USING OPEN LEARNING RESOURCES – THE DIFFERENCE BETWEEN TEACHERS OF DIFFERENT DISCIPLINES, GENDER, AND ROLES IN SCHOOL

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ABSTRACT

This study examines gender differences and teacher's profession in teachers' use of open learning resources. It aims to help understand the way Open Educational Resources (OER) should be assimilated in the education system. This study was conducted in a qualitative research approach that checked correlations between variables. The research participants are 76 teachers from various schools, about half of them from a vocational school chain and the other half are from academic schools. The results show that teachers of technological subjects use open educational resources more than teachers of humanities do. Gender differences were found in the use of open learning resources. Among male teachers there was greater use of open learning resources than among female teachers.

Keywords: Open Educational Resources, Learning Object Repositories, Primary Sources, Professional Development.

INTRODUCTION

This study examines gender differences and the teacher's profession in teachers' use of open learning resources. It aims to help understanding the way Open Educational Resources (OER) should be assimilated in the education system. The research questions are: Is there a difference in the usage of open educational resources between teachers of different disciplines? Is there a difference in the usage of open educational resources between the genders? Is there a difference in the usage of open educational resources between teachers with different roles at school?

1. Theoretical Background

The modern world is in the midst of a technological revolution in the fields of communication and information. Many disciplines are changing their nature in light of the technological changes generated by this revolution. People's life in this age encompass features that are entirely different from those of people who lived in our world a decade ago. The education system too has become an essential part of these transformations and it must adapt itself at the pace of these changes. Beyond the challenges, development of thinking processes and building innovative and constructivist teaching processes (Shamir-Inbal & Kelly, 2011), the paradigmatic revolution in education responds to the changes dictated to us by the information revolution and the changing world. The education system is required to generate changes in the teaching methods in order to educate graduates whose skills, competences, and abilities will comply with this changing world (Hilton, in Levy, 2010). From the conventional teaching method of knowledge delivery, the education should shift to pedagogy that is focused on learners, their needs and advanced inquiry competences.

Consequently, it is generally understood that the transformations in the modern world greatly affect paradigms in the world of education. According to Rotem and Avni (2011), viewing teachers' learning as a way of life, due to the accelerated introduction of frequent new technologies, constitutes part of that change. They argue that mature teachers engage in new experiences without

any apprehension. They demonstrate flexibility, investigate, initiate, and strive to create collaborative knowledge by means of the tools available to them, while being aware of ethical difficulties that confront them. This way of life necessitates teachers' deep commitment and openness and sometimes it seems that those teachers are topic figures that do not exist in reality. Mishra and Koehler (2008) maintain that teachers in the modern age also have to deal with multiple changes in the professional demands from them. Like other professionals, they have to adapt themselves the period whereby the needs of the world and accordingly the professional expectations from them, are changing. The education system has become a meeting point of 'digital natives' who are the pupils, in certain cases also the parents and sometimes even young teachers in their 20s and the 'digital immigrants' who are mainly teachers, principals, and extended educational team. This gap between those for whom technology is their 'mother tongue' and those for whom it is a 'foreign language' is the topic of a daily dialogue. Up to now, the teachers were the absolute source of information and hence the source of authority. They sometimes do not keep pace with the technological changes, do not speak the 'same language' as their pupils, and the gap is increasingly growing. Today, teachers have at their disposal digital learning materials that are offered free-of-charge, are open and accessible to any person who is interested in using them for the purpose of learning and teaching. There is no doubt that the more teachers expose and train themselves to be more technologically accessible, the better they will be able to use the open educational materials. This will upgrade the quality of their teaching and the learning climate in class (Hertz, 2012; Prensky, 2009).

These data highlight the importance of investigating teachers' attitudes towards technology-integrated teaching and, mainly, the distinction between young and older teachers and between notice and experienced teachers in the education system. These findings will shed light on issues associated not only with the assimilation of technology in the education system, but also in the assimilation of changes in teaching methods and in teachers' job perception.

2. Open Educational Resources – Definition

The Organization for Economic Cooperation and Development (OECD) defines open educational resources as "digital materials that are accessible and offered freeof-charge for any person – from teachers and students and up to independent learners, for their private use or for teaching, learning and research". Open educational databases encompass learning materials, development of programming tools, content use and distribution and even applied tools such as free user licenses (Ischinger, 2007, p. 30).

Hylén (2006) defines open educational resources as digital learning materials offered freely and with no charge to teachers, students and independent learners for use and reuse in teaching, learning and research. Moreover, these resources promote collaboration and reuse of these learning materials and enhance the potential to provide a strategic opportunity for improving the teaching and learning quality.

Hewlett Foundation Defines Open Educational Resources in the Following Way:

Teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge (Allen & Seaman, 2014, p. 38).

