

# Arhitektonsko obrazovanje za budućnost: Multidisciplinarna istraživanja i razmjene znanja sa arhitektonsko-građevinskim sektorom

## Architectural Education for the Future: Multidisciplinary Research and Knowledge Exchange with the Architectural and Construction Sector

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dipl. ing. arch.

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**Sažetak** Da bi se doprinijelo kvalitetu obrazovanja arhitekata u skladu s kontinuiranim, globalnim i lokalnim, društvenim, ekonomskim, tehnološkim i ekološkim promjenama, autorica predlaže proširivanje saradnje istraživača sa arhitektonsko-građevinskim sektorom i stanovništvom.

Cilj prvog dijela članka je da ukaže na značaj obrazovanja stečenog na Arhitektonskom fakultetu u Sarajevu (1971-1976), magistarskom studiju iz oblasti revitalizacije graditeljskog naslijeđa i doktorskom studiju iz oblasti historije arhitekture na Arhitektonskom fakultetu u Zagrebu, te profesionalnih iskustava u stambenoj izgradnji u Sarajevu (pet godina) i u obrazovanju studenata Arhitektonskog fakulteta u Sarajevu na Katedri za historiju arhitekture i revitalizaciju graditeljskog naslijeđa (11 godina). Članak sadrži nekoliko primjera primjene profesionalnog obrazovanja i iskustava u nalaženju posla u gradu Alžiru (1992-1994) i u građenju akademske karijere u Glasgowu, Velika Britanija (1994-2022).

Fokus drugog dijela članka je na saznanjima i iskustvima stečenim kroz proširivanje istraživačkih interesa kroz multiinstitucionalne projekte za razmjenu znanja između istraživača i arhitektonsko-građevinskog sektora u vezi s održivosti arhitekture (postojeće i planirane) i urbanog razvoja (1998-2020). Konferencija Ujedinjenih nacija "Prirodna okolina i razvoj", održana u Rio de Janeiru 1992. god., označila je i prekretnicu u proširivanju njenih istraživačkih interesa jer je podržavala razvoj koji nastoji da ukloni ili značajno smanji negativne uticaje ljudskih aktivnosti na biosferu. Prijedlozi u vezi s arhitektonskim obrazovanjem su bazirani na istraživanjima i iskustvu stečenom kroz multidisciplinarnе, multiinstitucionalne, internacionalne, regionalne i lokalne projekte u toku 22 godine.

**Abstract** The aim of this article is to propose expanding the cooperation of researchers with the architectural and construction sector and the population in order to contribute to the quality of the education of architects in the context of continuous, global and local, social, economic, technological and ecological changes.

The first part of the article aims to highlight the importance of the education I received at the Faculty of Architecture in Sarajevo (1971-1976) as well as my MSc degree in the field of the revitalization of architectural heritage, and my doctoral degree in the field of architectural history at the Faculty of Architecture in Zagreb, followed by professional experience in residential construction in Sarajevo (5 years) and in the education of students at the Faculty of Architecture in Sarajevo at the Department of Architectural History and Revitalization of Architectural Heritage (11 years). The article contains a couple of examples of how I applied my professional education and experiences in finding a job in the city of Algiers (1992-1994) and in building an academic career in Glasgow, Great Britain (1994-2022).

The focus of the second part of the article is on the knowledge and experiences I gained through expanding research interests through multi-institutional projects for knowledge exchange between researchers and the architectural-construction sector regarding sustainable architecture (existing and planned) and urban development (1998-2020). The United Nations Conference on "Environment and Development", held in Rio de Janeiro in 1992 marked a turning point in the expansion of my research interests because it supported development that seeks to eliminate or significantly reduce the negative impacts of human activities on the biosphere. Recommendations regarding architectural education are based on research and experience gained through multidisciplinary, multi-institutional, international, regional and local projects over the course of 22 years.

**Ključne riječi** transdisciplinarna saradnja; inovacije; razmjena znanja; arhitektonsko-građevinska praksa; arhitektonsko obrazovanje.

**Keywords** transdisciplinary cooperation; innovation; knowledge exchange; architectural and construction practice; architectural education.

# 1 Razvoj i primjene arhitektonskog obrazovanja

## 1.1 Početak: Zašto arhitektura, njena revitalizacija i historija?

Dok sam razmišljala o izboru studija nakon završetka gimnazijskog obrazovanja 1971. god., znala sam da su moji najjači interesi vezani za kreativnost koja ima značajnu vizuelnu dimenziju kao što su slikarstvo, dizajn, arhitektura, pozorišna i filmska režija. Pošto tada u Sarajevu nisu postojale umjetničke akademije, studij arhitekture je bio jedini koji je mogao da zadovolji taj primarni interes. U toku prve dvije godine studija, slobodno crtanje, historija arhitekture, arhitektonske kompozicije i osnove projektovanja su bili predmeti koji su odgovarali mojim tadašnjom idejama o kreativnosti. Mada su profesori predmeta vezanih za graditeljske tehnologije i infrastrukture bili izvrsni, moj interes za te teme nije bio posebno izražen. Tek u praksi, koja je odmah uslijedila u oblasti stambene izgradnje u Sarajevu, i nakon kasnijeg proširivanja mojih istraživačkih interesa u područje održive arhitekture i urbanizma, shvatila sam značaj tog inženjerskog znanja. Međutim, kasnije sam isto tako shvatila koliko je slobodno crtanje pomoglo da se snađem u trenutku kada nije bilo lako naći posao u arhitektonskoj struci u Alžiru gdje sam se zatekla 1992. god.

Kada su profesori Husref Redžić i Džemal Čelić predstavili nacrt *Regulacionog plana sanacije, konzervacije, restauracije i revitalizacije sarajevske čaršije*, na javnom skupu u Vijećnici 1972, odlučila sam da će revitalizacija graditeljskog naslijeđa biti smjer koji ću odabrati u toku dvije završne godine studija i magistarskog studija. Naučni radovi profesora Ibrahima Krzovića i Nedžada Kurte o arhitekturi Bosne i Hercegovine u periodu 1878-1918. postavili su temelje za dalja istraživanja o najznačajnijim arhitektima tog perioda među kojima se, kvalitetom, značajem i brojnošću izgrađenih objekata, isticao češki arhitekt Karlo Pařík čiji sam stvaralački opus predstavila u doktorskoj disertaciji (Dimitrijević, 1990; 1991) i doprinijela organizaciji izložbe održane u Zemaljskom muzeju u Sarajevu u junu 2007. god. koja je bila posvećene njegovom arhitektonskom opusu (Ilustracija 1).



# 1 Development and Applications of Architectural Education

## 1.1. Beginning: Why Architecture, its Revitalization and History?

Thinking about my choice of studies after completing my high school education in 1971, I knew that my strongest interests were related to creativity that has a significant visual dimension, such as painting, design, architecture, theater and film direction. Since there were no art academies in Sarajevo at the time, studying architecture was the only thing that could satisfy that primary interest. During the first two years of study, freehand drawing, the history of architecture, architectural compositions and the basics of design were subjects that corresponded with my ideas about creativity at the time. Although the professors of the courses related to construction technologies and infrastructure were excellent, my interest in these topics was not very strong. Only in practice, which immediately followed in the field of residential construction in Sarajevo, and after later expanding my research interests into the field of sustainable architecture and urban planning, did I understand the importance of this engineering knowledge. However, later I also realized how much freehand drawing helped me navigate the times when it was not easy to find a job in the architectural profession in Algeria, where I found myself in 1992.

When Professors Husref Redžić and Džemal Čelić presented the *Regulatory Plan for the Rehabilitation, Conservation, Restoration and Revitalization of the Sarajevo Bazaar* at a public meeting at Sarajevo's Vijećnica in 1972, I decided that the revitalization of architectural heritage would be the direction I would choose during the two final years of my studies and during my master's studies. The research of Professors Ibrahim Krzović and Nedžad Kurto on the architecture of Bosnia and Herzegovina in the period 1878-1918 laid the foundations for further research on the most important architects of that period, among whom, in terms of the quality, significance and number of buildings built, the Czech architect Karel Pařík stood out. I presented his creative work in my doctoral dissertation (Dimitrijević, 1990; 1991) and contributed to the organization of an exhibition dedicated to his architecture, held in the National Museum in Sarajevo in June 2007 (Figure 1).

