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Gordana Rudić, Mirjana Brković, Dejan Pajić

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Sustainable Development Literacy for Educators and Librarians

Gordana Rudić¹, Mirjana Brković², Dejan Pajić³

¹Department of Librarianship, Faculty of Education, University of Novi Sad, ²University of Novi Sad Central Library, ³Department of Psychology, Faculty of Philosophy, University of Novi Sad
goga@dmi.uns.ac.rs, mirjana.brkovic@uns.ac.rs, dpajic@ff.uns.ac.rs

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Abstract:

Purpose – This paper aims to present and analyse the experiences and challenges during the development of sustainable development literacy (SDL) implemented in the context of the EDUCABILITY project.

Design/methodology/approach – It briefly discusses the methods and tools used to deliver a source mapping for SDL, a relevant Delphi Study, an SDL Curriculum and an e-Learning Module in the EDUCABILITY Virtual Learning Environment.

Findings – The systematic review of international literature and the results of the Delphi Study enabled the proposal of an SDL curriculum, including definitions, key concepts and content, learning objectives and outcomes, teaching approaches and evaluation methods.

Originality/value – The proposed educational materials enable the capacity of educators and librarians in SDL to apply it to different problems and various aspects of the same problem.

Index Terms — sustainability, sustainable development literacy, information literacy, educators, librarians.

I. INTRODUCTION

According to The Alexandria Proclamation on Information Literacy and Long-life Learning, information literacy ""empowers people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals"" [1]. Dealing with a wide range of different types of information implies dividing information literacy into different types of literacies. Mackey and Jacobson [2] see information literacy as the essential framework that unifies additional literacy types. However, they also state that ""while the type of information may change from one format to another (from print to Web page to multimedia file, to learning object, to collaborative document), the abilities to determine, access, evaluate, incorporate, use, understand, produce, collaborate, and share information are common

considerations" "".

Since we live in an overwhelming information world, educators and librarians, before all others, should be well-educated and skilled in all kinds of literacies. Crary [3] states: "The literature review revealed that, in general, teachers have limited understanding of information literacy skills". The survey conducted by this author shows that "teachers responded with a high preference for school librarians to prepare professional development on topics related to information literacy skills for teachers. Teachers then take that information to develop their information literacy skills and lessons to help students develop them"." Educating educators and librarians in information literacy is the basis for disseminating those skills in their communities. Developing different projects, tools, courses, or educational materials helps educators and librarians meet their communities' growing information needs.

Such a project is EDUCABILITY – Building the Capacity of Educators and Librarians in Information Literacy (Erasmus+ KA2). Partners of the project are Cyprus University of Technology (CUT), Universidad Carlos III de Madrid (UC3M) – Spain, University of West Attica (UNIWA) – Greece, University of Novi Sad (UNS) – Serbia and Centre for Social Innovation (CSI) – Cyprus. Each partner was in charge of specific literacies and project deliverables, but all partners worked collaboratively. The project aims to train educators and librarians in the basic skills of Information Literacy (horizontal goal) and the skills of six existing and emerging literacies (vertical goal). These six literacies are Critical Information Literacy, Digital Literacy, Mobile Literacy, Media and Information Literacy, Data Literacy, and Sustainable Development Literacy. The project partners developed a complete curriculum for each of the literacies above. All seven curricula were converted into seven e-Learning Modules and integrated into an open-access Virtual Learning Environment (VLE)¹ [4].

This paper aims to present and analyse experiences and challenges during Sustainable Development Literacy (SDL) implementation through EDUCABILITY Project. This part of the project was carried out by UNS-Serbia. UNS-Serbia team members are: Mirjana Brković (team leader), Ivana Ikonić (administrator), Gordana Rudić, Dejan Pajić, Nataša Belić and Ljiljana Matić.

¹ <https://vle-educability.uc3m.es/course/index.php>

and abilities: identifying problems at the macro level, reflection, continuous and interdisciplinary action, finding solutions, and solving the issues at the local level.

