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BESTSDI – Western Balkans Academic Education
Evolution and Professional's Sustainable
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Life-long learning (LLL) courses

Version 1.0

Author(s)/Organisation(s):

Nikola Kranjčić / UNIZG FGE

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1 INTRODUCTION

The specific BESTSDI project objectives are to develop, test and adapt new curricula, courses, learning material and tools within the field of SDI. By the incorporation of SDI and other modern concepts based on spatial data and information, students of the new courses will provide efficiently spatial data and services to SDI users when entering the job market. In parallel, the project also introduces SDI and related concepts in undergraduate and graduate study programs of academic institutions which professional profiles are well recognized as SDI users, raising awareness among the students and professionals about the relevance of SDI and advantages of well-organized, harmonized and accessible spatial data.

In this context, the specific objective of the project is to develop appropriate curricula, courses and their content for both target groups (SDI providers and SDI users) of academic institutions, as well as for vocational LLL training initiatives. This includes the development of:

- SDI compulsory course for undergraduate study programs in geodesy;
- SDI modules for graduate study programs in geodesy and geo-informatics;
- SDI user course components (not necessary full courses) for undergraduate study programs of partner faculties;
- SDI elective courses for graduate study program of partner faculties (SDI users);
- Development of sustainable training courses (life-long education) of broad scope of professionals.

The goal of the first part of **WP2 “Development of curriculum”** is to develop the learning material to be included in the project curriculum as specified in D1.4-5 and to prepare the partner universities in providing courses according to their needs. This work will address both the data management students/faculties and the SDI user students/faculties.

The WP2 is subdivided into five tasks:

Task 2.1 - Development of project curriculum

Task 2.2 - Development of LLL courses

Task 2.3 - Equipment purchase/installation

Task 2.4 - Training of teachers

Task 2.5 - Localisation of project curriculum



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Organized in several sub groups project partner representatives worked on learning materials, both for the theoretical and practical part of lectures resulting in documents ready to be adopted as internal teaching material of respective partner faculty/university, which procedure will also be conducted. Developed curricula/courses and learning materials will additionally be localised to the needs of the respective study programs and the profile of professionals educated at the respective universities. For example, it is obvious, besides the fundamentals of SDI and SDI related content, that emphasis of curricula/courses/part of courses on mining and geology studies will not be identical with the emphasis at the computer science studies.

Special responsibility of partners from program countries is to ensure a modern and innovative approach in the creation of learning materials and teaching methodology.

The goal of Task group 2.2 according to Project Management Plan is:

Development of Life-long learning (LLL) courses for professionals

LLL courses will be developed for professionals in all target sectors. As a baseline, the training material developed in the LINKVIT project will be used. Similar as in T.2.1 the work will be organized in two sub-groups in accordance to their study program:

- Sub-group A – geodesy and geoinformatics
- Sub-group B – all other study programs

Each sub-group has the objective to develop three LLL courses for the respective groups of professionals including theoretical and practical learning material as well as methodology for courses execution.

Persons dealing with the execution of task group 2.2. are task leader, task deputy leader and all partners contributing to the deliverable.



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Role	Name	Organization	e-mail
Task leader	Hrvoje Meaški	UNI Zagreb FGE (P01.2)	hrvoje.measki@gfv.hr
Deputy task leader	Slavko Vasiljević	UNI Banja Luka (P08)	slavko.vasiljevic@aggf.unibl.org
Member	Nikola Kranjčić	UNI Zagreb FGE (P01.2)	nikola.kranjicic@gmail.com
Member	Dražen Tutić	UniZg FoG (P01.1)	dtutic@geof.hr
Member	Zlatko Srbinoski	UKIM Skopje (P04)	srbinoski@gf.ukim.edu.mk
Member	Ulrike Klein	HBO (P05)	ulrike.klein@hs-bochum.de
Member	Edmond Hoxha	PUT FGN (P06.2)	ehoxha63@gmail.com
Member	Snježana Musa	UNI Mostar (P09)	snjezamusa@hotmail.com
Member	Hamid Ćustović	UNI Sarajevo FASF (P10.2)	custovic.hamid@gmail.com
Member	Mirza Ponjavić	UNI Tuzla (P11)	mirza@gis.ba
Member	Naim Preniqi	UBT (P12)	naim.preniqi@ubt-uni.net
Member	Mirko Knežević	UCG BTF (P13.2)	mirkok@ac.me
Member	Dragomir Grujović	UNI Beograd (P14)	dragomir.grujovic@sfb.bg.ac.rs
Member	Viktorija Aladžić	UNI Novi Sad FCE (P15.2)	aviktorija@hotmail.com



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2 DELIVERABLES

This task group produced the following deliverables.

