	p
Affected	200	41.26	5.32			
Unaffected	200	42.12	5.91	-.865	-1.53	.125

Students from affected locations had a mean score of 41.26, while non-affected students had a mean score of 42.12 (Table 4). While students from the unaffected locations exhibited slightly descriptively higher attitudes to schooling than their peers from affected locations, these differences were not significantly different, $t(398) = -1.53$, $p = 0.125$. Thus, the null hypothesis that there is no significant difference in the attitude of students to schooling between the affected and unaffected secondary schools in Rivers State was not rejected.

Discussion

The results indicated that students from unaffected locations performed better than their peers from affected locations on the *BSAT*. It could be deduced that the Niger Delta crisis had negatively impacted the students' academic achievement. The results of this study also showed that

students from unaffected locations did not demonstrate more positive attitudes to schooling than their counterparts from affected locations. These findings are inconsistent with those reported by Shah (2009) who indicated that students with positive attitudes towards school demonstrate significantly better academic achievement than their counterparts with negative attitude towards school.

Overall, all students in this study demonstrated low attitudes towards schooling as measured on the *SASQ*, suggesting that many students may lack motivation for school regardless of location. Alternatively, the instrument used here may have lacked the ability to document subtle differences among students.

The findings also are inconsistent with some studies (such as Okwelle, 2004) that have found students' poor academic

performance in both internal and external examinations was attributed to lack of learning materials in schools. Based on the findings of this study, it appears that students from unaffected areas perform better than those from affected areas despite similar access to resources and attitudes to school. There are several possible explanations for this finding. As Mkpa (2002) reported, even when instructional resources are available in schools, many teachers do not use them in teaching. Moreover, as Okafor (2006, cited in Victoria, 2009) suggested, teachers may use inadequate strategies in their science classrooms that can affect achievement. Given the conflict in the Niger Delta, it is possible that teacher practice and student achievement has been negatively affected. It is also possible that the principals included in this study may not have had as informed an opinion about the students' achievement and attitudes as teachers. We recommend further study to explore teachers' views on students' academic achievement and studies that account for possible differences in attitude and achievement based on gender.

The study is limited to four local government areas of Rivers State and focused solely on junior secondary school basic science. The finance and personnel support to carry out this research in multiple local government areas was not available. Further study should be carried out at the entire state level, involving all 23 local government areas and a number of

subject areas beyond Basic Sciences.

Conclusion

Nigeria's rapid development has had adverse effects on its population, particularly youth. For example, since the Niger Delta crisis, many youth have elected to engage in illegal bunkering and refining of crude oil (i.e., "*kpom fire*") instead of going to school. The findings of this study suggest that while secondary school students affected by the Niger Delta crisis did not develop a more negative attitude to school than those from unaffected schools, their achievement scores lagged behind their peers. Secondary students in the unaffected secondary schools performed better than their counterparts in the affected locations in the Basic Science I and Basic Science II tests.

The schools unaffected by the Niger Delta crisis had descriptively (but not statistically) more educational resources, with students also performing better on measures of science achievement than their counterparts in affected areas. Presumably, the Niger Delta crisis destroyed most of the educational resources that enhance effective teaching and learning, contributing to these students' poor performance in basic science.

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DIETARY HABITS AND BEHAVIOUR PROBLEMS AT SCHOOL AMONG NORWEGIAN 14 YEAR OLDS

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Abstract: *This study examined the association between dietary habits and behavioural problems at school among adolescents in Norway. Participants in this study included 517 adolescents and 336 of their parents. Students attended schools in the south of Norway, where the study was conducted. In 2012, adolescents completed a food frequency questionnaire (FFQ) and a questionnaire regarding behavioural problems at school. Parents completed a questionnaire regarding socioeconomic status. All statistical analyses were carried out using SPSS. High intake of soda with sugar and frequent consumption of take-away food were significantly associated with increased behavioural problems at school in the adjusted analysis, while frequent consumption of fast food and frequent consumption of dinner (as opposed to skipping meals) were significantly associated with decreased odds of behavioural problems only in the crude analysis (i.e., unadjusted for age, BMI, and parental SES). The study shows an association between diet and behavioural problems at school, even when adjusting for parental SES. The study underlines the importance of a healthy diet in adolescence and the importance of promoting both cooking skills and nutritional knowledge among adolescents at school.*

Keywords: diet, adolescent, behavioural problems, unhealthy eating habits, meal patterns

Introduction

A healthy diet in childhood and adolescence is important for both physical and mental health (Laska, Murray, Lytle, & Harnack, 2012; O'Neil et al., 2014) as well as for school performance (Florence, Asbridge, & Veugelers, 2008). For example, Rampersaud, Pereira, Girard, Adams, and Metz (2005) found an association between nutrition and cognitive and academic performance where a diet with an appropriate amount of fat and a high intake of fruits and vegetables is associated with better school performance. Conversely, adolescents with low quality diets that include a high intake of junk food are more likely to be hyperactive with age (Wiles, Northstone, Emmett, & Lewis, 2009). Although some observational studies show that sugar intake is related to hyperactivity, controlled experimental studies have found no correlation between sugar intake and hyperactivity (Millichap & Yee, 2012). Among the few studies to have considered the relationship between

diet quality and general behavioural problems are two cross-sectional studies that showed that a high intake of unhealthy foods, such as soft drinks sweetened with sugar and sweets, is associated not only with hyperactivity, but increased behavioural problems in general (Lien, Lien, Heyerdahl, Thoresen, & Bjertness, 2006; Øverby & Høigaard, 2012). Behavioural problems at school can range from shouting in class to having to leave the classroom because of bullying.

In addition to dietary quality, meal patterns are an important element of the diet. Varied meal patterns and skipped meals are increasing trends among adolescents, although this may have stabilized among Norwegian children (Øverby, Stea, Vik, Klepp, & Bere, 2011). Some studies have concluded that not eating breakfast may be related to psychological distress (Lien, 2007) and is associated with increased behavioural problems at school (Øverby & Høigaard, 2012). Breakfast can increase concentration and motivation to learn,

which may contribute to improved behaviour (Wesnes, Pincock, & Scholey, 2012).