Analysis of relevant literature also provided insight into the key concepts concerning SDL. Team members recognised ten (10) key concepts and proposed a set of learning objectives and outcomes for each of those concepts. Those key concepts with proposed learning objectives and outcomes are listed below.

1. Introduction to Sustainable Development Literacy (SDL)

Objectives: introducing the main theoretical concepts and the practical outcomes of SDL in connection with achieving the UN SDGs; reducing inequality in access and attainment of education; motivating others to educate themselves; recognising 'one's needs for education.

Outcomes - trainees will: understand the connection between SDL and achieving the UN SDGs; become aware of inequality in access to and attainment of education, particularly between girls and boys and in rural areas, and about reasons for lack of equitable access to quality education and lifelong learning opportunities; be able through participatory methods to motivate and empower others to demand and use educational opportunities; recognise the intrinsic value of education and analyse and identify their own learning needs in their personal development.

2. Interdisciplinary approach to SDL teaching and learning in specific age groups

Objectives: introduction of an interdisciplinary approach to the SDL teaching and learning in specific age groups; to speak up against all forms of age discrimination and debate the benefits of full empowerment of all age groups; to advocate for the life-long learning (LLL) possibilities; to introduce different forms of education (formal, nonformal, informal) for achieving SDL.

Outcomes - trainees will: become familiar with an interdisciplinary approach to SDL teaching and learning in specific age groups; become the agents of annihilating age discrimination; understand the critical role of education and lifelong learning opportunities for all; accept the formal, nonformal, and informal learning as the main drivers of sustainable development and in achieving the UN SDGs.

3. Teaching the connection between environment, society, and economy

Objectives: teaching the connection between environment, society, and economy; explaining basic physical, social, and psychological human needs and identifying how these needs are currently addressed in their own physical urban/rural settlements; addressing basics of sustainable planning and building; teaching how to decouple economic growth from natural hazards and natural degradation.

Outcomes - trainees will: understand the connection between environment, society, and economy; become agents of change towards sustainability since they realise how innovation, entrepreneurship, and new job creation can contribute to decent work and a sustainability-driven economy in their community; support the sustainable

planning and building; be able to understand the principles of decoupling of economic growth from the impacts of natural hazards and environmental degradation.

4. SDL as the tool for critical thinking and empowering students with sustainability competencies

Objectives: introducing SDL as the tool for critical thinking; empowering students with sustainability competencies like Systems thinking, Anticipatory thinking, Normative thinking, Strategic thinking, Collaboration thinking, Self-awareness, Integrated problem-solving; explaining how to identify a problem, organise and express ideas, synthesise information from more than one source; show the trainees how to critically assess issues of peace, justice, inclusion, and strong institutions in their region, nationally and globally; teaching how to recognise and reflect on 'one's demands on the local infrastructure such as carbon and water footprints and food miles.

Outcomes - trainees will: recognise SDL as the tool for critical thinking; from more than one source; critically assess issues of peace, justice, inclusion, and strong institutions in their region, nationally and globally; recognise and reflect on their demands on the local infrastructure such as carbon and water footprints and food miles; become self-aware and realise that they are the agents of change; learn the integrated way of problem-solving.

5. Filling the gap between social groups and reducing inequalities to foster equitable social development and inclusion

Objectives: teach the students about the indicators that measure and describe inequalities; show the local, national, and global processes that both promote and hinder equality; teach the ways of filling the gap between social groups; raise awareness of and reducing the inequalities; negotiate the rights of different groups based on shared values and ethical principles; fostering equitable social development; inclusion of minority groups.

Outcomes - trainees will: be able to recognise the inequalities in their surroundings as well as in the broader world and recognise the problematic consequences; know to recognise the local, national, and global processes that both promote and hinder equality; be ready to become agents of filling the gap between social groups; become aware of inequalities and recognise the need of reducing the inequalities; be ready to negotiate the rights of different groups based on shared values and ethical principles; change the attitude from passive to active in fostering equitable social development; be able to plan, implement and evaluate strategies to include minority groups in their working space, schools.