Number	Title	Date
D1	Learning materials	30.09.2018.
D2	Long-life learning modules proposed	12.11.2018.
D3	Final report	27.11.2018.



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3 PROPOSED LIFE-LONG LEARNING MODULES

Every partner should have proposed three (3) LLL courses in accordance to their study program and with relation to the SDI curriculum building block. Learning materials are prepared in joint task with task group 2.1. Task group 2.2 was also combined with task group 4.2 (life-long learning courses for professionals). These task groups are connected and they were simultaneously discussed in following workshops:

- Q4 workshop in Nikšić – Introduction to task group 2.2
- Q5 workshop in Mostar – Development of LLL courses
- Q6 workshop in Banja Luka – LLL training program and LLL implementation example
- 2nd Summer School Split - LLL program & courses – structure, content, lectures, exercise, materials. LLL program & courses – adaptation to partner study program & profile of professionals. LLL program & courses – organisation, management, execution
- Q7 workshop in Tirana – description of LLL course program. Presenting results of collection of initial information from partners.

After 2nd Summer School in Split the questionnaire on LLL courses was prepared and send to each partner. Questionnaire was prepared to find out and evaluate how many LLL courses partners intend to implement, organizational issues, and general topics on LLL that would partners implement. Questionnaire was sent to partners via their mail addresses. 15 out of 19 partners responded on questionnaire and proposed different LLL modules. However, partners HBO (P05) and UNI Novi Sad FTS (P15.1) have sent letters explaining that they are not able to define LLL modules. HBO have started negotiating with public administrations in order to set up tailor made LLL courses for selected staff group and cannot fill-in the questionnaire with tangible content. UNI Novi Sad FTS explained that they are working on LLL courses in the area of E-Learning and they are obliged not to share those results outside the project and therefore aren't able to fill-in the questionnaire.

In follow-up to this introduction are summarized reports of each partner with proposed names of LLL courses, building blocks, expected date and expected number of participants.

3.1 Faculty of Geodesy, UNIZG (P01.1)

Proposed name of LLL course No.1: *Fundamentals of IPP for providers of spatial services*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *Winter 2018/2019*



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Expected number of participants: 20

Proposed name of LLL course No.2: *Establishment of web-services for spatial data (WMS, WFS, CSW)*

Relation to the SDI curriculum building block: *BB9: SDI Application Development*

Expected date of execution: *Winter 2018/2019*

Expected number of participants: 30

Proposed name of LLL course No.3: *Smart Cities – future of geodetic profession?*

Relation to the SDI curriculum building block: *BB6: Non – technical Developments*

Expected date of execution: *Winter 2018/2019*

Expected number of participants: 40

Proposed name of additional LLL course: *In April 2019 new round of LLL courses for Croatian Chamber of Licensed Surveyors will start. SDI courses are foreseen to be conducted again.*

Relation to the SDI curriculum building block: *Not defined yet*

Expected date of execution: *Spring 2019/ Winter 2020*

Expected number of participants: 30

3.2 KU Leuven (P02)

Proposed name of LLL course No.1: *Beyond SDI: GDPR and secure access to geospatial data and services*

Relation to the SDI curriculum building block: *BB7: Technological Trends*

Expected date of execution: *Spring 2019*

Expected number of participants: 10



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Proposed name of LLL course No.2: *Beyond SDI: exchanging metadata between portals using DCAT*

Relation to the SDI curriculum building block: *BB7: Technological Trends*

Expected date of execution: *Spring 2019*

Expected number of participants: *15*

Proposed name of LLL course No.3: *Beyond SDI: time components and the use of data cubes*

Relation to the SDI curriculum building block: *BB/: Technological Trends*

Expected date of execution: *Spring 2019*

Expected number of participants: *10*

3.3 Faculty of Civil Engineering, Architecture and Geodesy, UNIST (P03)

Proposed name of LLL course No.1: *State spatial databases*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *May 2019*

Expected number of participants: *10*

Proposed name of LLL course No.2: *SDI in urban planning*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *September 2019*

Expected number of participants: *10*

Proposed name of LLL course No.3: *MSDI*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *June 2019*



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Expected number of participants: 10

3.4 UKIM Skopje (P04)

Proposed name of LLL course No.1: *Basic of SDI*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *March 2019*

Expected number of participants: *100*

Proposed name of LLL course No.2: *Technological Trends*

Relation to the SDI curriculum building block: *BB7: Technological Trends*

Expected date of execution: *May 2019*

Expected number of participants: *100*

Proposed name of LLL course No.3: *SDI Access Mechanism*

Relation to the SDI curriculum building block: *BB4: SDI Access Mechanism*

Expected date of execution: *June 2019*

Expected number of participants: *30*

3.5 HBO (P05)

University of Applied Sciences Bochum will not organize LLL courses.