Ehlers (2011) presents a model according to which there is a relation between learning architecture and the use of open educational resources. The higher the learning level, the more efficient and effective the use of open educational databases, leading to more high-quality products, such as: writing an online manual by the students. Another model presented in Ehlers' study is the usage penetration model of open learning materials. The model illustrates a relation between the level of using open educational resources in teaching and learners' involvement. The higher the level of assimilation, the greater the level of learners' collaboration and involvement. The findings of Ehlers (2011) attest that an

efficient usage of open educational resources entails a higher teaching and learning quality. Moreover, appropriate assimilation among the teachers is highly important in order to facilitate a friendlier usage of learning databases (Shamir-Inbal & Kelly, 2011). McAndrew et al. (2009) argue that in spite of these and others terminological differences (Hylén, 2006), open educational resources are essentially digital assets (music, pictures, words, animations) grouped together in a logical structure by the course developer who added an open license to us. In other words, the content is available to all.

The scope of the open educational resources differs from one researcher to another. Pirkkalainen and Pawlowski (2010) for example, define open educational resources in a very wide way: "Every digital resource that can be accessed free-of-charge and used for educational needs" (p. 24). DeLangen and Bitter-Rijkema (2012) underscore that this concerns in fact a wide 'umbrella' term that can be used not necessarily for open materials, but also in a wider context of open education. That is, education open to all and performed by open learning materials.

Conole et al. (2010) present the following definitions in order to clarify the different distinctions:

- A learning object can range between a simple digital asset (e.g. a fragment of a text or a sound file) and more complex educational resources that integrate a wide variety of media, aiming to support a certain learning activity.
- Open educational resources are learning materials open free-of-charge for teachers and students. The emphasis is on the fact that they are open for use and reuse.
- A learning activity consists of a series of assignments performed by the learners either individually or in groups, while using a certain series of resources in order to obtain directed learning results.
- A learning design is a research field that develops methods, tools, and resources for encouraging teachers to make an informed and better pedagogical usage of technologies.

These definitions expose some of the tensions associated with the definition of open educational resources (Camilleri et al., 2014):

- Nature of the resource: Certain definitions limit the definition of open educational resources to digital resources whereas others maintain that any educational resource can be included in this definition.
- Sources of the resource: While some of the definitions require that the resource should have an explicit educational objective, other definitions expand this requirement, specifying that any resource that can be used for learning may be included.
- Level of openness: Most of the definitions require that the resource should be found in a public domain. Other definitions maintain that this domain should serve only for educational purposes or that it is not used commercially.

Nevertheless, all the definitions have several common features. They all concur that open educational resources include use and reuse as well as matching of the resources: offer free use for educational purposes by teachers and learners; encompass all the types of digital media (Camilleri et al., 2014).

The guiding lines document issues by the OECD (Ischinger, 2007) divides the open educational resources into three groups:

- Publications open to public access: Professional papers and so on, published in the empirical literature or in journals and they can be unlimitedly accessed on the Internet, for example on Google Scholar.
- Educational databases: Course materials, syllabi, teaching aids, assessment aids, software programs and simulators.
- Open license: To texts, multimedia and so on, for example on YouTube.

Clements and Pawlowski (2012) characterize five stages of using open educational materials: the research stage – the users, teachers, or students, check where and how they can find resources that are suitable to their use; the assessment stage-examining whether the resources

match the teaching context and whether they comply with the objective to which they have been designed; the compliance stage – changing the educational resource for use in the required context as well as combination with other or additional sources; the usage stage – using the new resource that is adapted to the need that it satisfies; the sharing stage – the last and most advanced stage, whereby the adapted resource is shared.

For the purposes of this study, materials that meet the following criteria are considered as open educational resources (Camilleri et al., 2014):

- The materials were produced or distributed especially for usage in the formal or non-formal education.
- The materials were used as course materials in a theoretical course or educational program.
- The materials are included in a materials database designed to support formal or non-formal education.

3. Advantages versus Disadvantages of using Open Educational Resources

Cohen et al. (2013) indicate that the usage of open educational resources renders education accessible to everyone, encourages collaborative patterns of creation, and enhances flexibility in the learning process. Yuan et al. (2008) stipulate that using learning databases accounts for the improvement of teaching processes by means of use and reuse of available teaching materials. Another advantage resides in the availability of materials that facilitate experiential learning and acquisition of knowledge combined with pleasure and communication. Petrides et al. (2010) found that teachers who participated in activities that exposed them to open learning databases, collaborated in curricular activities as well as shared more with their colleagues' materials and creative teaching ways to which they had been exposed. The mutual feedback embodied in the exposure to educational databases on the web can be considered as a move that reflects the overall social processes of the global village that the world is undergoing today.