6. SDL and promoting the integrated and sustainable management of natural resources and ecosystems

Objectives: promoting the integrated management of natural resources; maintaining the sustainable development of ecosystems; explaining the production and consumption patterns and value chains and the interrelatedness of production and consumption; teaching the strategies and practices of sustainable production and

consumption; promoting different lifestyles; explain differences between needs and wants and reflect on the students own individual consumer behaviour in light of the needs of the natural world, other people, cultures and countries, and future generations; teach how to evaluate, participate in, and influence decision-making processes about acquisitions in the public sector.

Outcomes - trainees will: understand the need for integrated management of natural resources; become advocates for maintaining the sustainable development of ecosystems; be able to understand the production and consumption patterns and value chains and the interrelatedness of production and consumption; accept the strategies and practices of sustainable production and consumption; become promoters of different lifestyles; be able to differentiate between needs and wants and to reflect on their consumer behaviour in light of the needs of the natural world, other people, cultures and countries, and future generations; be able to evaluate, participate in, and influence decision-making processes about acquisitions in the public sector.

7. Ethical approach to complex problems and ambivalent situations

Objectives: enabling the ethical approach to complex problems and ambivalent situations; learning how to respect other 'people's opinions, emotions, cultural values, ways of living, and political attitudes; teaching the trainees to act ethically, i. e., to do in any situation whatever will produce the best outcomes taking into consideration the interests of all concerned parties; discuss what kind of people or organisations we want to be, and what kind of ethical examples we ought to follow; teach a complex set of interrelated perspectives that emphasise interpersonal concerns (caring, interdependence), and the ethical requirements of particular relationships.

Outcomes - trainees will: accept the attitude which enables the ethical approach to complex problems and ambivalent situations; know how to respect other 'people's opinions, emotions, cultural values, ways of living, and political attitudes; be able to act ethically, i. e. to do in any situation whatever will produce the best outcomes taking into consideration the interests of all concerned parties; recognise what kind of people they want to be or in what kind of organisation to work in, and what kind of ethical examples they ought to follow; become aware of a complex set of interrelated perspectives that emphasise interpersonal concerns (caring, interdependence), and the ethical requirements of a particular relation.

8. Transformative learning for changing unsustainable to sustainable patterns

Objectives: Introducing transformative pedagogy as the key driver for delivering SDGs in the classroom; combining the elements of constructivist and critical pedagogy; empowering students to examine their beliefs, values, and knowledge critically; developing a reflective knowledge base; acquiring an appreciation for multiple perspectives; to develop a sense of critical consciousness and agency.

Outcomes - trainees will: be able to use transformative pedagogy as the key driver for achieving SDGs; be ready to combine the elements of constructivist and critical pedagogy in their classrooms; be eager to examine their beliefs, values, and knowledge critically in order to change them if necessary, develop a sense of self-examination and redefinition of oneself; develop a reflective knowledge base and learn how to use it; acquire an appreciation for multiple perspectives; have a developed sense of critical consciousness, social critique, social advocacy, and agency.

9. Responsibility for the decision-making and behaviour

Objectives: explain the responsibility of each person for their decision-making and behaviour; promote the development of productive and socially responsible individuals; teach trainees to become agents of change in local decision-making, speaking up against injustice; explain how to evaluate and participate in and influence decision-making related to management strategies of local, national, and international enterprises concerning poverty generation and eradication; how to participate in decision-making related to public policies concerning the combat against hunger and malnutrition and the promotion of sustainable agriculture, gender issues, well-being, climate change.

Outcomes - trainees will: accept responsibility for the decision-making and behaviour; become productive and socially responsible individuals; know how to evaluate, participate in, and influence decision-making related to management strategies of local, national, and international enterprises concerning poverty generation and eradication; know how to participate in decision-making related to public policies concerning the combat against hunger and malnutrition and the promotion of sustainable agriculture, gender issues, well-being, climate change.