Behaviour at school is especially important because student behaviour can affect learning and the social environment at school. Although some research has suggested that adolescents experience poor health and diet in Norway (Øverby & Andersen, 2002) and indicates an association between diet and behavioural problems among Norwegian adolescents (Øverby & Høigaard, 2012), studies are limited. Moreover, few of these studies include socioeconomic data, which is highly related to diet trends among Norwegian adolescents (Fisken et al., 2016) and behaviour (Tremblay, 1999). This study aimed to address this gap in the literature. It examined the associations between dietary habits and behavioural problems at school among adolescents in the southern part of Norway adjusting for parental socioeconomic status.

Materials and Methods

Participants

This study was conducted during autumn of 2012 and used two questionnaires. A total of 742 ninth grade adolescents and their parents or guardians (hereafter called parents) from 15 secondary schools in four different municipalities in Vest-Agder County, Norway were invited to participate. Of those invited, 517 adolescents completed the questionnaires resulting in a participation rate of 69.7%. All 517 adolescents (232 boys and 285 girls) were included in the statistical analysis. Of the 308 parents who completed the questionnaire (60% participation rate), 50% of fathers and 58% of mothers had higher education.

This study was conducted according to the guidelines of the Declaration of Helsinki and all procedures involving human

subjects were approved by the Norwegian Social Data Services (NSD). Students and parents involved in the study provided written and informed consent.

Procedure

Data were collected between September and November 2012. All secondary schools in the communities of Kristiansand, Søgne, Mandal, and Vennesla, representing both urban and rural municipalities, were invited to participate. Researchers (Western and Skaardal) contacted the principals at the different schools to request participation. Out of the 15 schools invited to join, nine agreed to participate: five schools from Kristiansand, two from Søgne, one from Mandal, and one from Vennesla (see Skardal, Western, Ask, & Øverby, 2014).

The researchers were available at the schools to provide oral and written information about the project. All parents received a consent form with clear and concise written information about the project's aims and methods. Some schools informed parents about the study and consent form through mobile messaging and in lesson plans that were sent home with students each week. The consent form was completed through the project's website, where parents entered their ID numbers. The ID numbers were designed to match the pupils and the parents.

The adolescents' questionnaire responses were considered confidential. Each student was provided with an ID number to match with their parents' questionnaire. Students completed the questionnaire on a computer during a designated school lesson. Two researchers were available while students completed the questionnaires and remained after students finished to answer any questions that may have arisen during the survey. Students were asked to think about their usual habits when filling in the food-frequency

section. Parents also completed a short (5 minute) online questionnaire about the adolescent's family situation.

Data Collection Tools

Diet. We use the term diet to refer to the food and drinks that are consumed by individuals, which yields energy and nutrients for growth, development and nourishment (Willett & Sampson, 2013). Diet also includes meal patterns.

Behavioural Problems. This study drew on Ogden's (2009) definition of behavioural problems at school: "Behavioral problems at school is pupil conduct that breaks the school rules, norms, and expectations. This conduct prevents teaching and teaching activities and thereby impedes pupils' learning and development, and it makes positive interactions with others difficult" (p. 18). Ogden explicitly discussed that it is important to distinguish between normal behaviour and problem behaviour, where the frequency and intensity determines whether it is a behavioural problem. If the behaviour is disruptive then it is classified as a behavioural problem.

Socioeconomic Status (SES). According to Baker (2014), SES is a measure of individuals' economic and social status and tends to be positively associated with health. Generally, there are three common measures of SES: education, income, and occupation. In this paper, we only measured parental education as this is the factor that is most highly related to diet (Skardal et al., 2014).

Overweight. Self-reported weight and height were used to calculate body mass index ($BMI = kg/m^2$). The international cut-off points for BMI were used to estimate the prevalence of overweight adolescents (Cole, Bellizzi, Flegal, & Dietz, 2000).

Adolescent Questionnaire. Adolescents completed one questionnaire. The questionnaire asked adolescents to respond to questions about their meal patterns, school environments, learning experiences, and behaviour at school. The questionnaire also included a food frequency questionnaire (FFQ), assessing adolescents' diet. Questions in the FFQ included the following categories of food habits: beverages, yoghurt, breads and cereals, spreads, fruits and vegetables, desserts, and snacks. Each category contained 4-26 related foods. For each category, participants answered the question, *How often do you eat/drink...?* The frequency intervals ranged from *never* to *more than three times a day*. The adolescents could indicate their answers in *units per day*, *units per week*, and *units per month*. The questionnaire was tested for reliability and validated against 24-hour recall and biological markers as vitamin D and fatty acids (Øverby, Johannesen, Jensen, Skjævesland, & Haugen, 2014). Participants could indicate whether they frequently or seldom consumed food/drinks. Frequent consumption of soda with sugar was defined as drinking more than two bottles (1 bottle = 0.5 litres) per week. A high intake of fruits and vegetables was defined as eating 10.5 or more servings of fruit per week and 12 or more servings of vegetables per week. Frequent consumption of unhealthy food such as fast food and take-away was defined as having it one or more times per week. Meal frequency was ascertained by the question *How often do you eat breakfast each week?* with the same question asked for lunch, dinner, and supper (evening meals). In Norway dinners are often eaten at 5 in the afternoon and supper is eaten before bed time. Response alternatives ranged from never or seldom to 7 days a week, and were collapsed into dichotomized categories: having a meal frequently (defined as every day) and having meals

infrequently (defined as less than every day).

To measure the adolescents' behavioural problems at school, four self-reported questions were adapted from Roland (1998): (a) *Do you make so much noise in class that the teachers yell at you?*, (b) *Are you expelled from class because you make too much noise?*, (c) *Does your teacher write down your name because of bad behaviour?*, and (d) *Do you disturb the class to such an extent that other pupils in your class can't pay attention?* The questions had five response categories, ranging from 1 to 5: *never, seldom, sometimes, often, and very often*. The score of these questions yielded a sum from 4–20, where higher rates indicated more problems. The scores were collapsed into dichotomized categories: those not having behavioural problems at school (score: 4–9) and those having behavioural problems at school (score: 10–20).

Parent Questionnaire. The parent questionnaire included questions about parents' educational attainment, marital status, residential area, income, age, ethnicity, and family structure. To measure socioeconomic status, parents were asked about their educational attainment. The response alternatives were *9-year primary school or less; high school; college or technical school; college or university education equal to or less than 4 years; and college or university education equal to or more than 4 years*. These were collapsed into dichotomized categories: those with shorter periods of education (primary and secondary education) and those with longer periods of education (college or university education). We did not include questions regarding income or occupation.