3.6 PUT FCE (P06.1)

Proposed name of LLL course No.1: *Inspire and NSDI, Architecture and Legislation*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *December 2018*



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Expected number of participants: 15

Proposed name of LLL course No.2: *Main themes in SDI (Ortho-photo and Spatial Databases and Web-GIS)*

Relation to the SDI curriculum building block: *BB3: SDI Data Modelling and Data Harmonization*

Expected date of execution: February 2019

Expected number of participants: 15

Proposed name of LLL course No.3: *Working with Portals and Data sets*

Relation to the SDI curriculum building block: *BB4: SDI Access Mechanism*

Expected date of execution: May 2019

Expected number of participants: 12

3.7 PUT FCE (P06.2)

Proposed name of LLL course No.1: *SDI Concept and Principles*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: March 2019

Expected number of participants: 15

Proposed name of LLL course No.2: *Remote Sensing; OrthoPhotos; Databases and WEB-GIS*

Relation to the SDI curriculum building block: *BB3: SDI Data Modelling and Data Harmonization*

Expected date of execution: May 2019

Expected number of participants: 15

Proposed name of LLL course No.3: *Mine Surveying and Working with Portals*



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Relation to the SDI curriculum building block: *BB4: SDI Access Mechanism*

Expected date of execution: *Autumn/Winter 2019*

Expected number of participants: *15*

3.8 AUT Tirana (P07)

Proposed name of LLL course No.1: *SDI and using data of National Forest Inventory*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *November 2017 / May 2018*

Expected number of participants: *20*

Proposed name of LLL course No.2: *SDI and using data of National Forest Inventory*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *May 2018*

Expected number of participants: *20*

3.9 UNI Banja Luka (P08)

Proposed name of LLL course No.1: *Basic of SDI*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *June 2019*

Expected number of participants: *10*

Proposed name of LLL course No.2: *SDI Data Modelling*

Relation to the SDI curriculum building block: *BB3: SDI Data Modelling and Data Harmonization*

Expected date of execution: *September 2019*



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Expected number of participants: 10

Proposed name of LLL course No.3: *Advanced course of SDI Data Modelling and Data Harmonization*

Relation to the SDI curriculum building block: *BB3: SDI Data Modelling and Data Harmonization*

Expected date of execution: *December 2019*

Expected number of participants: 10

3.10 UNI Mostar (P09)

Proposed name of LLL course No.1: *SDI Concepts and Principles*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *October 2019*

Expected number of participants: 5

Proposed name of LLL course No.2: *SDI at Work*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: February 2020

Expected number of participants: 5

Proposed name of LLL course No.3: *SDI for Thematic Applications*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *June 2020*

Expected number of participants: 5

3.11 UNI Sarajevo FCE (P10.1)



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Proposed name of LLL course No.1: *Spatial Databases and Spatial Data Infrastructure*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *January 2019*

Expected number of participants: *20*

Proposed name of LLL course No.2: *Metadata*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *2019*

Expected number of participants: *20*

Proposed name of LLL course No.3: *Harmonization of spatial data*

Relation to the SDI curriculum building block: *BB3: SDI Data Modelling and Data Harmonization*

Expected date of execution: *2019*

Expected number of participants: *20*

3.12 UNI Sarajevo FAFS (P10.2)

Proposed name of LLL course No.1: *SDI in agriculture*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *May 2019*

Expected number of participants: *15*

Proposed name of LLL course No.2: *SDI in agriculture*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *May 2019*

Expected number of participants: *15*



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Proposed name of LLL course No.3: *SDI in agriculture*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *May 2019*

Expected number of participants: *15*

3.13 UNI Tuzla (P11)

Proposed name of LLL course No.1: *SDI in mining*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *July 2019*

Expected number of participants: *15*

Proposed name of LLL course No.2: *SDI in geology*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *July 2019*

Expected number of participants: *15*

Proposed name of LLL course No.3: *SDI in Civil Engineering*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *July 2019*

Expected number of participants: *15*

3.14 UBT (P12)

Proposed name of LLL course No.1: *Harmonization of geospatial data in Kosovo*

Relation to the SDI curriculum building block: *BB3: SDI Data Modelling and Data Harmonization*



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Expected date of execution: *May 2019*

Expected number of participants: *20*

Proposed name of LLL course No.2: *The role and importance of SDI*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *November 2019*