10. SDL and raising basic standards of living and enhancing economic growth in order to eradicate poverty

Objectives: promotion of well-being for all at all ages; explaining the best ways of raising basic standards of living; showing the socio-political-economic dimensions of health and well-being; explaining the relationship between employment and economic growth and knowing about other moderating factors like a growing labour force or new technologies that substitute jobs; teaching the relevant prevention strategies to foster positive physical and mental health and well-being; to teach how the SDL helps to end poverty in all its forms everywhere; teaching how to advocate prevention strategies and promoting health and well-being.

Outcomes - trainees will: know how to promote well-being for all at all ages; recognise the best ways of raising basic standards of living and act accordingly; know the socio-political-economic dimensions of health and well-being; know the relation between employment and economic growth and knows about other moderating factors like a growing labour force or new technologies that substitute jobs; accept the relevant prevention strategies to foster positive physical and mental health and well-being and plan, implement, evaluate and replicate those strategies; learn how the SDL helps to end poverty in all its

forms everywhere; learn not only to advocate prevention strategies and to promote health and well-being but also to perceive when others need help and to seek help for themselves and others.

Learning objectives and outcomes in chosen literature mainly recognise SDL's primary goal of empowering learners to take responsible actions for environmental integrity, economic viability, and just society. It is also essential to enable students to become system problem solvers, change agents, and transition managers towards more sustainable development of our society in different areas and to develop leadership skills.

In the analysed literature, several different teaching approaches were recommended, such as problem-based learning (the most often suggested), interdisciplinary, transformative, and learning through group work. The approach to teaching SDL should be holistic, transformative, multi-faceted and multi-level, interdisciplinary and transdisciplinary, and hands-on.

III. DELPHI STUDY

Through the Delphi Study method, which is internationally suitable for developing educational programs, the aim was to achieve the maximum possible consensus of an expert group in assessing the proposed curriculum in Sustainable Development Literacy.

The project's partners chose the online survey platform 'Welpi' to implement this method'.

Sixteen (16) participants engaged in the Delphi Study from the University of Novi Sad. Half were professors, six (6) were librarians, and two (2) were policymakers. Two professors and one librarian could not start the Delphi Study, so the University of Novi Sad gathered thirteen (13) experts.

The study was conducted in two rounds to achieve the maximum possible consensus of experts in the group.

UNS Project Team conducted a study using a Delphi Study Questionnaire about the definitions, key concepts, learning objectives and outcomes for each key concept, and teaching approaches and evaluation methods.

UNS expert group assessed ten (10) proposed SDL definitions rating them in order of importance for inclusion in a course for educators and librarians, from one (1) for the most important definition to ten (10) for the least important.

The experts evaluated the offered list of key concepts using the drag-and-drop option, whereby they transformed the list so that the most important concept was in the first place and the least important concept was in the last place. Similarly, experts evaluated proposed teaching and evaluation methods concerning SDL.

Using 'Likert's four-point scale (from Completely Agree to Completely Disagree), experts evaluated each set of learning objectives and outcomes attached to a specific key concept. In addition, they had an opportunity to comment each of these sets.

Experts generally showed a low level of consensus on the importance of definitions. One of the two highly graded definitions focuses on ecological and ethical aspects, while the second addresses SDL's ecological, economic, and educational aspects. Those two definitions are:

1. Sustainability is a concept, a goal, and a strategy needed for the reconciliation of social justice, ecological integrity and the well-being of all living systems on the planet. The goal is to create an ecologically and socially just world within the means of nature without compromising future generations. Sustainability refers to the process or strategy of moving towards a sustainable future.