Data Analysis

All statistical analyses were carried out

using SPSS version 19. Descriptive analyses were performed to present the characteristics of the participants with means and standard deviations. Independent sample *t*-tests and chi-square tests were used to explore differences across gender. Variables such as behavioural problems at school and consumption of take-away and fast food were not normally distributed. Thus, logistic regression was used to explore the association between behavioural problems at school and meal patterns and the other food groups. Behavioural problems were the dependent variable and meal patterns and dietary variables were chosen as independent variables. Odds ratios (OR) with confidence intervals (CI 95%) were given for each variable. Both crude (unadjusted) and adjusted (for sex, BMI, parental education) ORs are presented.

Results

Tables 1 and 2 show the characteristics of the participants and their dietary habits respectively. Of the 517 pupils who completed the questionnaire, 232 (44.9%) were identified as male and 285 (55.1%) were identified as female. An approximately equal distribution of boys and girls were classified as overweight (14% vs. 11% respectively; $p = 0.360$). More boys than girls had behavioural problems at school (13% vs. 2% respectively; $p \leq 0.001$). There were sex differences related to meal patterns and food consumption. More girls than boys ate breakfast frequently (79% vs. 69%, $p = 0.019$ respectively) and had evening meals frequently (49% vs. 36%, $p = 0.004$ respectively). More girls than boys ate vegetables frequently (54% vs. 44% respectively; $p = 0.017$). Boys drank soda with sugar more frequently compared with girls (43% vs. 19% respectively; $p \leq 0.001$). Boys' intake of unhealthy food such as fast food ($p = 0.026$) and take-away ($p \leq 0.001$) were higher than the girls' for both food groups.

Table 1
Characteristics of Adolescent Participants

Characteristic	N	All	Boys	Girls	p ^a
Age (year), mean (SD)	517	13.9 (0.3)	13.9 (0.3)	13.9 (0.3)	0.898
Weight (kg), mean (SD)	501	55.8 (10.3)	58.4 (11.6)	53.7 (8.6)	≤0.001
Height (cm), mean (SD)	510	167.3 (7.9)	170.7 (8.1)	164.4 (6.6)	≤0.001
Overweight*, N (%)	499	64 (12.8)	32 (14.3)	32 (11.6)	0.360
Behaviour problems, N (%)	509	37 (13.1)	30 (12.9)	7 (2.5)	≤0.001

Notes. ^a = Independent sample t-test continuous variables and chi-square for categorical variables;

* = Overweight calculations defined by Cole et al. (2000)

Table 2
Dietary Habits of Adolescent Participants

Characteristic	N	Total N(%)	Boys N(%)	Girls N(%)	p ^f
Breakfast ^a	514	382 (74.3)	184 (79.3)	198 (70.2)	0.019
Lunch ^a	514	282 (54.9)	127 (54.7)	155 (55.0)	0.960
Dinner ^a	514	425 (82.7)	193 (83.2)	232 (82.3)	0.784
Supper ^a	514	215 (41.8)	113 (48.7)	102 (36.2)	0.004
Fruits ^b	516	259 (50.2)	106 (45.7)	153 (53.9)	0.064
Vegetables ^c	515	254 (49.3)	101 (43.5)	153 (54.1)	0.017
Soda with sugar ^d	517	155 (30.0)	101 (43.5)	54 (18.9)	≤0.001
Fast food ^e	513	54 (10.5)	32 (13.9)	22 (7.8)	0.026
Take-away ^e	513	38 (7.4)	28 (12.1)	10 (3.5)	≤0.001

Notes. ^a = Having meals every day; ^b = Having fruits 10.5 or more times a week frequently; ^c = Having vegetables 12 or more times a week frequently; ^d = Drinking more than two bottles per week. 1 bottle = 0.5 litres; ^e = Having unhealthy food one or more times per week; ^f = *p* values for Chi-square

Table 3 shows the associations between behavioural problems and dietary habits

(both crude and adjusted for sex, BMI, and parents' educational attainment).

Table 3

Crude (unadjusted) and Adjusted Odds Ratio (OR) for Behaviour Problems at School in Relation to Meal Patterns and Food Consumption

	Crude (unadjusted) OR (95 % CI)	p	Adjusted OR ^f (95 % CI)	p
Breakfast ^a	0.69 (0.34-1.43)	0.320	0.45 (0.06-3.11)	0.418
Lunch ^a	0.86 (0.44-1.68)	0.661	0.73 (0.16-3.24)	0.681
Dinner ^a	0.39 (0.19-0.82)	0.012	1.98 (0.22-17.59)	0.539
Supper ^a	1.18 (0.60-2.30)	0.636	0.72 (0.16-3.18)	0.539
Fruits ^b	0.73 (0.38-1.46)	0.388	1.78 (0.42-7.62)	0.437
Vegetables ^c	1.56 (0.79-3.07)	0.203	2.37 (0.53-10.56)	0.256
Soda with sugar ^d	3.86 (1.94-7.67)	≤0.001	5.49 (1.03-29.37)	0.046
Fast food ^e	4.33 (2.00-9.38)	≤0.001	4.29 (0.82-22.41)	0.084
Take-away food ^e	8.23 (3.72-18.21)	≤0.001	10.17 (1.55-66.73)	0.016

Notes. ^a = Having meals every day, ^b = Having fruits 10.5 or more times a week, ^c = Having vegetables 12 or more times a week, ^d = Drinking more than two, 0.5 litre bottles per week, ^e = Having unhealthy food one or more times per week, ^f = Adjusted for sex, BMI, and parents' levels of education

The crude (unadjusted) results show that adolescents who reported drinking soda with sugar frequently, OR: 3.86 [1.94–7.67], $p \leq 0.001$, had significantly higher odds of having behavioural problems at school compared with those who seldom drank soda with sugar. Frequent consumption of fast food, OR: 4.33 [2.00–9.38] $p \leq 0.001$, and take-away food, OR: 8.23 [3.72–18.21], $p \leq 0.001$, were significantly associated with increased odds of behavioural problems at school. Furthermore, regular consumption of dinner was significantly associated with decreased odds of behavioural problems at school, OR: 0.39 [0.19–0.82], $p = 0.01$.

Table 3 also presents the association adjusted for sex, BMI, and parents' educational attainment. Drinking soda with sugar, OR: 5.49 [1.03–29.37], $p = 0.046$, and eating take-away frequently,

OR: 10.17 [1.55–66.73], $p = 0.016$, remained significantly associated with increased odds of behavioural problems at school after adjustment. Eating fast food frequently, OR: 4.29 [0.82–22.41], $p = 0.084$, and dinner frequently, OR: 1.98 [0.22–17.59], $p = 0.539$, were not significant predictors for behavioural problems at school when the adjustments were made.