In addition to the advantages encompassed in the open databases, the empirical literature indicates several difficulties that should be considered. First, the difficulty to adapt materials to specific learner populations with needs that are different from those for whom the material was originally designed. This entails a low reuse of learning materials (Hilton et al., 2012). Second, there are difficulties in the assessment of the information reliability and quality. A controlled, and checked reuse, adjusted to the specific learner population' needs for educational resources from the web, undoubtedly encompasses a huge potential as part of the culture resolution of interactive collaboration on the Internet (Cohen et al., 2013; Hsu et al., 2012).

It is noteworthy that the educational potential is intertwined with a challenge of proper assimilation of social websites in the education system. The problems of reducing the face-to-face communication that involves the infiltration of computerized projects must not be disregarded. Moreover, teachers' ability to accept criticism and protect their attitudes is limited since they are not sole owners of knowledge, but are mediators in the learning process.

4. Patterns of Open Educational Resources

Many models have been suggested for the purpose of describing the ways of using open educational resources.

The 4 R's Model, conceived by Hilton and Wiley (2010), relates to the openness level of the resources and distinguishes between four levels of reuse: individual use of the material without making any changes (Reuse), distribution of the learning materials (Redistribute), usage of the learning material while changing it (Revise), and integration of different learning materials in order to create a new product (Remix). Hilton and Wiley (2010) describe the usage of the open educational materials in a shape of an inverted pyramid. At the sharp end of the pyramid, only the reuse is positioned; at the middle level are the individual use and the distribution as well as the reuse of the materials; and at the pyramid wide basis, i.e. the third stage, are introduced also making changes in the learning material and integrating the materials and thus, creating a new resource. Hilton et al. (2010) added to the 4 R's Model several elements that affect the openness of the open educational resources, mainly on the Revise and Remix levels. If a body that provides open educational resources allows people to use its resources, it needs also to consider supplying technical tools to people so that they can adapt

the resource to their needs. Wiley (2009) developed the ALMS (Access, Level, Meaningful, Source) analysis framework as a pattern for reflecting about aspects of educational resources openness: Access to editing tools; Level of expertise necessary for revising or remixing the materials; Meaningful editing; and Source-file access.

Hilton et al. (2010, p.9) argue that changing the open educational resources and creating new materials will be easier for teachers if they are easy to edit, if access is granted to the source files and if they can be edited by a wide variety of software programs known to many people. Wiki, for example, is a difficult format that not everybody is willing to invest time and efforts in order to learn it. Conversely, HTML is a user-friendly format for many people.

Clements and Pawlowski (2012) described the way of using open educational sources in five stages: search, assessment, adaptation, use, and sharing. At the search stage one has to ask: where and how do teachers find resources for use? At the assessment stage one should ask: Are the resources suitable for teachers' use? At the adaptation stage one has to ask: Can they be adapted according to the context? At the use stage, the question should be: Is the educational resource adapted to the use and the context and can it be integrated with other resources? At the last stage, sharing, the adapted resource is shared with the community. Stages 1-4 are stages of simple use, while stage 5 is a stage of advanced use. Many studies attest that the main usage teachers make of open educational resources is simple and only few teachers apply an advanced use (Clements & Pawlowski, 2012; Richter et al., 2013). It can be said that when they use open educational resources, most teachers mainly use it on a level of initial use. Only a few of them create new sources and share them with their colleagues.

4.1 The use of Technology in the Education System

Preparing students to cope with the changing demands, both as employees and citizens at present and in the future, constitutes a primary challenge in modern education systems of our age. The acquisition of suitable skills and competences is an assignment that necessitates the adjustment of the education system to the requirements of the future. These skills include mastery of one's mother tongue and foreign languages, mathematical, scientific, technological and digital capabilities, cultural and social skills, learning competences, critical reflection, and entrepreneurship. The entirety of these skills builds adults that can use technological, social and cultural tools, communicate and make decisions while assessing the risks as well as initiating and solving problems. Thus, these adults can take an active part in the modern society.

The use of technologies and, mainly, information technology in the education system, is perceived as leverage for structuring an advanced and innovative pedagogy that improves the learning methods. Moreover, Salomon (1997), specifies that these innovative technologies reflect the constructivist approach to education that advocates putting the learner at the center of the learning process. Since the online process embodies a real interaction between learners and the learning materials, knowledge is built by an active rather than passive way. Salomon argues that the scope and quality of materials learnt by these computerized technologies exceed those of materials learnt by any other technology.

4.2 Assimilation of Technology Among Teachers

The OECD (Ischinger, 2007) specified four stages in the dynamics of assimilating the education systems changes in general and innovative and technological changes in particular. These stages have emerged since education systems tend to be associated with bureaucratic, frequently awkward working patterns. They require not only the development of need-complying tools, but also recruitment of partners, coordination between varied hierarchical bodies inside, and outside the system as well as clear and dictated laws.