2. The basic premise of sustainable development is that human and natural systems are dynamically interdependent and cannot be considered in isolation to resolve critical issues. Human societies and ecological systems are so interconnected that they are co-adaptive. Sustainability is the doctrine that economic growth and development must occur and be maintained over time within limits set by ecology in the broadest sense – by the interrelations of human beings and their works, the biosphere and the physical and chemical laws that govern it. Environmental protection and economic development are complementary rather than antagonistic processes. By embracing societal, environmental, economic, and cultural dimensions of sustainable development in a holistic and integrated manner, education for sustainable development enables all individuals to fully develop the knowledge, perspectives, values and skills necessary to take part in decisions to improve the quality of life both locally and globally on terms which are most relevant to their daily lives.

A high percentage of experts ranked the key concept 1 (Introduction to Sustainable Development Literacy) as the first most important (69% experts), concept 4 (SDL as the tool for critical thinking and empowering students with sustainability competencies) as second (69%), and concept 3 (Teaching connection between environment, society, and economy) as third (69%), which implicated putting them at the beginning of the future course. Key concepts 6 (SDL and promoting the integrated and sustainable management of natural resources and ecosystems) and 10 (SDL and raising basic standards of living and enhancing economic growth in order to eradicate poverty) were ranked last (eighth position or less) by 54% and 46% of experts respectively. Key concepts 7 (Ethical approach to complex problems and ambivalent situations) and 9 (Responsibility for the decision-making and behaviour) had the most disperse distribution of rankings, which indicates that these issues are of general importance and should be tackled within practically all other lessons as they concern issues of responsibility and ethics. Key concepts 2 (Interdisciplinary approach to the SDL teaching and learning in specific age groups), 5 (Filling the gap between social groups and reducing inequalities to foster equitable social development and inclusion), and 8 (Transformative learning

for changing unsustainable to sustainable patterns) had the largest proportions of medium ranks.

The results of both rounds show that many experts agreed with the proposed learning objectives and outcomes for each key concept, so their most common answers were Agree and Completely Agree. In the second round, experts reached a higher consensus - the vast majority of experts answered Completely Agree for concepts 8 and 9 (69%), 6 and 7 (77%), 3 and 5 (85%), and 4 (100%). Three experts constructively commented on some concepts in the first round (concepts 1, 2, 4, 5, 7-9). There were no comments in the second round. The experts answered Disagree in a small percentage for the following concepts: 2 and 8 (15%), 7 (8%), and 9 (23%). No expert answered Completely Disagree.

Ultimately, experts ranked the relevance of key teaching and evaluation methods for a future course. They showed a high level of agreement when assessing the importance of key teaching and evaluation methods, even during the first round. This agreement was further improved in the second round. Two key teaching methods were graded as the most relevant. One gives a comprehensive core overview of definitions related to sustainable development, while the other deals with searching and retrieving information on a specific sustainable development topic. The teaching method ranked third indicates 'experts' opinion that courses should be supplemented with appropriate quizzes and interactive feedback on learning achievement. The following teaching methods, in order of relevance, indicate that:

- courses should also include activities that would make students more active and involved in the teaching process, and students should explore SDG topics on their own and make reports and presentations that their peers will evaluate,
- students should be asked to think of keywords that will help them find useful information (to help them think of the appropriate terms, they should be given a list of pertinent keywords) and to complete an e-crossword of broader, synonym, narrower terms,
- students should be asked to study their retrieved information and to write an adequately cited short answer to a question,
- students should be presented with a video lecture, which is automatically paused for a question and continued when students answer a question,
- students would be expected to read at least one of the proposed references linked to the course and write the summary,
- students should be constrained in advancing the course based on their achievement in previous course units.

The two teaching methods evaluated as the least important showed 'experts' opinions that they would not be appropriate for the future course. So, they were excluded and not used in the course. Other methods were considered for use.

IV. SDL COURSE

To prepare an SDL course, the UNS-Serbia team had to deal with 17 sustainable development goals described in the UNESCO documents [9]. It was a big task for one teaching course and demanded a holistic, interdisciplinary, transdisciplinary, and transformative approach to this literacy. To teach the SDL, we needed educational content applicable to different problems and various aspects of the same problem. 'Developing students' critical thinking, understanding complex systems, imagining future scenarios, and making participatory and collaborative decisions were essential.