## 1.2 Continuation: Combining Theory and Practice

After acquiring theoretical knowledge during my architecture studies, it was necessary to see firsthand how architectural and urban projects are transformed into buildings and urban entities. I was lucky enough to start gaining these experiences as a member of a team of experienced engineers who had been supervising the construction of a residential complex in the neighbourhood

**Ilustracija 1** Katalog izložbe o arhitekti Karlu Paříku, 2007.god.  
Izvor: Kuděla, Dimitrijević i Vacik, 2007.

**Figure 1** Catalogue of the exhibition about the architect Karel Pařík, 2007. Source: Kuděla, Dimitrijević i Vacik, 2007.



## 1.2 Nastavak: Kombinovanje teorije i prakse

Nakon sticanja teoretskih znanja u toku studija arhitekture, bilo je neophodno vidjeti iz prve ruke kako se arhitektonski i urbani projekti transformišu u građevine i gradske cjeline. Imala sam sreću da počnem sticati ta iskustva kao član tima iskusnih inženjera koji su vodili nadzor izgradnje stambenog naselja na Alipašinom polju od 1976. god. Samostalno sam vodila nadzor izgradnje jednog ansambla 'trgovki' na Baščaršiji i nekoliko novih stambenih objekata u centru grada. Istovremeno sam pohađala magistarski studij za revitalizaciju graditeljskog naslijeđa u Splitu, u organizaciji Univerziteta u Zagrebu, te u septembru 1981. god. počela da radim kao asistent na Katedri za historiju arhitekture i revitalizaciju graditeljskog naslijeđa na Arhitektonskom fakultetu u Sarajevu.

## 1.3 Putokazi 1992: Slikarstvo i konferencija Ujedinjenih nacija

U januaru 1992. god. započela sam planirano istraživanje o međusobnim uticajima arhitekture i urbanizma u području Mediterana s idejom da objavim rezultate tog jednogodišnjeg istraživanja i organizujem u Sarajevu prateću izložbu mojih akvarela alžirske arhitekture. Obišla sam Kazbu u gradu Alžiru, u pratnji jednog od njenih stanovnika, ali nisam mogla da skiciram na ulicama Kazbe — kao što smo u toku studija skicirali na Kovačima i Vratniku — jer stanovnici Kazbe ne vole da vide strance u svom stambenom naselju. Međutim, brojne fotografije ulica, građevina, arhitektonskih detalja i panorame s vrha Kazbe, koja se spušta niz strmu padinu, poslužile su da napravim prvu seriju akvarela (Ilustracija 2).

Pošto smo počeli da se družimo sa Alžircima i strancima koji su radili u Alžiru, moji akvareli su privukli pažnju. Jedna nova poznanica je predložila da organizuje izložbu u svojoj kući uz kafu i kolače. Druga je prokomentarisala da radije kupuje uljane slike zbog njihove duže trajnosti. Pošto su me i ranije privlačile i druge slikarske tehnike, ponijela sam iz Sarajeva knjigu *Crtanje i slikanje* (Bagnal, 1990) koja sadrži detaljna uputstva, uključujući liste i fotografije

of Alipašino Polje since 1976. I independently supervised the construction of an ensemble of traditional shops at Baščaršija and several new residential buildings in the city center. At the same time, I attended the MSc programme for the revitalization of architectural heritage in Split, organized by the University of Zagreb, and, in September 1981, I started working as an Assistant at the Department of Architectural History and the Revitalization of Architectural Heritage at the Faculty of Architecture in Sarajevo.

## 1.3 Roadmaps in 1992: Painting and the United Nations Conference

In January 1992, I started planned research on the mutual influences of architecture and urbanism in the Mediterranean area with the idea of publishing the results of that one-year research and organizing an accompanying exhibition of my watercolours of Algerian architecture in Sarajevo. I visited the Casbah of Algiers accompanied by one of its residents, but I could not sketch on the streets of the Casbah — as we sketched at Kovači and Vratnik during my studies — because the residents of the Casbah do not like to see foreigners in their residential area. However, numerous photographs of streets, buildings, architectural details and the panorama from the top of the Casbah, which descends down the steep slope, served to create my first series of watercolours (Figure 2).

As we began to socialize with the Algerians and foreigners working in Algeria, my watercolours attracted attention. A new acquaintance suggested organizing an exhibition at her house with coffee and cookies. Another commented that she prefers to buy oil paintings because of their longer durability. Since I had previously been attracted to other painting techniques, I had brought with me from Sarajevo the book 'Drawing and Painting' (Bagnal, 1990), which contained detailed instructions, including lists and photographs of the necessary painting materials and tools. I bought everything I needed to paint with oil paints and did my first series of ten paintings of the architecture in the Casbah, experimenting with each one to understand what effects could be achieved.



**Ilustracija 2** Primjeri mojih akvarela Kazbe u gradu Alžiru, 1992. (s lijeva na desno): portal, ulica, portal. Izvor: Dimitrijević, 1992.

**Figure 2** Examples of my watercolours of the Casbah of Algiers, 1992: (a) portal, (b) street, (c) portal. Source: Dimitrijević, 1992.

neophodnih slikarskih materijala i pribora. Kupila sam sve što je bilo potrebno da slikam uljanim bojama i uradim prvu seriju od deset slika arhitekture u Kazbi, eksperimentišući na svakoj od njih da bih shvatila koji se efekti mogu postići. Izložila sam preko 30 akvarela i tih 10 eksperimentalnih uljanih slika na toj prvoj, privatnoj izložbi u septembru 1992. god. — i sve prodala... To je bio veliki podsticaj da nastavim slikati i izlagati u privatnim i javnim prostorima u Alžiru i kasnije u Glasgowlu. Slobodno crtanje je zatim pomoglo da nađem prvo stalno zaposlenje od januara 1993. god. kao nastavnica likovnog obrazovanja u američkoj osnovnoj školi u Alžiru. Naravno, i dalje sam slikala, izlagala i prodavala slike koje su otputovale u koferima stranaca u mnoge krajeve svijeta kao pokloni i suveniri jer je bilo praktično složiti neuokvirene slike u prtljag. Nisam vodila evidenciju o broju slika koje sam prodala, ali sam procijenila, uzimajući u obzir prosječni nedjeljni rezultat, da se više od 600 mojih slika nalazi na zidovima u Alžiru i u mnogim drugim zemljama.

Prije odlaska iz Sarajeva pohađala sam kurs AutoCada. Ponijela sam iz Sarajeva AutoCad tablet i kompjuter na kojem sam pisala doktorsku disertaciju, završenu 1989. i odbranjenju 1991. god. Međutim, ubrzo je postalo jasno da će biti vrlo teško naći posao arhitekta jer je u Alžiru tada postojala Asocijacija nezaposlenih alžirskih arhitekata. Prijatelji koje smo upoznali u Alžiru pomogli su da uspostavim kontakt s poznatim alžirskim arhitektom i urbanistom Tewfikom Guerrouddjem s kojim sam sarađivala na izradi regulacionog plana jednog manjeg alžirskog grada. Na sličan način sam dobila priliku da uradim projekt enterijera Britanskog kluba u zgradi ambasade Velike Britanije u Alžiru. Ipak, bilo je jasno da su slikanje, rad sa djecom u školi i par projekata bili privremeno rješenje i da, pošto povratak u Sarajevo nije bio moguć, treba tražiti mogućnosti za dugotrajniji profesionalni angažman koji se nije mogao ostvariti u Alžiru.

Dok je stradanje Sarajeva uzimalo maha, u Rio de Janeiro se, od 2. do 14. juna 1992. god., održavala konferencija Ujedinjenih nacija (UN) pod nazivom "Prirodna okolina i razvoj" (UN, 1992). Besmislenost svega što se istovremeno dešavalo u nekadašnjoj Jugoslaviji nije mogla biti veća u poređenju s planovima UN-a za održivi razvoj. Inovacije u vezi s održivosti postojeće i nove arhitekture i urbanizma postale su od tada moj primarni istraživački interes. Pošto još nisam imala iskustva u toj istraživačkoj oblasti, nastavila sam da tražim akademske pozicije u oblasti historije arhitekture i revitalizacije graditeljskog naslijeđa. Prof. Frank Walker sa Strathclyde Univerziteta u Glasgowlu poslao je pozitivan odgovor i vidjevši, tokom neformalnog intervjua u junu 1994. god., primjere mojih akvarela alžirske Kazbe, predložio je da ih izložim na Departmanu za arhitekturu. Slobodno crtanje je tako, uz ostala profesionalna znanja i iskustva, pomoglo u nalaženju zaposlenja i u Glasgowlu.