At first, prior to the introduction of the change, at the coming-into-being stage, it is necessary to create acquaintance and collaboration of all the bodies, map needs and difficulties and classify them. Then, at the initial stage, feasibility is checked in the dimensions of organization and management, knowledge, sources and scientific-professional dimension. Only after this stage, is the innovation integrated into the texture of the education system, through negotiation with the reality in the field. This includes the needs, general context of the curricula and

the teachers and, naturally, consolidation, additional adaptation and development. The last stage is in fact the survival stage that constitutes the real challenge, at which the assimilated innovation as well as the relationship it develops with the system within which it is functioning are examined. Will the introduced change survive and be able to adapt itself to the field over a period of time? Will it be able to continue and change? Will it be affected by and impact the field? Will it develop or remain stable, or perhaps disappear?

Such innovation process can also be the assimilation of technology in the education system. When examining the assimilation of using open educational resources, it should be asked at what stage and in which relationship the specific change is positioned. Barak et al. (2011) investigated science teachers' job perception and its relation to their teaching strategies. Their study found that the use of advanced technologies in teaching might help teachers in choosing or developing assignments that are relevant to their students' daily life and thus increase their motivation for learning. Moreover, another advantage of using advanced technologies is teachers' ability to follow up and closely guide the students during the performance of the assignment, improving their final product. The teachers' personal attitude towards the students, increases the latter's personal involvement in the learning process as well as contributes to the positive drive. From the teachers' viewpoint, using advanced technologies in teaching, creates a window of opportunities for applying new teaching methods. Teachers who had experienced assimilation of technologies in teaching, used strategies that involved demonstration, inquiry-based learning, problem solution, and reflective learning. These skills expand the knowledge and the option given to students to experience them and develop them will most certainly benefit them outside the education system too.

A successful assimilation depends also on teachers' professional training. When teachers are not sufficiently qualified to properly use a tool, this might slow down the learning pace in class. When teachers are busy in operating the tools and are not available for teaching, they might get stressed and helpless vis-à-vis the students. Earlier studies illustrate that about two years are needed for assimilating a technology in such a way that makes teachers feel at ease to use it, to such extent that the learners of those teachers benefit from this technology (Mishra & Koehler 2008).

Aflalo (2014) classifies the difficulties of assimilating technology in the education system into two groups. The first group comprises the organizational and administrative elements, including the operational preparation of the school, for the changes' assimilation. For example: classes division, time organization, and flexibility of roles within the system. The second group consists of elements that are associated with the human resource in the system, namely teachers. Acquiring knowledge does not guarantee its use. According to Aflalo (2014), teachers' beliefs and not their knowledge will affect their behavior and hence their choice of teaching method in class. All the teachers in Afflalo's study have attended in the last years atleast one in-service training course that dealt with computer application assimilation in teaching. However, only about one quarter of them attest to a negligible use of online tools in practice in the class work.

4.3 Teachers' Willingness to use Open Educational Resources

Kochavi (2010) conducted a study that explored in different schools the integration of interactive writing boards in the classroom. The research findings showed that the assimilation process was different and varied and could be divided into three main groups:

- Apprehensive teachers whose work is characterized by known and familiar working methods. They feel threatened by the new tool but do not object to using it. These teachers need much support and tutoring throughout the entire way.
- Inquisitive teachers demonstrate an interest in the change, are willing to exert efforts in it but need support and reinforcements in order to feel that the process is worthy.
- Leading teachers are ready for the change and believe in it. They are willing to lead the assimilation process in their school and support the teachers who need it. The principal's involvement together with a

leading teacher from the faculty are two factors that will facilitate the motivation of the process.

Studies indicate that most teachers use technologies in teaching. However, their usage is superficial and conventional, namely they do not harness in practice the technology to the service of the learner-focused teaching (Wadmany, 2012). This fact is probably inherent in teachers' personal perceptions, positions, and beliefs since these have considerably impacted the adjustment to the new environment and learning processes (Clarke et al., 2008). Teachers who applied technology-based teaching methods adopted learner-oriented and constructivist teaching methods. Conversely, teachers who avoided using technologies in teaching, usually embraced traditional teaching perceptions. It is important to remember that implementation of the computerized teaching process in schools cause difficulties. The teachers' views, perceptions and attitudes, as well as the belief in their capabilities to implement this process, are highly essential for a successful change. Thus, assimilating IT technologies in the education systems is a function of teachers' personal development (Rotem & Avni, 2011).

Cuban (2001) argued that teachers continue applying a linear usage, putting the teacher at the center as a knowledge-delivering authority, even if they integrate online tools in their work. This is despite the perception that teachers who profess the constructivist approach to teaching will easily adopt new technology whereas teachers who put the teacher and not the learner at the center of the teaching process, will prefer conventional methods (Wadmany, 2012).