SDL course² begins with general information and the course introduction. The course consists of six modules: M1 - Introduction to the SDL; M2 - SDL as a tool for critical thinking; M3 - Teaching connection between environment, society and economy; M4 - Ethical approach to complex problems and ambivalent situations; M5 - Filling the gap between social groups and reducing inequalities; and M6 - Applying an interdisciplinary approach to the SDL teaching and learning in specific age groups.

Each SDL module contains information about learning objectives and outcomes for that module, a set of activities, and a list of complementary materials. The activities are adapted for the education of educators and librarians, but they also contain some simple exercises that they can assign to their students.

Module 1, which introduces students to SDL, consists of three activities. Students firstly can see the summary of 17 Sustainable Development Goals (SDG), two introductory videos (about 17 SDGs and The 2030 Agenda for Sustainable Development), then answer questions in the quiz regarding information from the videos and restore the puzzle about the danger of climate change. The second activity contains the video about the gender gap and the quiz about that theme. Finally, students can solve a memory card game about pollution.

SDL as a tool for critical thinking is introduced in Module 2. After explaining the IDEALS model for developing critical skills, students are asked to watch a video about declining ecosystems and consider six questions regarding the video using the proposed model. The second activity gives a list of competencies for educators in education for sustainable development. After watching a video about artificial intelligence used for sustainability, students have to solve the appropriate crossword. The next activity is about key sustainability competencies, and students can learn about them from the proposed book chapter and use accordion cards with explanations of those competencies. In the last activity, students learn about carbon footprint through a cartoon that explains it, and after that, they should solve the related memory card game.

At the beginning of the third module, Teaching Connection between Environment, Society, and Economy,

² <https://vle-educability.uc3m.es/course/view.php?id=266>

students are asked to read a section from the scientific paper about SD as a contested concept and to try to answer some questions about the topic. After watching a video about the environment in our life, students should think about the motto, associations, and keywords related to the video. They should also answer questions in a quiz after watching a video about microplastic pollution. The next task is to complete a text connected with broader, synonym, and narrower terms and keywords regarding the connection between economy, ecology, and human society. Finally, they should determine the type of pollution in a few pictures and mark the correct answer.

Module 4 deals with an ethical approach to complex problems and ambivalent situations. After the introductory video, students should take a short quiz. The next activity also contains a quiz, which trainees should complete after reading an article on sustainable development and ethics. Then, an accordion presentation introduces new terminology to teach Sustainable Development Literacy, reflecting on the educational process, such as foreseeing or forecasting the sustainable future. Finally, there is a jigsaw puzzle photo about environmental ethics for recovering.

Filling the gap between social groups and reducing inequalities is the topic of Module 5. After watching an introductory video about SDG 10 (Reducing inequalities), students must think about keywords connected with the topic. To expand the set of considered keywords, they are given a list of pertinent keywords to consider their meanings. Then, they can read possible explanations for each (in the form of dialogue cards) and complete the crossword with the given keywords. In the third activity, there is an accordion with the targets of SDG 10 and strongly connected SDGs 1, 2, 3, 4, 5, and 8 since the term "reducing inequalities" covers different types of inequalities among people, social groups, countries, economies, education. After reading these targets, students should fill in the missing words or choose the correct word or value in the text that contains some of them. Finally, students should read an article about reducing inequalities and insert missing words in related text using the drag-and-drop option.