Discussion

This study showed that a high intake of soda with sugar and consumption of take-away and fast food were associated with increased odds of behavioural problems among adolescents at school. The findings support a previous Norwegian study which found that a high intake of sugar-sweetened soft drinks was significantly

associated with increased odds of behavioural problems at school among adolescents (Øverby & Høigaard, 2012). However, our study adjusted for parental education as an indicator of socioeconomic status, unlike the previous study. Furthermore, another study from Norway demonstrated that a high intake of sugar may lead to attention and conduct problems in children and that there is a dose-response relationship between hyperactivity scores and the number of soft drinks consumed (Lien et al., 2006). Given the additional negative impact sugar-sweetened beverages may have on diet quality (Øverby, Lillegaard, Johansson, & Andersen, 2004), the high intake of sugar among adolescents is of concern (Øverby et al., 2004). Although Norway offers food-based dietary guidelines that specifically focus on the reduction of sugar sweetened beverages (Norwegian National Council of Nutrition, 2011), age specific guidelines and a more rigorous focus on health promotion in school is warranted.

Previous research also suggests, as does the present study, that intake of junk food may be related to behavioural problems, especially attention deficit hyperactivity disorder (Millichap & Yee, 2012; Park et al., 2012). This study did not specifically address ADHD, but explored general behaviour problems. There has been an increase in snacking and consumption of meals away from home and a shift toward higher consumption of fast food and processed foods (Lachat et al., 2012). Frequent dining in fast food restaurants also has been associated with higher energy and fat intake among adolescents (Sebastian, Wilkinson, & Goldman, 2009). Moreover, researchers have found that adolescents consume more servings of soft drinks, cheeseburgers, french fries and pizza, and fewer servings of fruits and vegetables (Øverby et al., 2004; Sebastian et al., 2009). The data suggest that an increased focus on healthy food preparation at home may counter the increase in fast food consumption. For

example, Lichtenstein and Ludwig (2010) argue that reinstating classic home economics courses that focus on food preparation skills could contribute to reductions in take-away food consumption and adolescent obesity. Our study indicated that take-away food is also associated with behavioural problems at school, which only adds to the importance of educating adolescents on food preparation.

The results of our study suggest that not only are particular foods associated with adolescent behaviour at school, but the regularity of meals may also be significant. Interestingly, our study found that having dinner frequently, (i.e., daily), was significantly associated with decreased odds of behavioural problems at school in the crude (unadjusted) analysis but not when adjusting for sex and parental socioeconomic background. Having family meals has been shown to reduce adolescents' levels of engagement in various risk behaviours (Skeer & Ballard, 2013). In addition to providing a healthier food option, regular family meals may help to prevent behavioural problems by allowing for more open communication between adolescents and parents about everyday issues and sensitive and difficult topics.

Behavioural problems at school affect not only the person involved, but whole classes of children. Addressing lifestyle behaviours that are associated with behavioural problems is now important for all school stakeholders. One important stakeholder is the home economics teacher who teaches pupils how to prepare healthy diets for themselves and their future families. Several countries do not offer this subject anymore, leading some to argue that the subject should be brought back to the school curriculum (Lichtenstein & Ludwig, 2010). This study's results, and previous results showing diet's effect on learning and health, underline the importance of home economics in schools. However, as a healthy diet is fundamental for development and an unhealthy diet is

associated with behaviour problems and poor learning, we suggest that all teachers, not just home economics teachers, emphasize the importance of a healthy diet in their respective courses in order to improve the broader food environment at school.

The present study has some limitations. Misreporting and especially underreporting is a major problem in dietary studies among adolescents (Lioret et al., 2011; Livingstone, Robson, & Wallace, 2004). Young people may have low motivation and interest in reporting what they are eating and drinking (Livingstone et al., 2004). Another limitation is the low response rate from parents. Several parents consented to their children participating but did not answer the questionnaire themselves. The reason for this may be that they simply did not want to participate or that they had not seen the survey link after consenting to participate. Another limitation of this study is the cross-sectional correlational design, which cannot indicate causality. To demonstrate the temporal sequence of the relationship and determine causality, further longitudinal research examining dietary habits and behavioural problems as well as intervention studies are needed.

Despite these potential limitations, this study has several methodological strengths. It was a population-based study with a relatively high sample size and response rate among adolescents, with data from both adolescents and their parents. The educational levels of the parents were comparable to the general population in this age group, especially for the mothers

(Statistics Norway, 2016). Further strengths were that every school in the four different municipalities in Vest-Agder County (except for the combined schools, which are schools including both primary and secondary grades) was invited to participate. The participating schools came from communities that represented both urban (greater than 50 000 inhabitants) and rural (less than 5000 inhabitants) contexts, which allowed for variation in the sample. Because Norway is generally a homogeneous country, the results may be generalizable for Norwegian adolescents.

Conclusions and Implications

The current study demonstrated an association between diet and behavioural problems at school and identified specific dietary factors that contribute to this association. Frequent consumption of take-away food and sugar sweetened beverages yield higher odds of behavioural problems; having dinner frequently yields lower odds of behavioural problems at school. The study underlines the importance of a healthy diet in adolescence, not just for health, but for learning and social engagement in school. The study underlines the importance of improving adolescents' food preparation skills as part of nutrition education programs. We suggest a more rigorous focus on classical home economic teaching in school and additional research to explore the effects of home economic teaching on diet, health, and behaviour. In addition, we suggest that all teachers should have a minimum knowledge of healthy diets so that they can promote healthy living among their students.

Acknowledgments: This project was funded by the University of Agder in Norway.