Fulton and Torney-Purta (2000) conducted a very interesting study, whose findings show that teachers do not perceive the new technologies as changing or affecting their educational perception. Their findings contradict a later study conducted by Burton (2003). She showed that the very experiences and learning of teachers in the field of information technology might change their educational perception of learners' ability and the importance of the latter's involvement in processes of deep approach to learning.

Rotem and Avni (2011) specify five stages that teachers undergo during their professional development, until reaching maturity in online teaching. These are: (1) Acquaintance of and introduction into the world of using technological means in teaching; (2) An illusion of understanding the integration of technological tools in teaching and the role of these tools; (3) An awakening that results from a sense of unclarity, leading to the need for experiencing online teaching; (4) Initiating coping, namely development of technological tools and personally adapted online activities; and (5) The maturity stage, whereby teachers are thoroughly aware of the technological knowledge and its meaning in teaching processes.

The study conducted by Rotem and Avni (2011) illustrates that teachers at different levels of development towards an online teaching, differ from each other in the nature of the technological environment which they use, the type and style of the materials they apply for teaching and up to the learning process itself. This fact is of supreme importance since it attests to the changing demands from the teachers (but not only from them) in the 21st century. It also indicates the complexity of the change process and the adaptation to these new demands from contemporary teachers. Consequently, it seems that the transformation in the modern world greatly affects paradigms in the world of education. According to Rotem and Avni (2011), viewing the learning of teachers themselves as a way of life, due to the accelerated introduction and frequent innovation of technologies, is part of that change. The researchers maintain that mature teachers engage in experiencing without any fear, demonstrate flexibility, investigate, initiate, and strive to create a collaborative knowledge by the tools available to them, while being aware of ethical difficulties that they face. This way of life requires teachers' deep commitment and openness and, sometimes, it seems that the teachers described by Rotem and Avni (2011) are utopian figures that do not exist in reality. Mishra and Koehler (2008) stipulate that in the modern age, teacher also deal with numerous changes in the professional demands from them. Like other professionals, they are required to adapt themselves to the period, whereby the needs of the world and, hence,

the professional expectations from them are changing.

4.4 Israeli Teachers' Usage of Open Educational Resources

Although information today is accessible and available, teachers still view themselves as the sole source of knowledge. Many of them are not aware of the options of using new technologies and lack the necessary skills for designing educational activities that apply these technologies in an efficient way (Phillips et al., 2012).

A survey conducted by Cohen et al. (2013) illustrates that 96% out of 43 teachers in Israeli schools use a wide variety of open educational resources. The researchers divided the open educational resources into three groups:

- Formal databases of the Ministry of Education: The National Authority for Measurement and Assessment, Subject Teacher Centers and the Educational Content Portal that was developed as part of the National Program for the Adaptation of Education to the 21st Century. These databases include learning materials and contents that were developed by professional teams and were examined and approved by the formal inspection teams of the Ministry of Education.
- Databases of external content suppliers: BrainPOP, Galim (Waves – children's educational website), Kotar (digital library), and so on. These databases comprise learning materials that are developed by professionals outside the Ministry of Education according to the agenda of the website in which they are presented. Some but not all of these websites have been approved by professionals on behalf of the Ministry of Education.
- School local databases: These are online spaces with materials created by the school teachers, for their own use. The teaching staff of the school itself (subject coordinators, pedagogical coordinators, and others) are usually responsible for supervising the materials. The local databases represent the entirety of the organizational knowledge and great importance is attributed to their conservation since they represent management of the knowledge accumulated in the organization.

Moreover, the study of Cohen et al. (2013) divides the usage patterns into online usage of learning materials (e.g. movies broadcast, presentations, etc.) and reuse and offline use (e.g. working pages printing). Although findings indicate that teachers extensively use online databases, these data should be considered with maximum discretion. Firstly, because the sample was very small (43 teachers) and secondly since almost all the participating teachers attended in-service courses about IT information during the two years prior to the study.

Hilton et al. (2012) maintain that in general teachers' awareness of using computerized learning databases in teaching is low. This is due to the fact that they do not believe in the effectiveness of the materials and still perceive that identifying materials that match the exact needs of the learners is a waste of time. Moreover, Cohen et al. (2013) found that teachers tend to use learning materials from local sources, namely from the schools in which they are working. This is based on teachers' perception that these databases were adapted to the specific learner population of their school. It is likely to assume that using such a database enables teachers to assess the extent to which the materials they use are adapted to their class, while feeling that the learning aids in the database have been checked by their colleagues whom they appreciate.