Module 6 is about Applying an interdisciplinary approach to SDL teaching and learning in specific age groups. Firstly, an introductory video about the need for a transdisciplinary approach to solving relevant, sustainable development issues is given. Students should choose the correct answer to a question about the main principles of that approach and analyse the comments for each answer, both correct and incorrect. In the second activity, students should read the provided article and, using the drag and drop option match SDGs with the proper action that scientists in various disciplines can take to deal with some of the sustainability issues. Then they are asked to sort 'students' roles by the level of curriculum integration and interdisciplinarity and, ultimately, to choose a random sustainable development issue and search online sources for various approaches to

solving the problem from the perspective of different scientific disciplines. The next three activities (3, 4, and 5) deal with gender equality, reducing ageism, and lifelong learning, respectively. After introductory texts and videos, students should do the following tasks: fill in the missing words in the list of six targets related to SDG 5 (Gender Equality); read the proposed text and think of ways to create an age-friendly environment, and use the flipping cards to view some of the possible solutions; and to answer the quiz questions about the lifelong learning.

After finishing all the activities in six SDL modules, students should answer eleven (11) questions in the Final quiz.

V. CONCLUSION

This paper aims to present and analyse experiences, challenges, and doubts during the work on the part of the project EDUCABILITY - Building the Capacity of Educators and Librarians in Information Literacy, which is related to Sustainable Development Literacy (SDL).

Discussing who will teach the teachers in the field of sustainability, Howard [10] states that one of the major thrusts of Education for Sustainable Development (ESD) is to reorient education at all levels to address sustainability issues. It means rethinking and revising education from nursery schools through university to include principles and skills, knowledge, and values related to sustainability. Regarding librarians, it is vital to their role in raising users' information literacy levels. Hauke [11] states that moving from teaching information literacy to educating sustainability literacy seems to be the 'libraries' meaningful contribution to help achieve the Agenda 2030 goals. Training teachers and librarians in sustainable development literacy helps to raise this kind of literacy within the population.

One of the main objectives of the project EDUCABILITY – Building the Capacity of Educators and Librarians in Information Literacy, was to create an online, free-of-charge training for educators at all education levels and librarians in the basic skills of Information Literacy. An innovative approach to the curriculum design was creating six modules concerning six types of emerging literacies within the concept of Information Literacy. One of those literacies was Sustainable Development Literacy (SDL), so the appropriate 'module's curriculum design took into consideration a variety of learning theories and teaching approaches to provide end users with various educational approaches of high quality for the development of SDL skills. The proposed educational materials enable raising the capacity of educators and librarians in SDL and can be applied to different problems and various aspects of the same problem.

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Mirjana Brković defended PhD at the Faculty of Philosophy in Novi Sad, Serbia. She worked for 14 years as a librarian for old and rare books at the Matica Srpska Library in Novi Sad. Since 2004 she has been the head of the University of Novi Sad Central Library. She is

engaged in writing studies in cultural and literary history, librarianship, personal bibliographies, book reviews, etc. She has participated in several national and international library conferences and published numerous journal articles, bibliographies, exhibition catalogues, etc. She is the author of 9 books.



Dejan Pajić is an associate professor at the Department of Psychology of the Faculty of Philosophy in Novi Sad where he teaches statistics and computer science in psychology. His fields of interest are bibliometrics, research evaluation, HCI, and information visualisation. He was involved in numerous open science

projects, including the creation of the Serbian Citation Index, the University of Novi Sad Repository, interactive open textbook Application of visualisation techniques in basic statistics, and free statistics course Be Data Driven. He is a member of the Center of Excellence for Behavioral Research in Psychology, the Team for Open Science in Serbia, and the Statistical Council of the Statistical Office of the Republic of Serbia.

VII. AUTHORS



Gordana Rudić graduated in Numerical Mathematics with Cybernetics and received a 'magister's degree in Informatics at the Faculty of Science, University of Novi Sad. She defended her doctoral dissertation in Librarianship and Informatics at the Faculty of Philology, University of Belgrade. She is an associate

professor at the Department of Librarianship, Faculty of Education in Sombor, University of Novi Sad. Her scientific interests include Library Information Systems, Cataloguing, Library standards, etc. She has published 30 scientific publications and is involved in developing the Library information system BISIS used in 60 libraries in Serbia.