## 2 Istraživanja i razmjene znanja o održivoj arhitekturi i urbanizmu

Opisi ciljeva i rezultata naučnih istraživanja i razmjene znanja koji slijede praćeni su ponegdje komentarima o značaju znanja i iskustava koje sam stekla prije odlaska iz Sarajeva 1992. god. i *prijedlozima u vezi s arhitektonskim obrazovanjem*.

I exhibited over 30 watercolours and 10 experimental oil paintings at that first private exhibition in September 1992 — and sold everything... This was a great incentive for me to continue painting and exhibiting in private and public spaces in Algeria, and later in Glasgow. Freehand drawing then helped me find my first permanent job in January 1993 as an art teacher at an American elementary school. Of course, I still painted, exhibited and sold pictures that travelled in the suitcases of foreigners to many parts of the world as gifts and souvenirs, because it was practical to put unframed pictures in luggage. I did not keep a record of the number of paintings I sold, but I estimated, taking into account the average weekly result, that more than 600 of my paintings hang on walls in Algeria and many other countries.

Before leaving Sarajevo, I attended an AutoCad course. I brought an AutoCad tablet and a computer from Sarajevo on which I wrote my doctoral dissertation, completed in 1989 and defended in 1991. However, it soon became clear that it would be very difficult to find a job as an architect because there was an Association of Unemployed Algerian Architects in Algeria at the time. The friends we met in Algeria helped me establish contact with the well-known Algerian architect and urban planner Tewfik Guerroudj, with whom I collaborated on the development of a regulatory plan for a small Algerian city. In a similar way, I got the opportunity to design the interior of the British Club in the building of the British Embassy in Algiers. Nevertheless, it was clear that painting, working with children at school and a couple of projects were a temporary solution and that, since returning to Sarajevo was not possible, I should look for opportunities for a longer-term professional engagement that could not be realized in Algeria.

While the destruction of Sarajevo was gaining momentum, a United Nations (UN) conference entitled "Environment and Development" was held in Rio de Janeiro from 2-14 June 1992 (UN, 1992). The senselessness of everything that was happening simultaneously in the former Yugoslavia could not be greater, especially when compared to the UN's plans for sustainable development. Innovations regarding the sustainability of existing and new architecture and urban planning have since become my primary research interest. Since I still had no experience in that research field, I continued to look for academic positions in the field of architectural history and the revitalization of architectural heritage. Prof. Frank Walker from Strathclyde University in Glasgow sent a positive reply and having seen, during an informal interview in June 1994, examples of my watercolours of the Casbah of Algiers, he suggested that I exhibit them in the Department of Architecture. Freehand drawing thus, along with other professional knowledge and experience, helped me in finding employment in Glasgow as well.

## 2 Research and Knowledge Exchange about Sustainable Architecture and Urbanism

The following descriptions of the goals and results of research and knowledge exchange are sometimes accompanied by comments about the importance of the knowledge and experiences I gained before leaving Sarajevo in 1992, and by recommendations regarding architectural education.



## 2.1 Proširivanje istraživanja: Štednja energije u građevinama

Prvo istraživanje o održivoj arhitekturi u kojem sam učestvovala je imalo naziv *Održive građevine: trajnost, adaptabilnost i štednja energije*<sup>1</sup>, zasnovano na hipotezi da ove tri karakteristike građevina imaju presudan uticaj na njihovu održivost. Cilj istraživanja je bio da se definišu i testiraju kriteriji za evaluaciju ovih karakteristika na 11 građevina (šest obrazovnih i pet za smještaj studenata) izgrađenih u periodu 1905-1998. u okviru kampusa Strathclyde Univerziteta. Testiranje predloženih kriterija i rezultata evaluacije odabranih građevina urađeno je u saradnji s arhitektima i građevincima iz prakse, primjenjujući princip razmjene znanja. Rezultati istraživanja su pokazali da je najstarija obrazovna zgrada u univerzitetskom kampusu (izgrađena 1905. god.) bila rangirana kao četvrta po ukupnom rezultatu evaluacije, tj. da su karakteristike trajnosti, adaptabilnosti i štednje energije bile lošije u preostalih sedam građevina koje su bile izgrađene kasnije. Ovaj rezultat je bio značajan u pogledu razumijevanja održivosti graditeljskog naslijeđa. Rezultati istraživanja objavljeni su u nekoliko radova od kojih ovdje navodim rad koji je predstavio glavne rezultate tog istraživanja (Langford, MacLeod, Maver & Dimitrijević, 2002).

Znanja o građevinarstvu i infrastrukturama koje sam stekla na Arhitektonskom fakultetu u Sarajevu i kroz praksu u nadzoru stambene izgradnje bila su odlična osnova za njihovo dalje proširivanje kroz istraživanja.

*Saznanja iz ovog projekta sugerišu da je u toku studija arhitekture potrebno planirati razmjene znanja (predavanja, vježbe, seminare o rezultatima istraživanja i iskustvima iz prakse, itd.) iz svih oblasti inženjerstva koje se primjenjuju u arhitektonskom dizajnu, građevinarstvu i urbanom planiranju.*

### 2.2 Razmjene znanja između istraživačkih institucija i prakse

Nakon konferencije Ujedinjenih nacija u Rio de Janeiru 1992. god., Velika Britanija je počela da usvaja planove za održivi razvoj i finansira istraživanja (na univerzitetima i u drugim istraživačkim institucijama) o tehnologijama za smanjivanje negativnih uticaja na prirodnu okolinu i klimu. To je bio signal za sve ekonomske sektore da će nacionalne i lokalne institucije dati prioritet finansiranju održivih projekata i usluga. Pošto manje firme najčešće nemaju istraživačke kapacitete za razvijanje novih tehnologija, počelo je finansiranje projekata razmjene znanja između istraživačkih institucija i malih i srednjih firmi. Evropski Fond za regionalni razvoj (European Regional Development Fund — ERDF) je sufinansirao te projekte do zvaničnog izlaska Velike Britanije iz Evropske unije (EU) 01/02/2020. Velika Britanija je nastavila da samostalno finansira ne samo projekte za razmjenu znanja već i kolaborativne istraživačke projekte istraživačkih institucija i firmi za razvoj inovacija za održivi izgrađeni prostor.

<sup>1</sup> Finansiranje: Energy and Physical Sciences Research Council (EPSRC), UK, 1998-2000. Ostali članovi istraživačkog tima: Prof. D. Langford, Prof. I. MacLeod (Civil Engineering) & Prof. T. Maver (Architecture), Strathclyde Univerzitet.

## 2.1 Expanding Research: Energy Conservation in Buildings

The first research project on sustainable architecture in which I participated was titled 'Sustainable Buildings: Durability, Adaptability and Energy Conservation', based on the hypothesis that these three characteristics of buildings have a decisive impact on their sustainability. The aim of the research was to define and test criteria for evaluating these characteristics on 11 buildings (six educational and five for student accommodation) built between 1905 and 1998 within the University of Strathclyde campus. The results of the study showed that the oldest educational building on the university campus (built in 1905) was ranked fourth in terms of the overall evaluation score, i.e. that the characteristics of durability, adaptability and energy conservation were worse in the remaining seven buildings that were built later. This result was significant in terms of understanding the sustainability of architectural heritage. The results of the research were published in several papers, of which I cite here the paper that presented the main results of that research (Langford, MacLeod, Maver & Dimitrijević, 2002).

The knowledge about construction and infrastructure that I acquired at the Faculty of Architecture in Sarajevo and through practice in residential construction supervision was an excellent basis for further expanding it through research.

*The findings from this project suggest that during the study of architecture, it is necessary to plan knowledge exchanges (lectures, exercises, seminars on research results and practical experience, etc.) from all areas of engineering applied in architectural design, construction and urban planning.*

### 2.2 Knowledge Exchange Between Research Institutions and Practice

After the UN Conference in Rio de Janeiro in 1992, the United Kingdom began to adopt plans for sustainable development and fund research (at universities and other research institutions) on technologies to reduce negative impacts on the natural environment and climate. This was a signal to all economic sectors that national and local institutions would prioritize financing sustainable projects and services. Since smaller companies often do not have the research capacity to develop new technologies, funding for knowledge exchange projects between research institutions and small and medium-sized companies began. The European Regional Development Fund (ERDF) co-financed these projects until the United Kingdom's official exit from the European Union (EU) on 01/02/2020. The UK has continued to independently fund not only knowledge-sharing projects but also collaborative research projects between research institutions and firms to develop innovations for a sustainable built environment.