These studies are in line with Aflalo (2012), who argues that there is a considerable gap between the potential embodied in the information revolution and the integration in practice of computerized tools in schools. Indeed, computers accessibility has increased, but the use is limited to activities on the most basic level, such as: building presentations and using an online word processor. Cohen and Nachmias (2011) showed that the reliability of the open materials on the web was the major reason for not using these materials, rather than the extent of acquaintance with them. Teachers prefer familiar uses, e.g. materials from the school website, presentations or video clips from YouTube and less materials that necessitate processing and adaptation

to their needs. An intermediate level relation was found between teachers who tend to search the Internet for private uses and the openness to use information sources from open educational materials.

5. Research Questions

- Is there a difference in the usage of open educational resources between teachers of different disciplines?
- Is there a difference in the usage of open educational resources between the genders?
- Is there a difference in the usage of open educational resources between teachers with different roles at school?

This study was conducted in a qualitative research approach that checked correlations between variables. This study also explored whether there was a difference between males and females in their usage of open educational resources. The participants were 76 teachers of different disciplines in four vocational and academic schools at the center of Israel. Out of the 76 participants, 34 were male (44.7%) and 42 were female (55.26%). Eleven participants (14.4%) worked part time and 65 (85.6%) worked between part time and full time. Thirty-five participants had a seniority of more than 20 years, 17 are relatively new teachers (upto ten years) and 24 participants (31.5%) worked as teachers between 10-20 years. A large group of the participants (34 teachers – 44/7%) were relatively older (over 55 years old). Twenty-four participants (31.5%) were 45-55 years old, 19 participants (25%) were 25-44 years, old and one participant (1.31%) was less than 25 years old. A large group of participants (37 teachers – 48/68%) had a B.Ed. degree, 25 participants (32.9%) also had an M.Ed. degree, 13 of them (17.1%) had only a teaching certificate, and one participant (1.31%) had a certified instructor certificate. Table 1 represents the distribution of the participants' personal data.

Table 1 illustrates that the participants who taught the subjects 'automotive mechanic pathway' and 'business management pathway' appeared at the highest frequency, followed by those who taught physics. The lowest frequency was demonstrated in the case of participants who teach computers and literature.

In order to investigate whether there was a relation between the participants' age and their seniority in teaching, a chi-square for independence test was performed. The test showed a dependence between the variables age and seniority in teaching ($X^2_{(8)}=41.93, p<0.01$).

Discipline	Frequency (%)
Automotive mechanic pathway	21.05
Business management pathway	17.1
Physics	14.47
Bible studies	10.53
Mathematics	9.21
English	7.89
History	7.89
Computers	5.26
Literature	2.63

Table 1. Distribution of the Participants by Disciplines (%)

5.1 Research Procedure

An online questionnaire was designed in order to respond to the research questions. The researcher of this study contacted the teachers in the schools that participated in the study and asked them to respond to the questionnaire that was circulated on Google Drive.

Questionnaires were administered to the participants in order to check a correlation between the dependent and independent variables. The independent variables of this study were the teachers' background characteristics: age, education, role, seniority in teaching, and the discipline they taught. The dependent variables were: types of usage of open educational resources, extent of using the educational resources, and way of using the educational resources. After receiving back 76 questionnaires, the data were inserted in SPSS software for the purpose of statistical analysis.

6. Methodology

The variables: teachers' patterns of using technology, awareness of open educational resources and personal data were measured by a questionnaire taken from a study conducted by the Babson Survey Research Group and the Council of Colleges in the United States, and co-financed by the Flora and William Hewlett Scholarships Foundation and Pearson Foundation (Allen & Seaman, 2014). The questionnaire was divided by topics and, accordingly, the measurement scale was designed. There were questions, such as: 'How frequently do you use social media in order to

establish a relation with your students?' the options being never', 'seldom', 'sometimes', 'on a regular basis'. On the other hand, there were assertions such as: 'Does the use of open educational resources improve your students' satisfaction, Participants were requested to indicate to what extent they used open educational resources. Their answers were measured on a 5-rank scale from: 1-not at all and up to 5-to very great extent.

7. Results

7.1 Difference in the Usage of Open Educational Resources between Teachers of Different Disciplines

In order to explore whether there was a difference between teachers of different disciplines in the usage of open educational resources, the average score for using the various resources was calculated first for each of the participants. It was followed by a one-way ANOVA test that showed a significant difference in the usage of open educational resources between teachers of different disciplines ($F_{(9,66)}=3.32$, $p<0.01$). A Scheffe Method continuation analysis illustrated that teachers from the field of computers used open educational resources much more (M=3.58, SD=0.771). After them were ranked teachers of business management pathway (M=2.89, SD=0.63) and teachers of literature (M=2.5, SD=1.45). The participants that least used open educational resources were teachers of mathematics (M=1.86, SD=0.715) and English (M=1.9, SD=0.39). Table 2 represents the mean values of using open educational resources among teachers of different disciplines.