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SCHOOL DEVELOPMENT PLANNING: A STRATEGIC TOOL FOR SECONDARY SCHOOL IMPROVEMENT IN RIVERS STATE, NIGERIA

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Abstract: *The challenge of improving secondary education to achieve the goals defined in the National Policy on Education (FRN, 2013) remains a daunting task. This study addressed the role of school development planning as a strategic tool for the improvement of secondary education in Rivers State, Nigeria. Three research questions and three hypotheses were used to guide the study. Stratified sampling technique was used to select 200 teachers from rural and urban schools in five local government areas of Rivers State. The Teacher Perception of School Development Planning and Improvement Questionnaire (TPSDPIQ) was used to collect data. The findings showed that, in general, teachers' perceptions about the significance of school development planning factors for secondary school improvement were strikingly similar. Specifically, the findings showed that: (a) teachers' perceptions about school development significantly predicted their perceptions about school improvement, (b) there was no significant difference between teachers' perception of school development planning across urban and rural schools, and (c) there was no significant difference between teachers' perception of school improvement across urban and rural schools. Recommendations included the development of a policy requiring all secondary schools in the state to have a school development plan for a specified period, as well as, having head-teachers, teachers, and community engage in developing the school plan.*

Keywords: secondary education, school development planning, school improvement

Introduction

As a developing nation, education remains a fundamental instrument in the quest for national development in Nigeria. In Nigeria's National Policy on Education, education is described as "instrument par excellence" and is accepted as the foundation for its national aspirations [Federal Republic of Nigeria (FRN), 2013]. The importance of education also is underscored by the United Nations' emphasis for Universal Basic Education (Ogbonda, 2016). Countries without strong educational foundations, especially at the basic level, run the risk of increased dependence and instability. United Nations Secretary General, Ban Ki-Moon, "confirms this when he noted that when young people have decent jobs, political weight, negotiating muscle and real influence in the world, they would create

better future" (Ogbonda, 2016, p. 77). Assisting young people to achieve those lofty aspirations is closely tied to countries' existing educational programs. In Nigeria, basic education leading up to junior secondary education is free and compulsory. Laws establishing the Universal Basic Education Programme (UBE), confirmed education as a right of all children and made it mandatory for every government in Nigeria to make educational programming available (FRN, 2004; Ogbonda, 2016).

In consolidating Universal Basic Education, secondary education (consisting of 3 years of senior secondary school) was targeted for preparing individuals for meaningful living within society and engagement in higher education (FRN, 2013). Specifically, secondary education should accomplish

the following:

- i. Provide primary school leavers with opportunity to access education at a higher level;
- ii. Offer diversified curriculum to cater for various talents, opportunities and future roles;
- iii. Provide trained manpower in the applied sciences, technology and commerce at professional levels;
- iv. Inspire students to achieve excellence;
Provide technical knowledge and vocational skills. (FRN, 2004, p. 18)

Secondary education, defined as the education that children receive after primary education and before tertiary education, is expected to equip pupils for survival in the society and beyond.

Reforms associated with Universal Primary Education launched in 1976, Universal Basic Education launched in 1999, and the Millennium Development Goals launched in 2000, profoundly impacted the provision, access, quality, and management of secondary education in Nigeria. Secondary schools were required to admit more pupils without corresponding increases in the number of teachers, spaces, equipment, facilities, and funding. This situation created a crisis in which secondary education in Nigeria was ranked 120-out-of-144 in the World Economic Forum's Global Competitiveness Report Index (Adamolekun, 2013). The massive enrolment of pupils came with enormous challenges that threatened the ability of secondary education to achieve its goals. Today, the crisis remains visible. In Nigeria, where five credits (including English and Mathematics) are the baseline for admission to tertiary institutions, there has been a decrease in tertiary admissions. This is because candidates were unable to obtain the requirements needed to qualify them for entry. For instance, Adamolekun (2013) and Adawo (2011, p. 46) observed that secondary school students were not

able to perform well on the *West African School Certificate Examination (WASCE)*. They further observed that only 23% of students had five credits in 2008, 26% in 2009, 24% in 2010, 31% in 2011, and 39% in 2012. These yearly performances in the school certificate examinations are considered poor. By implication, these were the only students qualified to gain entry into tertiary education, with few people gaining further qualifications. Adawo (2011) observed that human capital acquired from primary school education was statistically more significant for the growth of Nigeria's economy than was human capital acquired from secondary education. By extension, graduates of secondary education are not positioned to gain meaningful employment more than graduates of basic education. Taken together, secondary education seems not to be achieving its goals of preparing graduates for the workplace, meaningful living, and tertiary education (Tenebe, 2011).

Decline of Secondary Education

Decline in secondary education in Nigeria is a concern for educational managers, parents, policy makers, and politicians (Agi & Yellowe, 2013; Ololube, 2009; Tenebe, 2011). There are a number of factors that can either be held accountable or contribute to the downward trend in the performance of secondary education in Nigeria including challenges related to teacher quality (Ololube, 2009), educational leadership (Keller, 2015; Okeke, 1986), equipment and infrastructure, policy implementation (Okoroma, 2000) and school location (urban and rural). According to Ogbonda (2016), policies are not implemented in the same way across the two strata. This dichotomy has contributed to poor implementation. Other factors include lack of strategic planning (Okeke, 1986; Okoroma, 2000) and lack of curriculum quality and delivery (Agi & Yellowe,

2013; FRN, 2013; Okeke, 1986; Ololube, 2009; Tenebe, 2011).

While all these factors may be important in improving secondary education, there is a need to prioritize planning in secondary education. This is because planning any activity before action ensures that decisions are reached only after considered and careful analysis of the situation and all relevant factors. In other words, a school plan arrived at through decision making takes account of the factors identified as contributing to school improvement.

This study explored the use of school development planning as a strategic tool for improving secondary education in Rivers State.

School Development Planning

School development planning is a strategic roadmap used for addressing school improvement and effectiveness in order to achieve school goals. It is a process in identifying priorities, and determining the human and material resources needed for school improvement (Agi & Yellow, 2012). School development planning is a useful guide for sustainable and progressive schools. School development planning involves developing a quality framework for school governance instead of school management (Ontario Ministry of Education, 2005). Schools initiating development planning work under the following assumptions:

- a) That schools are best placed to identify areas needing improvement;
- b) That quality education results from a mix of factors that are deliberately planned;
- c) That education is a partnership venture requiring input from quality representation; and
- d) That school requires committed leadership that possesses expertise and collective experience (Department of Education Ireland, 1999; Department of

Education, Northern Ireland, 2010; National High School Centre, 2013).

School development planning primarily focuses on curriculum delivery, school environment, and parental involvement. The Government of Ireland (1999) defined school development planning (SDP) as “a process undertaken by the school community to give direction to the work of the school in order to ensure that all pupils receive quality education in terms of both holistic development and academic achievement. School development planning promotes school improvement in several ways including:

- a) Supporting systematic self-evaluation that enables the school community to identify priorities, progress, and prepare adequately for the future;
- b) Directing school efforts for quality education and schooling;
- c) Supporting professional development for school staff;
- d) Partnering in school development;
- e) Mobilizing and optimizing school and community resources; and
- f) Supporting change and innovation [Department of Education, National High School Centre, 2013; Organization for Economic Co-operation and Development (OECD), 2004; Ontario Ministry of Education, 2005; Stringer & Hourani, 2016].