<sup>1</sup> Funding: Energy and Physical Sciences Research Council (EPSRC), UK, 1998-2000. Other members of the research team: Prof. D. Langford, Prof. I. MacLeod (Civil Engineering) & Prof. T. Maver (Architecture), University of Strathclyde.



Prvi projekti za razmjene znanja u vezi s inovacijama za održivi izgrađeni prostor u kojima sam učestvovala su organizovali seminare i simpozije o rezultatima akademskih istraživanja i o inovacijama arhitektonsko-građevinskog sektora. Program aktivnosti je kasnije uključio takmičenja za finansiranje studija izvodivosti inovacija koje su radili akademski istraživači za potrebe malih i srednjih firmi. Internet je potom omogućio da se prošire razmjene znanja putem interaktivnih vebinara. Slijede kratki opisi takvih projekata koji su doprinijeli razumijevanju problema u praksi i doprinosili širenju mog znanja koje sam zatim prenosila studentima magistarskih i doktorskih studija u oblasti arhitekture i urbanizma.

### 2.2.1 Mreža kreativnih graditeljskih klubova<sup>2</sup>

U ovom jednogodišnjem projektu razmjene znanja, koji sam koordinirala učestvovalo je 12 univerziteta u Velikoj Britaniji. Pošto sam u to vrijeme završila modul Internet komunikacije u obrazovanju i istraživanju jednogodišnjeg kursa na Fakultetu za obrazovanje Strathclyde Univerziteta, dizajnirala sam veb stranicu projekta na kojoj su bile objavljivane aktivnosti organizovane u četiri regionalna kluba. Organizovana su 23 seminara na kojima je predstavljeno 80 inovacija i na kojima je bilo preko 600 učesnika (Langford & Dimitrijević, 2002). Seminari su pružili mogućnost proširavanja znanja i uspostavljanja kontakata s inovativnim firmama u Velikoj Britaniji pošto su informacije o predstavljenim inovacijama bile objavljene na veb stranici projekta.

*U pogledu arhitektonskog obrazovanja, akademski istraživači su mogli da identifikuju primjere iz prakse koji se mogu upotrijebiti u nastavi. Univerziteti koji organizuju seminare za razmjenu znanja mogu omogućiti studentima arhitekture da im prisustvuju.*

### 2.2.2 Izgradnja konzorcija za istraživanje inovacija za održivo graditeljstvo<sup>3</sup>

Kada je 2001. god. EU Framework 5 ponudio finansiranje projekata u kojima su mogli da učestvuju Bosna i Hercegovina i tadašnja Bivša jugoslavenska republika Makedonija, kontaktirala sam ministarstva za nauku u Sarajevu i Skoplju i dobila iz Skoplja pozitivan odgovor za pripremu zajedničkog projekta. Cilj projekta je bio da se identifikuju firme koje su zainteresovane da razviju inovacije za održivu izgradnju. Informacije o ovim makedonskim firmama su bile objavljene na veb stranici projekta i promovisane građevinskim firmama u Velikoj Britaniji i EU. Na kraju projekta Univerzitet Ćiril i Metodije u Skoplju organizovao je skup građevinskih firmi koje su se bile prijavile. Mogućnosti za učestvovanje u projektima koji razvijaju inovacije

The first knowledge exchange projects regarding innovations for the sustainable built environment in which I participated organized seminars and symposia on the results of academic research and on innovations in the architectural and construction sector. The program of activities later included competitions for funding innovation feasibility studies conducted by academic researchers for the needs of small and medium-sized enterprises. The Internet then enabled the expansion of knowledge exchange through interactive webinars. The following are brief descriptions of such projects that contributed to understanding problems in practice and contributed to expanding my knowledge, which I then passed on to MSc and doctoral students in the field of architecture and urban planning.

### 2.2.1 Network of Construction Creativity Clubs<sup>2</sup>

This one-year knowledge exchange project, which I coordinated, involved 12 universities in the UK. Having completed the 'Internet Communications in Education and Research' module of the one-year course at the Faculty of Education, Strathclyde University, at that time, I designed a project website that published the activities organized in the four regional clubs. 23 seminars were organized, presenting 80 innovations and attended by over 600 participants (Langford & Dimitrijević, 2002). The seminars provided an opportunity to expand knowledge and establish contacts with innovative companies in the UK, as information about the presented innovations was published on the project website.

*In terms of architectural education, academic researchers could identify examples from practice that could be used in teaching. Universities that organize knowledge exchange seminars could allow architecture students to attend them.*

### 2.2.2 Consortium Building for Research in Innovations for Sustainable Construction<sup>3</sup>

When in 2001 the EU Framework 5 offered funding for projects in which Bosnia and Herzegovina and the then FYR Macedonia could participate, I contacted the ministries of science in Sarajevo and Skopje, and received a positive response from Skopje for the preparation of a joint project. The goal of the project was to identify companies interested in developing innovations for sustainable construction. Information about these Macedonian companies was published on the project website and promoted to construction companies in the UK and the EU. At the end of the project, Cyril and Methodius University in Skopje organized a meeting of the construction companies that had applied. Opportunities for participation in projects that develop innovations for

<sup>2</sup> Network of Construction Creativity Clubs. Finansiranje: EPSRC, 2000. Partneri: University of Strathclyde, University of Reading, South Bank University, University of Central England, Coventry University, University of Wolverhampton, University of Salford, Sheffield Hallam University, Liverpool John Moores University, Leeds Metropolitan University, Glasgow Caledonian University, University of Northumbria.

<sup>3</sup> Consortium Building for Research in Innovations for Sustainable Construction. Finansiranje: EU Framework Programme 5, 2001-2002. Partneri: University of Strathclyde, Glasgow (United Kingdom) & University 'Ćiril and Method', Skopje (FYR of Macedonia).

<sup>2</sup> Network of Construction Creativity Clubs. Funding: EPSRC, 2000. Partners: University of Strathclyde, University of Reading, South Bank University, University of Central England, Coventry University, University of Wolverhampton, University of Salford, Sheffield Hallam University, Liverpool John Moores University, Leeds Metropolitan University, Glasgow Caledonian University, University of Northumbria.

<sup>3</sup> Consortium Building for Research in Innovations for Sustainable Construction. Funding: EU Framework Programme 5, 2001-2002. Partners: University of Strathclyde, Glasgow (United Kingdom) & University 'Ćiril and Method', Skopje (FYR of Macedonia).



za održivo graditeljstvo i koje je finansirala EU bile su objašnjene učesnicima skupa.

*Aktivnosti za razmjenu znanja između univerziteta i prakse pružaju mogućnost za identifikaciju novih tema koje treba integrisati u arhitektonsko obrazovanje. Osim toga, univerziteti mogu organizovati kurseve koji su od interesa za profesionalni razvoj i proširenje znanja u praksi.*

### 2.2.3 Centar za izgrađeni prostor<sup>4,5</sup>

U periodu 2002-2006, partneri u ovom projektu su bili Strathclyde Univerzitet (arhitektonski i građevinski departmani) i Glasgow Caledonian Univerzitet. Prijedlog da se projekt produži u periodu 2006-2008, uz učešće trećeg partnera, The Glasgow School of Art (Mackintosh School of Architecture), je bio odobren. Cilj projekta je bio da se poveća kompetitivnost malih i srednjih arhitektonskih i građevinskih firmi u Škotskoj kroz saradnju s univerzitetima i razmjene znanja. Tim firmama su prosljeđena pitanja u vezi s njihovim potrebama za proširivanje znanja i o interesu za saradnju na razvoju inovacija za održivo graditeljstvo. Baza podataka o ekspertizi akademskih istraživača i njihovim istraživačkim projektima je bila dostupna na veb stranici projekta. Ovi podaci su poslužili da se organizuje 300 seminara kojima je prisustvovalo preko 6.000 učesnika u periodu 2002-2008.