For the purpose of examining the differences between the various disciplines, the categories were combined in the following way: the humanities (Bible studies, literature, history), languages (grammar and writing, English), sciences (computers, mathematics), and technology (automotive mechanic and business management pathways). A one-way ANOVA test was performed, showing significant differences between the various categories ($F_{(3,\ 73)}=1.54$, $p<0.01$) in the usage of open educational resources. A Scheffe Method continuation analysis found that teachers of technological subjects used open educational resources (M=2.52, SD=0.79) more than teachers of sciences (M=2.49, SD=0.79), humanities (M=2.29, SD=0.85) and languages (M=2.06, SD=0.519). Figure 1 below demonstrates the differences between the categories.

Disciplines	M	SD	F
English	1.9	0.39	1.87
Mathematics	1.86	0.715	1.9
Computers	3.58	0.771	3.58
Physics	2.05	0.868	2.05
Literature	2.5	1.45	2.5
Bible studies	2.21	0.837	2.21
History	2.27	0.401	2.27
Automotive mechanic pathway	2.08	0.588	2.08
Business management pathway	2.89	0.635	2.89

**p< 0.01

Table 2. Mean Values of Usage of Open Educational Resources among Teachers of Different Disciplines

Figure 1 indicates, teachers of technological subjects used open educational resources more than teachers of other disciplines.

Moreover, in order to investigate whether there is a relation between teachers' gender and the discipline that they teach (after combination of categories), a chi-square for independence test was performed. The test showed that there was a dependence between the variables gender and discipline ($X^2_{(3)}=31.79$, $p<0.01$).

As illustrated by Figure 1, most of the teachers of languages were females and most of the teachers of technological subjects were males in sciences, a gap of 6.6% was found between male and female teachers. In the humanities, a gap of 10.5% was found between male and female teachers.

7.2 Relation Between the Genders in the Usage of Open Educational Resources

This study also explored whether there was a difference

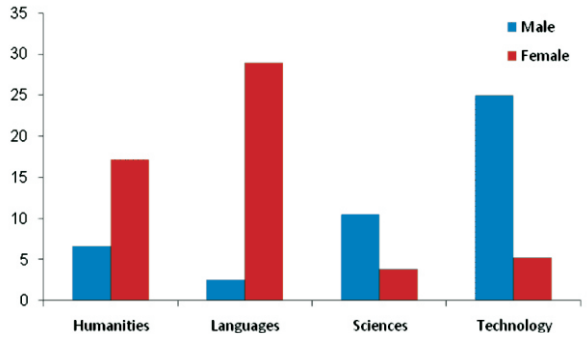

Figure 1. Distribution of Teachers by Gender and Discipline (%)

between males and females in their usage of open educational resources. For that purpose, a t-test for independent variables was performed. It showed significant differences between the usage of male teachers (M=2.57, SD=0.944) and that of female teachers (M=2.11, SD=0.587) (t(74)=2.45, p<0.05). Table 3 represents the mean usage that male teachers versus female teachers make of open educational resources.

7.3 Relation between Teachers in Different Roles at School and the Frequency of Using Open Educational Resources

For the purpose of investigating whether there were differences in the frequency of using open educational resources between teachers who have a different role at school, a One-Way ANOVA test was performed. The test showed significant differences between the various role ($M_{(4,71)}$=2.67, p<0.05). A Scheffe Method continuation analysis illustrated that age-group coordinators used open educational resources at the highest frequency (M=4.6, SD=0.2). After them a lower frequency was demonstrated by the teachers (M=2.38, SD=0.74) and the subject coordinators (M=2.28, SD=0.331). The home-class teachers used the open educational resources at the lowest frequency (M=2.1, SD=0.99).

8. Discussion and Conclusions

This study examines gender differences and the teacher's profession in teachers' use of open learning resources. It aims to help understand the way open educational resources should be assimilated in the education system. The motive for investigating the extent and way of using the educational resources in vocational schools was grounded in findings of previous studies (Camilleri et al., 2014; Clements & Pawlowski, 2012). These studies found that effective usage of open educational resources led to a higher quality of teaching and learning (Ehlers, 2011). Moreover, they showed that importance should be attributed to a proper assimilation among the teachers in order to facilitate a friendlier usage of educational resources (Shamir-Inbal & Kelly, 2011). In addition, the findings illustrated that most of the teachers who used technologies in teaching, did it in a superficial and conventional manner, namely they did not harness in practice the technology to the service of learner-focused teaching (Wadmany, 2012). Few of the studies related to the patterns of usage of Open Educational Resources (OER) by the teacher population in vocational schools.