Expected number of participants: *20*

Proposed name of LLL course No.3: *Use of programs and technologies in SDI*

Relation to the SDI curriculum building block: *BB9: SDI Application Development*

Expected date of execution: *November 2019*

Expected number of participants: *20*

3.15 UCG FF (P13.1)

Proposed name of LLL course No.1: *Speleology school*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *May 2019*

Expected number of participants: *20*

Proposed name of LLL course No.2: *Speleology school*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *June 2019*

Expected number of participants: *20*

Proposed name of LLL course No.3: *Geoecology camp on pasture Vranjak in Kolašin*



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Relation to the SDI curriculum building block: *BB8: SDI for Thematic Application*

Expected date of execution: *August 2019*

Expected number of participants: *30*

3.16 UCG BTF (P13.2)

Proposed name of LLL course No.1: *SDI and Soil Sampling*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *March 2019*

Expected number of participants: *10*

Proposed name of LLL course No.2: *SDI and Soil Analysis*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *May 2019*

Expected number of participants: *10*

Proposed name of LLL course No.3: *SDI and using data of National Forest Inventory*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *May 2019*

Expected number of participants: *10*

3.17 UNI Beograd (P14)

Proposed name of LLL course No.1: *Using SDI in Forestry*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *July 2019*



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Expected number of participants: 12

Proposed name of LLL course No.2: *Using SDI in Landscape Architecture*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *July 2019*

Expected number of participants: 10

Proposed name of LLL course No.3: *Using SDI in Ecological Engineering*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *July 2019*

Expected number of participants: 8

3.18 UNI Novi Sad FTS (P15.1)

Proposed name of LLL course No.1: *SDI in agriculture*

Relation to the SDI curriculum building block: *BB8: SDI for Thematic Applications*

Expected date of execution: *June 2019*

Expected number of participants: 10

Proposed name of LLL course No.2: *SDI in Smart Cities*

Relation to the SDI curriculum building block: *BB7: Technological Trends*

Expected date of execution: *June 2019*

Expected number of participants: 10

Proposed name of LLL course No.3: *SDI in Smart Cities*

Relation to the SDI curriculum building block: *BB9: SDI Application Development*



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Training for Spatial Data Infrastructures

*With the support of the Erasmus+ program:
Higher Education – International Capacity Building
N° 574150-EPP-1-2016-1-HR-EPPKA2-CBHE-JP*

Expected date of execution: *June 2019*

Expected number of participants: 20

3.19 UNI Novi Sad FCE (P15.2)

Proposed name of LLL course No.1: *Application and practical use of SDI in Civil Engineering*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *April 2019*

Expected number of participants: 20

Proposed name of LLL course No.2: *Application and practical use of SDI in Urban Planning*

Relation to the SDI curriculum building block: *BB2: SDI at Work*

Expected date of execution: *June 2019*

Expected number of participants: 20

Proposed name of LLL course No.3: *Fundamentals of SDI and its engineering applications*

Relation to the SDI curriculum building block: *BB1: SDI Concepts and Principles*

Expected date of execution: *April 2019*

Expected number of participants: 30



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4 RESULTS

As seen from chapter 3 each partner proposed minimum of 3 life-long learning modules. Planned execution of life-long learning is from the end of 2018 to beginning of 2020. Each of the partners expects between 5 and 40 participants, which would in total be over 800 participants. Large number of participants will have direct impact in education and resulting in dissemination activities on larger population. Detailed numbers of participants, courses, and building blocks are presented in Table 1, Table 2 and Table 3.

Table 1 shows number of participants and total sum of participants on LLL courses.



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Table 1 – Number of participants on each module

Partner	LLL course 1	LLL course 2	LLL course 3	LLL course 3	Number of participants
1. Faculty of Geodesy, UNIZG (P01.1)	20	30	40	30	120
2. KU Leuven (P02)	10	15	10	/	35
3. Faculty of Civil Engineering, Architecture and Geodesy, UNIST (P03)	10	10	10	/	30
4. UKIM Skopje (P04)	100	100	30	/	230
5. HBO (P05)	/	/	/	/	/
6. PUT FCE (P06.1)	15	15	12	/	42
7. PUT FCE (P06.2)	15	15	15	/	45
8. AUT Tirana (P07)	20	20	/	/	40
9. UNI Banja Luka (P08)	10	10	10	/	30
10. UNI Mostar (P09)	5	5	5	/	15
11. UNI Sarajevo FCE (P10.1)	20	20	20	/	60
12. UNI Sarajevo FAFS (P10.2)	15	15	15	/	45
13. UNI Tuzla (P11)	15	15	15	/	45
14. UBT (P12)	20	20	20	/	60



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15. UCG FF (P13.1)	20	20	30	/	70
16. UCG BTF (P13.2)	10	10	10	/	30
17. UNI Beograd (P14)	12	10	8	/	30
18. UNI Novi Sad FTS (P15.1)	10	10	20	/	40
19. UNI Novi Sad FCE (P15.2)	20	20	30	/	70
Total number of participants:	347	360	300	30	1037

In table 2 are presented levels of LLL courses each partner defined. The levels are divided in three categories according to project curricula. Each LLL course has been sorted based on proposed name of course and building block. Table 2 shows that partners have proposed mostly basic and application courses, which could attract more participants.