Problem Statement and Research Questions

Many researchers, parents, teachers, administrators, educational practitioners, and other stakeholders believe that the standard of secondary education in Rivers State has declined dramatically, with many students failing to pass school certificate and qualifying examinations (Agi & Adiele, 2011; Ogbonda, 2016). This has led to the question as to whether proper preparation and planning of educational activities takes place in secondary

education. School development planning may be a fundamental step to reverse this trend and achieve the goals of secondary education, as it is a holistic process that prompts the school community to use its available resources to focus on its mission. Therefore, the focus of the paper is to investigate the effectiveness of school development planning strategy in improving schools.

Research Questions

The following research questions guided this study:

RQ1: What are teachers' perceptions about school development planning?

RQ2: What are teachers' perceptions about school improvement?

RQ3: Do teachers' perceptions about school development planning predict their perceptions about school improvement?

RQ4: Do teachers' perceptions of school development planning differ across urban and rural schools?

RQ5: Do teachers' perceptions of school improvement differ across urban and rural schools?

Hypotheses

The following null research hypotheses were tested in the study:

H₀₁: Teachers' perceptions about school development planning do not significantly predict their perceptions about school improvement.

H₀₂: There is no significant difference between teachers' perceptions of school development planning across urban and rural schools.

H₀₃: There is no significant difference between teachers' perceptions of school improvement across urban and rural schools.

Methodology

This research study involved the use of descriptive survey. The population consisted of all 10056 public secondary school teachers in Rivers State. A sample size of 200 was selected through stratified random sampling techniques. First, the schools were stratified into urban and rural schools, with 10 schools selected from each strata. The simple random sampling technique then was employed to select 10 teachers from the 20 selected schools in the five local government areas in Rivers State, Nigeria. A researcher-designed questionnaire entitled, *Teachers' Perception of School Development Planning and Improvement Questionnaire (TPSDPIQ)* was used to collect data from respondents.

The instrument consisted of a 4-point Likert scale where 4 = strongly agree, 3 = agree, 2 = disagree, and 1 = strongly disagree. The scoring format involved provided a response of SA with 4 points, with scores of A, D, and SD being provided 3 points, 2 points and 1 point respectively. The instrument consisted of three sections: Section A, Section B, and Section C. Sections A included questions about teacher demographics while Sections B and C included questions assessing teachers' perception of school development and school improvement respectively. The instrument contained 25 items. The instrument was validated by lecturers in the Department of Educational Foundations/Management in the Faculty of Education at Ignatius Ajuru University of Education Port Harcourt Rivers State Nigeria. The Cronbach's alpha for the *TPSDPIQ* was 0.80. Means and standard deviations were used to determine teachers' perceptions.

Findings and Discussion

Descriptive statistics (means and standard deviations) for participants' responses to

the *TPSDPIQ* are presented in Tables 1 and 2. Regression analyses were carried out to determine whether there was a significant predictive relationship between teachers' perceptions about school planning and their perceptions about school improvement (Figure 1). Finally, independent *t*-tests were carried out to determine if there were significant differences in teachers' perceptions of school planning and school achievement across urban and rural schools (Tables 3 and 4 respectively). All tests were set at 0.05% level of significance.

Teachers' Perceptions of School Development Planning

Table 1 lists teachers' response frequencies and related descriptive statistics for their perceptions of school development planning. The results from Table 1 indicate teachers' mean rating of perception of school development planning ($M = 3.07, \pm 0.46$). The 95% confidence interval ranged from 3.01 to

3.14. The findings showed that 113 (57.07%) respondents strongly agreed and 65 (32.8%) agreed that their school has a clearly defined mission statement ($M = 3.42, SD = 0.81$). One hundred and nine participants (55.05%) strongly agreed and 70 (35.35%) agreed that their schools had a clearly defined vision. One hundred and five (53%) teachers strongly agreed and 78 (39.39%) agreed that their schools focused on curriculum delivery strategies, school environment, and parental involvement ($M = 3.41, SD = 0.76$). Seventy-eight (39.39%) teachers strongly agreed and 95 (47.98%) agreed that the school has clearly defined priorities ($M = 3.20, SD = 0.82$). Fifty-six (28.28%) participants reported strongly agreeing and 86 (43.43%) reported agreeing that their schools had clearly defined policies on students and staff welfare (guidance/counseling) ($M = 2.82, SD = 1.03$). Eighty-four (42.42%) participants strongly agreed and 75 (37.88) agreed that schools involved parents, students, teachers and PTA in their planning.

Table 1
Frequencies, Means, and Standard Deviations for Teachers' Perceptions of School Development Planning (N=198)

Item	SA	A	D	SD	M	SD	LB ^a	UB ^b
The school has a clearly defined mission statement.	113	65	10	10	3.42	0.81	3.31	3.53
The school has a clearly defined vision.	109	70	8	11	3.40	0.81	3.29	3.51
The school has clearly defined policies on admission, access, special needs students, discipline, bullying, learning and teaching processes, human rights.	62	96	14	26	2.98	0.96	2.85	3.11
The school has clearly defined policies in participation, involvement, stake holding, collaboration.	56	99	29	14	2.99	0.85	2.88	3.11
The school has clearly defined policy on students and staff welfare (guidance/counseling).	56	86	21	35	2.82	1.03	2.68	2.97
The school is focused on curriculum delivery strategies, school environment and parents' involvement.	105	78	6	9	3.41	0.76	3.30	3.52
The school has clearly defined priorities.	78	95	12	13	3.20	0.82	3.09	3.32