	M	SD	F
Male Teachers	2.57	0.944	*2.45
Female Teachers	2.11	0.587	2.37

*p<0.05

Table 3. Mean Usage of Open Educational Resources by Male and Female Teachers

The research question was: Is there a difference in the usage of open educational resources between teachers' different disciplines. The findings showed significant differences in the extent of use among teachers of different disciplines. This study illustrated that the teachers who used open educational resources to the greatest extent were teachers of computers, business management pathway and literature. The teachers who used open educational resources to the smallest extent were teachers of mathematics and English. Teachers in the business management pathway then used open educational resources much more than teachers of core subjects studied in every school. After combining the categories of the various disciplines, the findings indicated that teachers of technological subjects used open educational resources more than teachers of other disciplines. After them were ranked teachers of sciences, humanities and finally teachers of languages. This finding may be due to the fact that teachers of technological subjects and of sciences were more computer literate (a term explained later on) than teachers of humanities and languages. In order to elucidate why there was such a difference in the use of open educational resources by teachers of various disciplines, this issue should be investigated further and examined perhaps by a qualitative study that would include in-depth interviews with the teachers of the various disciplines.

Moreover, this study showed a significant difference in the usage of open educational resources between male and female teachers. Male teachers used open educational resources more than female teachers. This is an interesting finding that illustrates gender differences in the usage of computerized technologies. Moreover, the findings

showed that most of the teachers of technological subjects were male and most of the teachers of languages were female. These data accounted also for the difference in the extent of using open educational resources between teachers of various disciplines.

The study also examined whether there were differences in the frequency of using open educational resources between teachers with different roles at school, showing significant differences between the different roles. Age group coordinators used open educational resources at the highest frequency, followed by teachers and subject coordinators. The home-class teachers used open educational resources at the lowest frequency. It was likely to assume, then that there was a dependence between the discipline that teachers taught and their role at school. However, a chi-square test that was performed illustrated that the dependence was not statistically significant and no conclusions could be drawn at that point.

This might be due to computer literacy, namely teachers who are computer literate will experience less apprehension in using open educational resources. Computer literacy is referred to in the empirical literature as 'computer information literacy'. Computer Information literacy is an important literacy that learners are now required to possess. The skills learners need to have are manifested in varied areas, such as: creativity and innovation, critical reflection, problem solving, decision making, information and communication literacy, team work, and independent learning. This literacy is the ability of individuals to use computers for effective inquiry, creation and communication at school, at home and in the community (Fraillon & Ainley, 2010). Schools must see to it that teachers are computer and information literate. Studies indicate that teachers' experiencing and learning in the field of information technologies might change their educational perception of learners' ability and their important involvement in processes of meaningful approach to teaching.

8.1 Contribution of this Study

The contribution of this study is measured from two aspects: theoretical and applied. From a theoretical point of view, the results support the 4 R's Model designed by Hilton and Wiley (2010). Moreover, they support the definition of the term 'Open Educational Resources' (OER) conceived by Conole et al. (2010) and Camilleri et al. (2014). From the applied aspect, this study reflects teachers' prevalent patterns of using these educational resources on the initial level.

This study examined the usage of open educational resources among teachers in general and teachers of vocational pathways in particular. Teachers' usage and way of using open educational resources have been investigated in the past, but not in the context of vocational schools. Another contribution of this study is the finding that teachers of technological subjects used open educational resources more than teachers of other disciplines. It also supported findings of previous studies, namely that many teachers were unaware of the options of using new technologies and they lacked the necessary skills (Phillips et al., 2012). This study also contributed to the presentation of computer and information literacy as a factor that affected teachers' usage of open educational resources. Furthermore, the findings illustrated that teachers preferred maintaining their autonomy in planning the lessons they taught rather than receiving materials dictated to them in advance.

8.2 Research Limitations

The limitations of this study are due to the fact that it was conducted among 76 teachers only. All the participating teachers worked in schools at the center of Israel and in the Jewish sector. Perhaps if other regions and other sectors had been investigated, the results would have been different. Moreover, this study did not examine teachers' training for using open educational resources.

9. Recommendations

Recommendations for the field are organizing an in-service training course about open educational resources and web 2. The findings showed that teachers' use of the Internet for their personal needs was of web1 generation and less of web2 generation. Teachers in the 21st century should be computer literate and be able to use web 2. Teachers' use of the Internet for their personal needs is positively related to their use of open educational resources.

Another important recommendation for the field is making educational resources easy to identify. They should consist of materials according to the curriculum indications and be easily changed and edited. Moreover, they have to be up-to-date and on a high level, be user friendly and include a detailed explanation about their way of usage. When planning open educational resources, importance must be attributed to the reinforcement of teachers' pedagogical autonomy in order to promote the chances of a successful implementation among the teachers.

It is recommended to conduct future studies of the relationship between in-service training courses and their scope, and teachers' usage of open educational resources. It is to be expected that the more comprehensive the scope of the in-service training courses, the greater teachers' usage of open educational resources will be. It is also recommended to re-conduct this study among a wider research population, including schools from different regions and different sectors. For example, it is to be assumed that teachers in state-religious schools will use open educational resources to a lesser extent than teachers in state schools.

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