U periodu 2006-2008. finansiranje projekta je obuhvatalo i troškove 10 studija izvodivosti inovacija koje su uradili akademski istraživači za potrebe malih i srednjih arhitektonskih i građevinskih firmi u Škotskoj. Prijedlozi za ove studije su bili urađeni kroz saradnju istraživača i zainteresovanih firmi. Prijedloge studija je odobravao nezavisan panel eksperata. Rezultati tih studija su bili objavljeni na veb stranici projekta. Ovaj šestogodišnji projekt je pojačao veze između akademskih istraživača na tri univerziteta i učesnika u dizajnu i izgradnji održivih objekata u Škotskoj. Značajno je da su urbanističke službe u pet opština i najveća organizacija za izgradnju socijalnih stanova bili sponzori projekta jer su njihovi službenici u velikom broju pohađali seminare.

*Sadržaji seminara koji su organizovani u okviru ovog i narednog projekta omogućili su uvrštavanje primjera inovacija za održivu izgradnju u nastavu na univerzitetima koji su bili partneri u projektu.*

### 2.2.4 Škotski Građevinski centar<sup>6</sup>

Potreba za geografskim proširenjem organizacije seminara i simpozija za prenos znanja o održivom graditeljstvu bila je motiv za pokretanje ovog projekta koji je uspostavio četiri građevinska foruma u različitim dijelovima Škotske (Inverclyde, Aberdeen, Tayside i

sustainable construction and are funded by the EU were explained to the participants of the meeting.

*Knowledge exchange activities between universities and practice provide an opportunity to identify new topics to be integrated into architectural education. In addition, universities can organize courses that are of interest for professional development and knowledge expansion in practice.*

### 2.2.3 The Centre for the Built Environment<sup>4,5</sup>

In the period 2002-2006, the partners in this project were the University of Strathclyde (Architecture and Civil Engineering Departments) and Glasgow Caledonian University. A proposal to extend the project in the period 2006-2008 with the participation of a third partner, The Glasgow School of Art (Mackintosh School of Architecture), was approved. The aim of the project was to increase the competitiveness of small and medium-sized architectural and civil engineering firms in Scotland through collaboration with universities and the exchange of knowledge. Questions were sent to those companies regarding their needs to expand knowledge and their interest in cooperation on the development of innovations for sustainable construction. A database on the expertise of academic researchers and their research projects was available on the project's website. These data served to organize 300 seminars attended by over 6,000 participants in the period 2002-2008.

In the period 2006-2008, the project funding also included the costs of 10 innovation feasibility studies carried out by academic researchers for the needs of small and medium-sized architectural and construction firms in Scotland. The proposals for these studies were developed through collaboration between researchers and interested firms. The study proposals were approved by an independent panel of experts, and the results of these studies were published on the project website. This six-year project strengthened links between academic researchers at three universities and those involved in the design and construction of sustainable buildings in Scotland. It is notable that planning authorities in five municipalities and Scotland's largest social housing organisation were sponsors of the project, with their staff attending the seminars in large numbers.

*The contents of the seminars, organized within this and the next project, enabled the inclusion of examples of innovations for sustainable construction in teaching at universities that were partners in the project.*

### 2.2.4 Scottish Construction Centre<sup>6</sup>

The need to expand the geographical reach of seminars and symposia for the transfer of knowledge on sustainable construction was the motivation for this project, which

4 The Centre for the Built Environment (CBE). Finansiranje: ERDF, Scottish Executive, 2002-2006. Partneri: Strathclyde University, Glasgow Caledonian University.

5 Expansion of the CBE. Finansiranje: ERDF, Scottish Executive's SEEKIT Programme. Sponzori: Communities Scotland, Glasgow City Council, North Ayrshire Council, East Ayrshire Council, South Lanarkshire Council, North Lanarkshire Council, 2006-2008. Partneri: Strathclyde University, Glasgow Caledonian University and Glasgow School of Art.

6 Scottish Construction Centre. Finansiranje: Scottish Enterprise, 2008-2009. Partneri: Construction Industry Research and Information Association (CIRIA), Glasgow Caledonian University, University of Dundee, Building Research Establishment (BRE) Scotland, Building Software Ltd.

4 The Centre for the Built Environment (CBE). Funding: ERDF, Scottish Executive, 2002-2006. Partners: University of Strathclyde, Glasgow Caledonian University.

5 Expansion of the CBE. Funding: ERDF, Scottish Executive's SEEKIT Programme. Sponsors: Communities Scotland, Glasgow City Council, North Ayrshire Council, East Ayrshire Council, South Lanarkshire Council, North Lanarkshire Council, 2006-2008. Partners: University of Strathclyde, Glasgow Caledonian University and Glasgow School of Art.

6 Scottish Construction Centre. Funding: Scottish Enterprise, 2008-2009. Partners: Construction Industry Research and Information Association (CIRIA), Glasgow Caledonian University, University of Dundee, Building Research Establishment (BRE) Scotland, Building Software Ltd.

Forth) i sarađivao s postojećim građevinskim klubom u Edinburghu. Osim dva univerziteta, partneri u projektu su bili jedna asocijacija za istraživanja i informisanje građevinskog sektora (bazirana u Londonu), škotski dio jedne građevinske istraživačke institucije i jedna firma koja je pružala usluge u upotrebi novih informatičkih programa u građevinarstvu. Mjesečni pregled novosti u građevinskom sektoru i program seminara bio je dostavljan e-mailom građevinskim firmama u Škotskoj. Inicijalna podrška za uspostavljanje četiri regionalna građevinska foruma je omogućila njihovu buduću samostalnu aktivnost i pojačala saradnju s univerzitetima što je bilo korisno za planiranje zajedničkih istraživačkih projekata.

### 2.2.5 CIC Start Online<sup>7</sup>

Da bi se omogućio još širi prenos znanja o održivom izgrađenom prostoru, pripremila sam projekt koji je umjesto seminara organizovao interaktivne vebinare. U projektu je učestvovalo sedam škotskih univerziteta. Finansiranje projekta je uključivalo i sredstva za izradu 60 studija izvodivosti inovacija koje su uradili akademski istraživači za potrebe škotskih firmi. Osim toga, finansirana je i izrada 21 akademskog izvještaja o rezultatima istraživanja i inovacijama. Rezultati ovih studija i istraživačkih izvještaja su bili predstavljeni u okviru 80 vebinara koji su omogućavali komunikaciju s gledaocima nakon prezentacije (Ilustracija 3a). Svi vebinari su bili snimljeni i dostupni onima koji nisu mogli da prisustvuju. Vebinari su privukli 2.428 gledalaca od kojih je preko 200 bilo iz 53 zemlje.

Organizovano je 18 simpozija (dva online i 16 u Glasgowu) i objavljeno 14 izdanja tromjesečnog online magazina *Pregled Inovacija* koji sam uređivala i u kojem su predstavljeni i prilozi iz prakse. Na kraju projekta objavljena je zajednička publikacija *Inovacije za održivi dizajn i obnovu građevina u Škotskoj* (Dimitrijević, 2013) (Ilustracija 3b). Škotski Forum za održivi razvoj uvrstio je projekt u *Škotsku zelenu listu* 2010. god. kao priznanje za rad na razmjeni znanja o održivoj arhitekturi

established four construction forums in different parts of Scotland (Inverclyde, Aberdeen, Tayside and Forth) and collaborated with an existing construction club in Edinburgh. In addition to the two universities, the project partners were a construction research and information association (based in London), the Scottish branch of a construction research institution, and a company providing services in the use of new IT programs in the construction industry. A monthly overview of construction sector news and a seminar programme were sent by email to construction companies in Scotland. Initial support for the establishment of four regional construction forums enabled their future independent activity and strengthened collaboration with universities, which was useful for planning joint research projects.

### 2.2.5 CIC Start Online<sup>7</sup>

To enable even wider knowledge transfer on the sustainable built environment, I prepared a project that organized interactive webinars instead of seminars. Seven Scottish universities participated in the project. The project funding also included funds for the production of 60 feasibility studies of innovations carried out by academic researchers for the needs of Scottish companies. In addition, the production of 21 academic reports on research results and innovations was funded. The results of these studies and research reports were presented in 80 webinars that allowed communication with viewers after the presentation (Figure 3a). All webinars were recorded and available for those who could not attend. The webinars attracted 2,428 viewers, of whom over 200 were from 53 other countries.