The school has clearly defined action plan.	42	125	16	15	2.98	0.77	2.87	3.09
The school has performance targets.	71	102	12	13	3.17	0.81	3.05	3.28
The school has strategies for implementing plan.	49	110	20	19	2.95	0.86	2.83	3.07
School has timeline for action and priorities.	66	97	20	15	3.08	0.86	2.96	3.20
School has defined responsibilities for implementation of development plan.	76	89	14	19	3.12	0.91	2.99	3.25
School has phase for action plan.	32	120	30	16	2.85	0.79	2.74	2.96
School has indicators of success/status update.	44	112	20	22	2.90	0.87	2.78	3.37
School has opportunities for revision.	82	96	10	10	3.26	0.78	3.15	3.37
Subject planning issues, learning outcome, assessment procedures and learning support are clearly defined and outlined.	82	97	11	8	3.28	0.75	3.17	3.38
School involves parents, students, teachers and PTA in planning its programmes and effort towards success.	84	75	15	24	3.11	0.99	2.97	3.24
School synergizes with industry and civil society for physical environment.	23	86	38	51	2.41	1.00	2.27	2.55

Notes: ^a = Upper Beta ^b = Lower Beta

The findings revealed that teachers were aware and approved of the nature of school development planning in secondary schools in Rivers State. Secondary education depends on, and adheres strictly to, national guidelines for curriculum implementation and delivery (Agi, & Yellowe, 2012; FRN, 2004). Onojerena (2014) noted that curriculum implementation in Nigerian secondary schools includes program implementation and change strategies that are essential for growing and improving schools. Secondary development planning is part of the leadership construction as schools engage in curriculum reforms, which according to Olibie (2010), involves “increasing the focus on school visions, decisions, communities, communication processes and students’ outcomes by improving the capacity of teachers and others to work together” (p. 86). Teachers’ responses suggested that school development planning is prevalent in secondary schools in Rivers State

irrespective of school location. However, a deliberate policy in school development planning may be lacking.

Teachers’ Perceptions of School Improvement

Frequency and mean scores for teachers’ perceptions of school improvement are listed in Table 2. Teachers’ perception about school improvement was $M = 2.94$, $SD = 0.53$. The 95% confidence interval ranges from 2.86 to 3.01. One hundred and sixty (80.80%) respondents either strongly agreed or agreed that their schools were identified by school board and educational authorities as models to be copied ($M = 3.12$, $SD = 0.87$). Fifty-one (25.75%) teachers strongly agreed and 115 (58.08%) agreed that there was sustained increase in academic achievement as a result of school development planning ($M = 3.01$, $SD = 0.82$). Sixty-one (30.80%) participants strongly agreed and 97 (48.99%) agreed

that the emphasis on school culture and values created an orderly atmosphere for studies ($M = 2.97$, $SD = 0.96$). Sixty-six (33.33%) participants strongly agreed and 82 (41.41%) agreed that students, teachers, parents, and the school community were highly motivated to participate in school

development programs ($M = 2.95$, $SD = 0.99$). Seventy-five (37.88%) strongly agreed and 85 (42.92%) agreed that their schools were identified by educational school boards and authorities as models.

Table 2
Frequencies, Means, and Standard Deviations for Teachers' Perceptions of School Improvement (N=198)

Item	SA	A	D	SD	M	SD	LB ^a	UB ^b
There is sustained increase in academic achievement resulting from school development planning.	51	115	15	17	3.01	0.82	2.89	3.13
The emphasis on school culture and values has created an orderly atmosphere for studies.	61	97	13	27	2.97	0.96	2.84	3.10
Students, teachers, parents, and school community are highly motivated to participate in school improvement.	66	82	24	26	2.95	0.99	2.81	3.09
Staff professional development and leadership capacities are noticed.	53	91	26	28	2.85	0.97	2.72	2.99
Staff and students take responsibility for their actions and ownership for program successes and failures.	40	103	17	38	2.73	0.99	2.59	2.87
School is noticed as outstanding within and outside the school district.	53	103	16	26	2.92	0.93	2.79	3.06
School is identified by educational school board and authorities as a model.	75	85	25	13	3.12	0.87	3.00	3.24

Notes: ^a = Upper Beta ^b = Lower Beta

These findings corroborate the assumption that strategic plan developed by the school in the process of attaining school goals and objective is critical to school improvement. (Hanover Research, 2015; Pipkin, 2015) Properly articulated plans define school vision, mission, goals and objectives through sincere assessment of school needs, challenges, and strength (Hanover Research, 2015; Pipkin, 2015). Strong school culture and climate that motivates teachers and students to achieve derives from the missions and visions that schools pursue (Hanover Research, 2015; Hoy & Miskel, 2008). School improvement therefore depends on the strategic plans the school community has put in place.

Perceived Relationship Between School Development Planning and School Improvement

There was a significant, positive relationship ($r = .35$) between teachers' perceptions of school development planning and school improvement (Figure 1). Multiple regression was used to test whether the teachers' perceptions of school development planning predicted their perceptions of school improvement. The results of the regression indicated that school development planning (SDP) and school improvement planning (SIP) explained 35.1% of the variance, $R^2 = .35$, $F(1,196) = 106.02$, $p = .001$. It was found

that school development planning (SDP) significantly predicated school improvement planning ($\beta = .592$, $p =$

.001). The null hypothesis was rejected at .05 alpha level.