Table 2 Levels of LLL courses

Partner	Basic	Advanced	Application
1. Faculty of Geodesy, UNIZG (P01.1)	2	2	x
2. KU Leuven (P02)	x	3	x
3. Faculty of Civil Engineering, Architecture and Geodesy, UNIST (P03)	1	1	1
4. UKIM Skopje (P04)	2	1	x
5. HBO (P05)	/	/	/



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6. PUT FCE (P06.1)	1	x	2
7. PUT FCE (P06.2)	1	x	2
8. AUT Tirana (P07)	2	x	x
9. UNI Banja Luka (P08)	2	1	x
10. UNI Mostar (P09)	2	x	1
11. UNI Sarajevo FCE (P10.1)	2	1	x
12. UNI Sarajevo FAFS (P10.2)	x	x	3
13. UNI Tuzla (P11)	x	x	3
14. UBT (P12)	2	x	1
15. UCG FF (P13.1)	1	x	2
16. UCG BTF (P13.2)	x	x	3
17. UNI Beograd (P14)	x	x	3
18. UNI Novi Sad FTS (P15.1)	x	3	x
19. UNI Novi Sad FCE (P15.2)	x	x	3
Total number:	18	12	24

Table 3 shows list of partners and proposed courses according to building blocks defined in project curricula. Filling out the questionnaire partners could select in which building block belongs each of proposed courses. To simplify appearance of table 3



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4. UKIM Skopje (P04)	1	/	/	1	/	/	1	/	/
5. HBO (P05)	/	/	/	/	/	/	/	/	/
6. PUT FCE (P06.1)	1	/	1	1	/	/	/	/	/
7. PUT FCE (P06.2)	1	/	1	1	/	/	/	/	/
8. AUT Tirana (P07)	/	/	/	/	/	/	/	2	/
9. UNI Banja Luka (P08)	1	/	2	/	/	/	/	/	/
10. UNI Mostar (P09)	1	1	/	/	/	/	/	1	/
11. UNI Sarajevo FCE (P10.1)	1	1	1	/	/	/	/	/	/
12. UNI Sarajevo FAFS (P10.2)	3	/	/	/	/	/	/	/	/
13. UNI Tuzla (P11)	3	/	/	/	/	/	/	/	/
14. UBT (P12)	1	/	1	/	/	/	/	/	1
15. UCG FF (P13.1)	/	1	/	/	/	/	/	2	/
16. UCG BTF (P13.2)	/	1	/	/	/	/	/	2	/
17. UNI Beograd (P14)	/	3	/	/	/	/	/	/	/
18. UNI Novi Sad FTS (P15.1)	/	/	/	/	/	/	1	1	1
19. UNI Novi Sad FCE (P15.2)	1	2	/	/	/	/	/	/	/
Total number:	18	9	6	3	0	1	5	8	3



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Comparing table 2 and table 3 we get similar conclusion. In table 2 most of the partners proposed Basic level of LLL courses and in table 3 they selected building block 1 (SDI Concepts and Principles) as primary focus which shows that partners consider that participants of LLL courses need basic knowledge on SDI. In table 2 most of the answers shows the need for courses on Application SDI and in table 3 second building block with most answers is building block 2 (SDI at work) which would imply that participants need practical use of SDI.



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5 CONCLUSION AND RECOMMENDATIONS

From this report we conclude that partners have conducted necessary means to implement life-long learning courses in academic year 2018/2019. Most of the partners in their LLL courses focus on basic and application SDI, which shows that partners have evaluated possible participants and will offer interesting courses for learning professionals. Most of the partners plan to perform LLL courses in partnership with public administration/private sector, which will assure high attendance and quality of performed courses. As part of the strengthening of cooperation with NMCA's, partners will continue to improve LLL courses and propose new LLL courses.

In order to assure quality and provide new ideas for the partners recommendation is to create a courses repositiorium in task group 4.2. Each partner could use prepared courses and implement it on their University or use prepared courses in order to upgrade and develop new courses.