18 symposia were organized (2 online and 16 in Glasgow) and 14 issues of the quarterly online magazine *Innovation Review*, which I edited and which also presented contributions from practice, were published. At the end of the project, a joint publication *Innovations for Sustainable Design and Building Renovation in Scotland* was published (Dimitrijević, 2013) (Figure 3b). The Scottish Forum for Sustainable Development included the project in the *Scottish Green List* in 2010 in recognition of its work on the exchange of knowledge



**Ilustracija 3a** Primjer CIC Start Online vebinara, 2009. / **3b** Publikacija o inovacijama ostvarenim u CIC Start Online projektu, 2013. Izvor: Dimitrijević, 2013.



**Figure 3a** Example of a CIC Start Online webinar, 2009 / **3b** Publication on innovations achieved in the CIC Start Online project, 2013. Source: Dimitrijević, 2013.

<sup>7</sup> Construction Industry Centre (CIC) Start Online. Finansiranje: ERDF, Scottish Government, 2009-2013. Partneri: Glasgow Caledonian University, Heriot Watt University, Edinburgh Napier University, The Robert Gordon University, The Glasgow School of Art, University of Strathclyde Glasgow and University of Edinburgh.

<sup>7</sup> Construction Industry Centre (CIC) Start Online. Funding: ERDF, Scottish Government, 2009-2013. Partners: Glasgow Caledonian University, Heriot Watt University, Edinburgh Napier University, The Robert Gordon University, The Glasgow School of Art, University of Strathclyde Glasgow and University of Edinburgh.



i građevinarstvu. Rezultati ovog projekta su doprinijeli nacionalnoj i internacionalnoj promociji inovacija škotskih istraživača i arhitektonsko-građevinskog sektora.

*Snimci vebinara o rezultatima istraživanja i inovacijama u arhitekturi i građevinarstvu mogu se koristiti u nastavi na arhitektonskim fakultetima.*

### 2.2.6 Prostorni, prirodni, energetska i društveni aspekti razvoja naselja i klimatske promjene<sup>8</sup>

Kolege s Instituta za arhitekturu i urbano i prostorno planiranje Srbije (IAUS) pozvale su me da učestvujem u ovom istraživačkom projektu s izvještajem o politici i praksi u Škotskoj u vezi s temom projekta.<sup>9</sup> Izvještaj sam predstavila na seminaru na kojem su prisustvovali kolege iz IAUS-a i kolege i studenti s Arhitektonskog fakulteta Univerziteta u Beogradu, a potom je objavljen u publikaciji *Klimatske promene i izgrađeni prostor: Politika i praksa u Škotskoj i Srbiji* (Pucar, Dimitrijević & Marić, 2013). Razmjena znanja o politici i praksi u vezi s uticajem klimatskih promjena na planiranje naselja u Škotskoj omogućila je usporedbu s politikom i praksom u Srbiji. Snimak seminara koji sam održala je bio dostupan svima koji nisu mogli da prisustvuju, kako istraživačima tako i studentima arhitekture.

*Ukoliko ne postoje, potrebno je razviti kapacitete za snimanje predavanja i seminara gostujućih istraživača koji bi bili dostupni studentima arhitekture.*

### 2.2.7 Integracija održive infrastrukture<sup>10</sup>

U ovom projektu je učestvovalo devet škotskih univerziteta. Tematski okvir projekta bio je proširen — osim održivih postojećih i novih građevina, obuhvatio je integraciju održivih infrastrukture u izgrađenom prostoru (Ilustracija 4). Organizovani su vebinari na kojima su bili predstavljeni istraživački rezultati, primjeri njihove primjene u praksi i inovacije škotskih firmi. Ovaj jednogodišnji projekt je privukao 939 gledalaca iz Velike Britanije i 30 drugih zemalja, uključujući Bosnu i Hercegovinu, Hrvatsku, Srbiju i Sloveniju. Informacije o finansiranju projekata u UK i EU za održive infrastrukture su bile objavljivane na veb stranici projekta. Projekt je objavljivao i tromjesečni magazin koji sam uređivala.

*Pošto integracija inovativnih infrastrukture zahtijeva intervencije u postojećem izgrađenom prostoru i u planiranju novih urbanih cjelina, neophodno je uvrstiti ove teme u arhitektonsko obrazovanje.*

on sustainable architecture and construction. The results of this project contributed to the national and international promotion of innovations by Scottish researchers and the architectural and construction sector.

*Recordings of webinars on research results and innovations in architecture and construction can be used in teaching at architecture faculties.*

### 2.2.6 Spatial, Natural, Energy and Social Aspects of Settlement Development and Climate Change<sup>8</sup>

Colleagues from the Institute of Architecture and Urban and Spatial Planning of Serbia (IAUS) invited me to participate in this research project with a report on policy and practice in Scotland related to the project topic<sup>9</sup>. I presented the report at a seminar attended by colleagues from IAUS and colleagues and students from the Faculty of Architecture, University of Belgrade, and it was subsequently published in the publication *Climate Change and Built Environment: Policy and Practice in Scotland and Serbia* (Pucar, Dimitrijević & Marić, 2013). The exchange of knowledge on policy and practice regarding the impact of climate change on settlement planning in Scotland enabled a comparison with policy and practice in Serbia. A recording of the seminar I held was made available to all those who were unable to attend, both researchers and architecture students.

*If they do not exist, it is necessary to develop capacities for recording lectures and seminars by visiting researchers that would be available to architecture students.*

### 2.2.7 Integration of Sustainable Infrastructure<sup>10</sup>

Nine Scottish universities participated in this project. The thematic scope of the project was expanded — in addition to sustainable existing and new buildings, it included the integration of sustainable infrastructures in the built environment (Figure 4). Webinars were organized, where research results, examples of their application in practice and innovations of Scottish companies were presented. This one-year project attracted 939 viewers from the UK and 30 other countries, including Bosnia and Herzegovina, Croatia, Serbia and Slovenia. Information on funding for projects in the UK and EU for sustainable infrastructures was published on the project website. The project also published a quarterly magazine that I edited.

*Since the integration of innovative infrastructures requires interventions in the existing built space and in the planning of new urban areas, it is necessary to include these topics in architectural education.*

<sup>8</sup> Spatial, Environmental, Energy and Social Aspects of Development of Settlements and Climate Change. Finansiranje: Ministry of Education, Science and Technological Development of the Republic of Serbia, 2011-2015. Partneri: Institute of Architecture and Urban & Spatial Planning of Serbia, the Faculty of Architecture, the Faculty of Civil Engineering and the Faculty of Electrical Engineering of the University of Belgrade, the Faculty of Sciences and Mathematics of the University of Niš, the Institute of Technical Sciences of the Serbian Academy of Sciences and Arts.

<sup>9</sup> strathprints.strath.ac.uk/55658

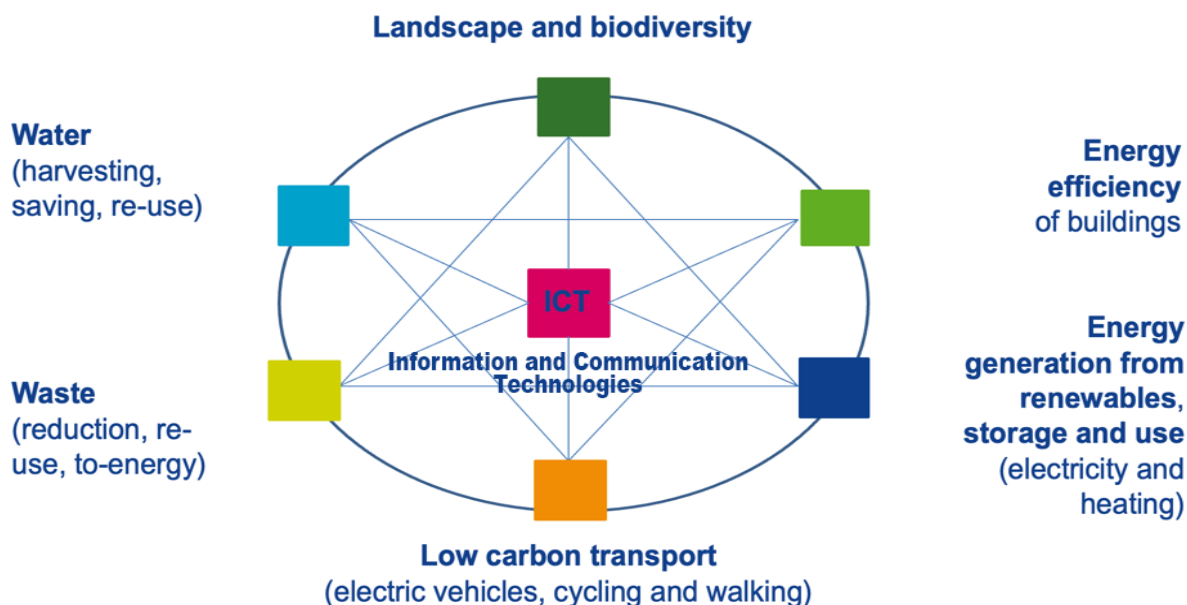
<sup>10</sup> Mainstreaming Innovation. Finansiranje: Scottish Government, 2013-2014. Partneri: Glasgow Caledonian University, Edinburgh Napier University, Heriot-Watt University, The Glasgow School of Art, The Robert Gordon University, University of Aberdeen, University of Abertay Dundee, University of Edinburgh and University of Strathclyde Glasgow.