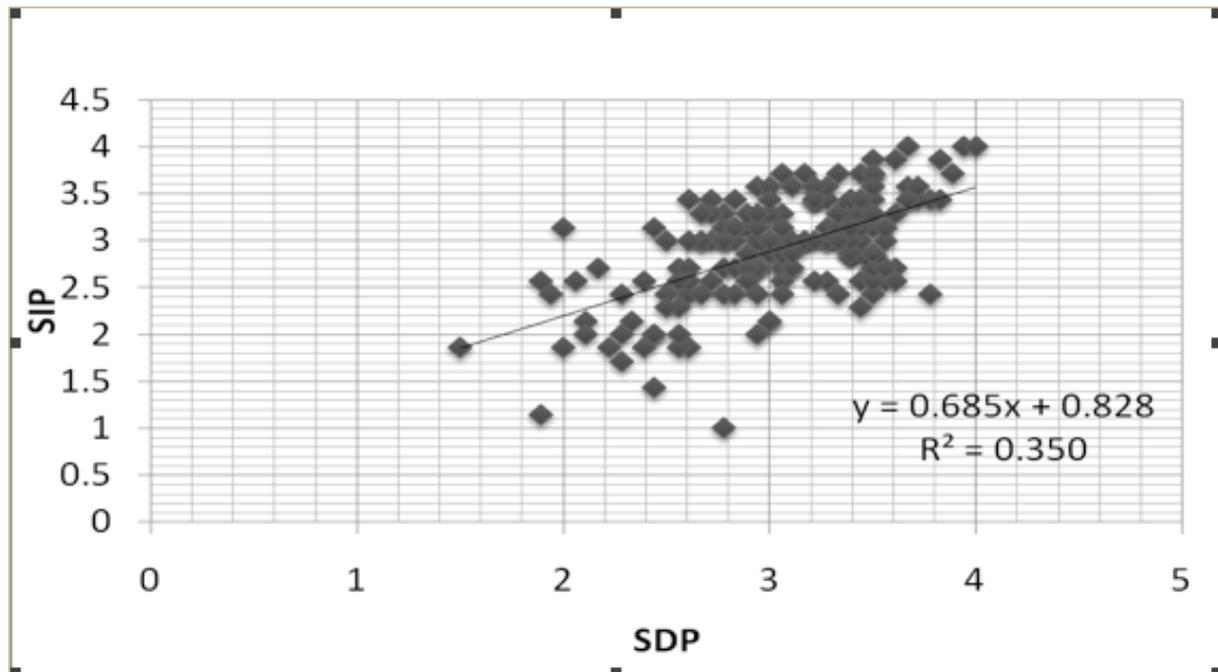


Figure 1. Relationship between teachers' perceptions of school development planning and school improvement.

The finding supporting the link between school development planning (sometimes referred to as strategic planning) and school improvement is well established (Agi & Yellowe, 2012; Hanover Research, 2015; Hoy & Miskel, 2008; Lunenburg & Ornstein, 2008; Pipkin, 2015). School strategic plans provide schools with clear pathways to operationalizing curriculum and achieving specific school objectives and goals within a specifically defined environment. This pathway depends on the model(s) for school improvement that schools choose to adopt in context of their peculiar circumstances (Hanover Research, 2015). Arguably, every school requires a development plan just as

planning is essential for the sustainability of every organization.

School Location

One hundred teachers in urban settings ($M = 3.07$, $SD = 0.47$) and 98 teachers in rural settings ($M = 3.08$, $SD = 0.46$) agreed about the importance of school development planning. The results of an independent sample t-test (Table 3) indicated that urban and rural teachers did not differ significantly in their perceptions of school development planning, $t(196) = .176$, $p = .860$. Thus, the null hypothesis was not rejected at .05 alpha level.

Table 3

Summary of t-test of Teachers' Perceptions of School Development Planning by School Location

Location	N	M	SD	t-value	df	p
Urban	100	3.07	0.47	-.176	196	.86
Rural	98	3.08	0.46			

One hundred teachers in urban settings (M = 2.99, SD = 0.49) and 98 teachers in rural settings (M = 2.88, SD = 0.57) agreed about the importance of school improvement planning (Table 4). The results of an independent sample t-test

indicated that urban and rural teachers did not differ significantly in their perceptions about school improvement, $t(196) = 1.49$, $p = .139$. Thus, the null hypothesis was not rejected at .05 alpha level.

Table 4

Summary of t-test of Teachers' Perceptions of School Improvement by School Location

	N	M	SD	t-value	df	p-value
Urban	100	2.99	0.49	1.485	196	.14
Rural	98	2.88	0.57			

The implications of the findings Tables 3 and 4 are significant for the curriculum and training for teachers and suggests that teachers everywhere, when well equipped, can be engaged and motivated to participate in leadership, curriculum initiative, learning improvement, and school planning (Bell & Stevenson, 2015; Gruenert, & Whitaker, 2015; Obanya, 2004).

Recommendations and Conclusion

Secondary education remains a critical level of Nigeria's educational system. Its role in preparing pupils for meaningful engagement in society and for tertiary education is well defined in the National Policy on Education. The ability of secondary education in achieving these noble goals is in doubt and remains a major challenge for stakeholders. A number of issues, including those internal and external to schools, are usually identified as contributing to challenges related to secondary education effectiveness and performance. Lack of

emphasis on school development planning is identified as one of those problems (Agabi, 1999; Agi & Adiele, 2011).

This study explored the perceived impact of school development planning on school improvement from the perspective of practicing teachers. The findings of the study revealed that teachers from urban and rural locations perceived that their schools included some elements of school development planning but that more planning is vital for secondary school improvement in Rivers State. What is now required is a deliberate policy that enshrines school development planning for school improvement in the education policy document of the country.

It is therefore recommended that school development planning at the secondary education level must be a deliberate policy and enshrined in laws governing education in Nigeria. The Federal Ministry of Education should have a deliberate policy requiring schools to create a school development plan for specified intervals.

Teachers' job descriptions should include involvement in the cooperative production of school development plans. Government should allow significant autonomy to reside in the schools, to enable school principals to initiate school development plans. District school boards should be responsible for no more than ten secondary schools for proper supervision and participation in school development

(vicinity management). Government should provide secondary schools with all resources needed for long-term planning. Head teachers and teachers in secondary schools should engage regularly in refresher courses in school redevelopment and improvement. Finally, the roles of community and other relevant stakeholders should be defined and mobilized in the school development and planning process.

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Future Issues and Submission Deadlines

2017 (Volume 21, Number 2)

Theme – *Global citizenship education* was the theme chosen by the conveners of first Asia-Pacific Regional ISfTE conference, held in Kuala Lumpur, November 2016. For JISTE publication, participants are invited to revise their seminar papers, attending carefully to the manuscript and publication guidelines, and submit them to the journal for consideration. Other members of ISfTE are similarly invited to submit articles for this issue. Members are encouraged to co-author articles with their students or colleagues who may not be members of ISfTE. Some articles in this edition could have been submitted for the 21.1 edition of JISTE.

Deadline for Submission has passed: Publication by December, 2017

2018 (Volume 22, Number 1)

Theme – *Education: Teaching and Learning for the Future* is the theme chosen by the conveners of the 38th seminar for ISfTE held at Aarhus University, Denmark, April 2017. For JISTE publication, participants are invited to revise their seminar papers, attending carefully to the manuscript and publication guidelines, and submit them to the journal for consideration. Book reviews on the theme are also invited.

Deadline for submission: September 15, 2017 – Publication by May/June 2018

Front Cover

These institutions' logos appear on the front cover of this issue: University of South Africa, UNISA sponsored the ISFTE seminar in 2016. The other four institutions – Aarhus University, Hong Kong Baptist University, Weber State University, and Brock University – support JISTE with their on-going sponsorship and/or support through the work of editors and other officials of ISFTE. If other institutions would like to participate, please contact the journal's editor, Karen Bjerg Petersen.

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