<sup>8</sup> Spatial, Environmental, Energy and Social Aspects of Development of Settlements and Climate Change. Funding: Ministry of Education, Science and Technological Development of the Republic of Serbia, 2011-2015. Partners: Institute of Architecture and Urban & Spatial Planning of Serbia, the Faculty of Architecture, the Faculty of Civil Engineering and the Faculty of Electrical Engineering of the University of Belgrade, the Faculty of Sciences and Mathematics of the University of Niš, the Institute of Technical Sciences of the Serbian Academy of Sciences and Arts.

<sup>9</sup> strathprints.strath.ac.uk/55658

<sup>10</sup> Mainstreaming Innovation. Funding: Scottish Government, 2013-2014. Partners: Glasgow Caledonian University, Edinburgh Napier University, Heriot-Watt University, The Glasgow School of Art, The Robert Gordon University, University of Aberdeen, University of Abertay Dundee, University of Edinburgh and University of Strathclyde Glasgow.

# Integration of Sustainable Infrastructure



**Ilustracija 4** Tematski okvir projekta Integracija održive infrastrukture. Izvor: Dimitrijević, 2013.

**Figure 4** Thematic framework of the project Integration of sustainable infrastructure. Source: Dimitrijević, 2013.

## 2.2.8 Online kursevi za profesionalni razvoj

U oktobru 2014. god. vratila sam se na Strathclyde Univerzitet na poziciju pomoćnika dekana za razmjenu znanja na Fakultetu za inženjerstvo i direktora za razmjenu znanja na Departmanu za arhitekturu. Moj prvi zadatak/projekt je bio da uspostavim studio i oformim tim za snimanje kurseva za profesionalni razvoj, predavanja i vebinare. U januaru 2016. god. smo objavili prvi online kurs koji sam organizovala u saradnji s univerzitetskim kolegama<sup>11</sup> i naredni s kolegama iz Departmana za arhitekturu,<sup>12</sup> a zatim je devet departmana Fakulteta za inženjerstvo nastavilo da koristi studio. Studio je postao posebno značajan u vrijeme epidemije Covid-19 kada je sva nastava (osim u nekim laboratorijima) na Strathclyde Univerzitetu bila organizovana online.

Projekti razmjene znanja koje sam vodila u periodu 2009-2014 demonstrirali su značaj upotrebe online tehnologija za prenos znanja što većem broju zainteresovanih firmi i pojedinaca. Interaktivni aspekti online komunikacija su posebno doprinijeli efikasnoj razmjeni znanja uprkos potencijalnim geografskim distancama između sagovornika. Interaktivni vebinari koje smo počeli objavljivati 2009. god. postali su jedan od standardnih načina za razmjenu znanja nakon globalne epidemije 2020. god.

*Pošto online kursevi za kontinuirani profesionalni razvoj mogu biti snimci predavanja o inovacijama u arhitekturi, potrebno je planirati program takvih kurseva koji bi ujedno promovisali kvalitet nastave na arhitektonskim fakultetima i doprinijeli povećanju broja studenata.*

## 2.2.8 Online Courses for Professional Development

In October 2014, I returned to the University of Strathclyde as Associate Dean for Knowledge Exchange in the Faculty of Engineering and Director of Knowledge Exchange in the Department of Architecture. My first assignment/project was to set up a studio and form a team to record professional development courses, lectures and webinars. In January 2016, we launched the first online course, which I organised in collaboration with university colleagues<sup>11</sup> and a subsequent one with colleagues from the Department of Architecture<sup>12</sup>. Nine departments in the Faculty of Engineering have since continued to use the studio. The studio was particularly important during the Covid-19 outbreak when all teaching (except for some laboratories) at the University of Strathclyde was organised online.

The knowledge exchange projects I led in the period 2009-2014 demonstrated the importance of using online technologies to transfer knowledge to as many interested companies and individuals as possible. The interactive aspects of online communication have particularly contributed to the efficient exchange of knowledge despite the potential geographical distances between the interlocutors. The interactive webinars that we started publishing in 2009 have become one of the standard ways to share knowledge after the global epidemic of 2020.

*Since online courses for continuous professional development can be recordings of lectures on innovations in architecture, it is necessary to plan a programme of such courses that would also promote the quality of teaching at architectural faculties and contribute to increasing the number of students.*

<sup>11</sup> flexible.strath.ac.uk/524/engaging-communities-with-innovative-public-lighting

<sup>12</sup> flexible.strath.ac.uk/639/what-decision-making-methods-and-tools-are-used-to-create-places-that-people-need-and-enjoy

<sup>11</sup> flexible.strath.ac.uk/524/engaging-communities-with-innovative-public-lighting

<sup>12</sup> flexible.strath.ac.uk/639/what-decision-making-methods-and-tools-are-used-to-create-places-that-people-need-and-enjoy



### 2.2.9 Laboratorije znanja<sup>13</sup>

Strathclyde Univerzitet je bio jedan od 11 partnera u Erasmus+ projektu koji je imao za cilj da pomogne razvoju novih nastavnih programa u vezi s održivim izgrađenim prostorom na univerzitetima u Kosovskoj Mitrovici, Beogradu, Banjaluci, Mostaru, Novom Pazaru i Višoj tehničkoj školi u Zvečanu. Osim nastavnih programa koji su bili razvijeni prema potrebama pojedinačnih institucija, objavljeno je šest tematskih publikacija stručnih radova, u vezi s glavnom temom projekta, koje se mogu koristiti u nastavi.<sup>14</sup> Bila sam jedna od urednika publikacije *Integralno urbano planiranje: Pravci, izvori i teritorije* (Anguillari & Dimitrijević, 2018) i koautor članka *Održiva obnova za adaptabilne građevine* (Konstantinou & Dimitrijević, 2018). Saradnja na ovom projektu ukazala je na neophodnost razumijevanja lokalnog socioekonomskog i prirodnog konteksta u pripremi nastavnih programa za obrazovanje arhitekata, urbanista i građevinskih inženjera koji će učestvovati u održivom razvoju područja u kojem žive i rade.

*Ukoliko ne postoji, baza podataka o objavljenim rezultatima naučnih radova na svakom univerzitetu treba biti оформljena i dostupna za pretraživanje da bi se omogućila identifikacija tema za potencijalnu interdisciplinarna saradnja i korištenje u nastavi.*

### 2.2.10 Održivi izgrađeni prostor<sup>15</sup>

Program Erasmus+ je omogućio razmjenu znanja između Departmana za arhitekturu Strathclyde Univerziteta i Arhitektonskog fakulteta Univerziteta u Beogradu u vezi s održivim izgrađenim prostorom putem razmjene profesora koji su održali predavanja i putem šestomjesečne razmjene po dva doktoranta. Ta saradnja je potom nastavljena mojim učešćem na predavanjima na doktorskom studiju na Arhitektonskom fakultetu Univerziteta u Beogradu i koautorstvom naučnih radova doktoranata s kojima sam sarađivala (Lević et al., 2023). Drugi, za mene vrlo značajan, rezultat te saradnje je jačanje veza s Arhitektonskim fakultetom Univerziteta u Sarajevu kroz komentorstvo jednog tadašnjeg doktoranta iz Sarajeva i koautorstvo naučnog rada baziranog na odbranjenoj doktorskoj disertaciji (Kahrović Handžić & Dimitrijević, 2024).

*Pošto razmjene znanja između arhitektonskih fakulteta doprinose proširivanju znanja svih učesnika, neophodno je podržavati učešće predavača, istraživača i studenata u takvim aktivnostima.*

### 2.2.9 Knowledge Labs<sup>13</sup>

Strathclyde University was one of 11 partners in an Erasmus+ project that aimed to support the development of new curricula on sustainable built environments at universities in Kosovska Mitrovica, Belgrade, Banja Luka, Mostar, Novi Pazar and the Technical University of Zvečan. In addition to the curricula that were developed according to the needs of individual institutions, six thematic publications of professional papers related to the main theme of the project were published that can be used in teaching.<sup>14</sup> I was one of the editors of the publication *Integral Urban Planning: Directions, Sources and Territories* (Anguillari & Dimitrijević, 2018) and co-author of the article *Sustainable Renovation for Adaptable Buildings* (Konstantinou & Dimitrijević, 2018). The collaboration on this project showed the necessity of understanding the local socio-economic and natural context in the preparation of curricula for the education of architects, urban planners and civil engineers who will participate in the sustainable development of the areas in which they live and work.

*If it does not exist, a database of published scientific results at each university should be created and made available for search to enable the identification of topics for potential interdisciplinary collaboration and use in teaching.*

### 2.2.10 Sustainable Built Environments<sup>15</sup>

The Erasmus+ programme enabled the exchange of knowledge between the Department of Architecture of the University of Strathclyde and the Faculty of Architecture of the University of Belgrade regarding sustainable built environments through the exchange of professors who gave lectures and through a 6-month exchange of two doctoral students. This cooperation was then continued with my participation in lectures during the doctoral study at the Faculty of Architecture of the University of Belgrade and co-authorship of scientific papers of the doctoral students with whom I collaborated (Lević et al., 2023). Another, for me very significant, result of this cooperation is the strengthening of ties with the Faculty of Architecture of the University of Sarajevo through the co-supervision of a then doctoral student from Sarajevo and the co-authorship of a scientific paper based on the defended doctoral dissertation (Kahrović Handžić & Dimitrijević, 2024).

*Since knowledge exchanges between architectural faculties contribute to expanding the knowledge of all participants, it is necessary to support the participation of lecturers, researchers and students in such activities.*

<sup>13</sup> Knowledge Labs (KLABS). Finansiranje: EU Erasmus+ Programme, 2016-2018. Partneri: University of Kosovska Mitrovica, University of Strathclyde, University of Ljubljana, University of Delft, University of Venice, University of Aachen, University of Belgrade, University of Banja Luka, University of Mostar, University of Novi Pazar, Higher Technical School of Zvečan.

<sup>14</sup> books.bk.tudelft.nl/press/catalog/series/KLABS

<sup>15</sup> Sustainable Built Environments. Finansiranje: EU Erasmus+ Programme, 2018-2020. Partneri: University of Strathclyde & University of Belgrade.

<sup>13</sup> Knowledge Labs (KLABS). Funding: EU Erasmus+ Programme, 2016-2018. Partners: University of Kosovska Mitrovica, University of Strathclyde, University of Ljubljana, University of Delft, University of Venice, University of Aachen, University of Belgrade, University of Banja Luka, University of Mostar, University of Novi Pazar, Higher Technical School of Zvečan.

<sup>14</sup> books.bk.tudelft.nl/press/catalog/series/KLABS

<sup>15</sup> Sustainable Built Environments. Funding: EU Erasmus+ Programme, 2018-2020. Partners: University of Strathclyde & University of Belgrade.

## Post scriptum

Projekti razmjene znanja između arhitektonskih fakulteta i arhitektonsko-građevinskog sektora imaju za cilj da rezultati istraživanja ne budu objavljeni samo u profesionalnim časopisima nego da se predstave direktno (putem seminara, simpozija, vebinara, kurseva za razvoj profesionalnih znanja, itd.) svima koji su zainteresovani da se ubrza primjena inovacija za održivi izgrađeni prostor i da se nova saznanja brže prenesu u praksu i u arhitektonsko obrazovanje. Da bi se to omogućilo, neophodno je da se na arhitektonskim fakultetima uspostavi organizaciona pozicija direktora za razmjenu znanja s praksom. Bilo mi je veliko zadovoljstvo da u toj poziciji vidim pozitivan uticaj razmjene znanja između univerzitetskih istraživača i arhitektonsko-građevinskog sektora kao i integraciju novih znanja u arhitektonskom obrazovanju u Škotskoj. Produžetak saradnje s Arhitektonskim fakultetom u Sarajevu otvara mogućnosti za razmjenu znanja sa novom generacijom akademskih istraživača i studenata u instituciji u kojoj sam se obrazovala i radila, i koja me pripremila da se suočim s vrlo različitim profesionalnim izazovima.

## Post scriptum

Knowledge exchange projects between architectural faculties and the architectural and civil engineering sector aim to ensure that research results are not only published in professional journals but are also presented directly (through seminars, symposia, webinars, courses for the development of professional knowledge, etc.) to all those interested in accelerating the implementation of innovations for sustainable built environments and transferring new knowledge more quickly into practice and architectural education. To enable this, it is necessary to establish an organizational position of Director for Knowledge Exchange with Practice at architectural faculties. It was a great pleasure for me to see in this position the positive impact of knowledge exchange between university researchers and the architectural and civil engineering sector, as well as the integration of new knowledge into architectural education in Scotland. The extension of cooperation with the Faculty of Architecture in Sarajevo opens up opportunities for knowledge exchange with a new generation of academic researchers and students at the institution where I was educated and worked, and which prepared me to face various professional challenges.

## Reference References

- Anguillari, E. & Dimitrijević, B. (2018). *Integrated Urban Planning: Territories, Resources and Directions*. TU Delft Open.
- Bagnol, B. (1990). *Crtanje i slikanje*. Jugoslovenska knjiga: Naučna knjiga.
- Dimitrijević, B. (1990). *Der Architekt Karl Pařík*. Österreichische Zeitschrift für Kunst und Denkmalpflege, 44(3/4), 155-169.
- Dimitrijević, B. (1991). *Arhitekt Karlo Pařík*. Doktorska disertacija, Univerzitet u Zagrebu.
- Dimitrijević, B. (2013). *Innovations for Sustainable Building Design and Refurbishment in Scotland: Outputs of CIC Start Online Project*. Springer. doi.org/10.1007/978-3-319-02478-3
- Kahrović Handžić, L. & Dimitrijević, B. (2024). *Criteria for evaluation of modern architecture in Bosnia and Herzegovina to support its preservation*. Archnet-IJAR, doi.org/10.1108/ARCH-06-2024-0244
- Konstantinou, T. & Dimitrijević, B. (2018). *Sustainable Refurbishment for an Adaptable Built Environment*. In Kosanović, S., Klein, T., Konstantinou, T., Radivojević, A. and Hildebrand, L. (Eds.) *Sustainable and Resilient Buildings: Approaches, Methods and Tools*. TU Delft Open.
- Kuděla, J., Dimitrijević, B. & Vacík, I. (2007). *Čeh koji je gradio evropsko Sarajevo: Arhitekt Karel Pařík 1857-1942*. Ambasada Češke Republike u Bosni i Hercegovini, Muzej Sarajeva.
- Langford, D. A., MacLeod, I., Maver, T. & Dimitrijević, B. (2002). *Durability, Adaptability and Energy Conservation Assessment Tool*. International Journal of Environmental Technology and Management, 2(1/2/3), 142-159.
- Langford, D. & Dimitrijević, B. (2002). *Construction creativity casebook*. Thomas Telford.
- Lević, B., Đukanović, L.J., Radivojević, A. & Dimitrijević, B. (2023). *Potentials for a complex and integrated refurbishment of post-war housing stock of Serbia*. Energy Efficiency, 16 (93) doi.org/10.1007/s12053-023-10171-z
- Pucar, M., Dimitrijević, B. & Marić, I. (2013). *Klimatske promene i izgrađeni prostor: Politika i praksa u Škotskoj i Srbiji; Climate Change and the Built Environment: Policies and Practice in Scotland and Serbia*. Institut za arhitekturu i urbanizam Srbije, Beograd. raumplan.iaus.ac.rs/bitstream/id/1278/MonoSkotskaSrbija\_201-223.pdf
- United Nations (1992). *Conference on Environment and Development, Rio de Janeiro, Brazil, 3-14 June 1992*. un.org/en/conferences/environment/rio1992

