

4 Smart City – Smart Learning. **Is there a correlation?**

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4.1 Abstract

This presentation intends to give some answers to the question if there is a correlation between the smartness of a city and the quality of education provided in that city. It is widely accepted that the smartness of a city depends on the smartness of its citizens, the smartness of the governance provided in that city. But is there a level of correlation between the level of education provided, its quality and the level of innovation included in that education?

The study has been performed in Timisoara, the largest higher education centre in the west of Romania. The target group of the research has been formed mainly from students of the Politehnica University, living in the campus.

The research has been interpreted based on students' perception in general about the campus conditions, on the conditions offered by their university, but also on the specific given by the faculty where they are studying.

The intention is to repeat the study regularly and to enlarge the target group to the rest of the students in the other 3 state universities in Timisoara and after that to the pre-university students in the city.

4.2 Introduction

A study made by the United Nations Department of Economic and Social Affairs [1] is defining Smart Cities as "complex ecosystems supported by technological infrastructures transforming citizen engagement, learning and participation".

On other words, it is recognized that a Smart City is a very complex ecosystem, that it is able to transform learning provided in its area. And this is suggested to be done by the use of technology, ie the new educational technologies available in a digital society.

However, more focus should be given to find out where is the smartness of learning in smart territories.

4.3 Smart Learning in a Smart City

The traditional approach to a Smart City is given by the 6 pillars model [2], that has been adopted by the European Union. These pillars are considered the dimensions to be taken into consideration when building a smart city. One can consider a city as

fully qualified for the smart title only when fulfilling all those pillars. However, there are cities that are able to develop only part of those pillars, so qualifying for smartness only in some dimensions.

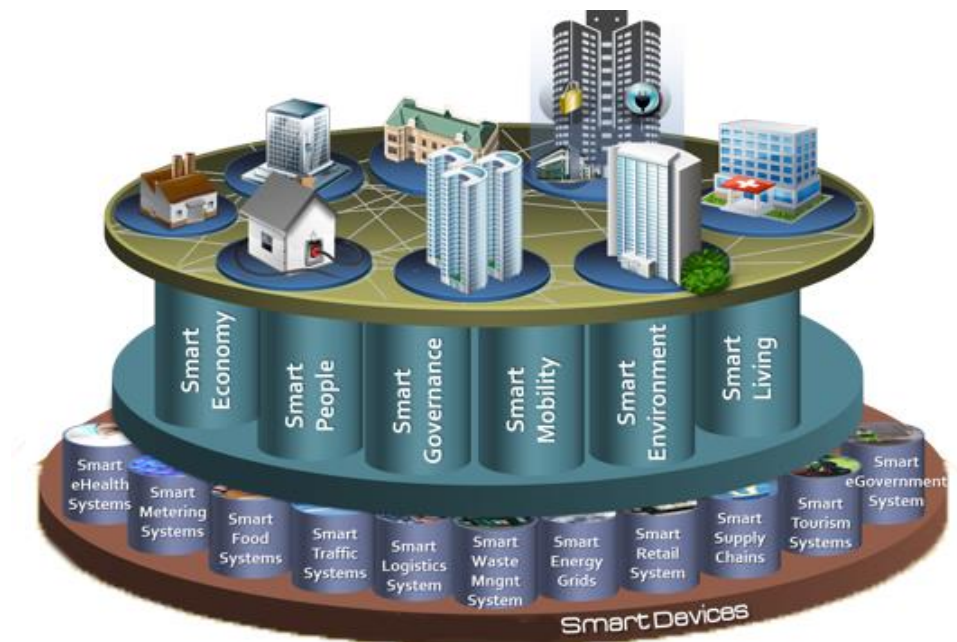


Fig. 1. The 6 pillars model for territorial development in a Smart City approach [2]

The six indicators defined in order to measure the “smartness” of a city in order to assess its success in the transformation process are defined as [3]:

1. Smart Economy (Competitiveness)
 - Innovative spirit
 - Entrepreneurship
 - Economic image & trademarks
 - Productivity
 - Flexibility of Labor market
 - International Embeddedness
 - Ability to transform
2. Smart People (Social and Human Capital)
 - Level of qualification
 - Affinity to lifelong learning
 - Social and ethnic plurality
 - Flexibility
 - Creativity
 - Cosmopolitanism / Open-mindedness
 - Participation in public life
3. Smart Governance (Participation)
 - Participation in decision making
 - Public and social services
 - Transparent governance
 - Political strategies & perspectives

4. Smart Mobility (Transport and ICT)
 - Local accessibility
 - (Inter-)national accessibility
 - Availability of ICT infrastructure
 - Sustainable, innovative and safe transport systems
5. Smart Environment (Natural resources)
 - Attractivity of natural conditions
 - Pollution
 - Environmental protection
 - Sustainable resource management
6. Smart Living (Quality of Life)
 - Cultural facilities
 - Health conditions
 - Individual safety
 - Housing quality
 - Education facilities
 - Touristic attractivity
 - Social cohesion

From this short description of the pillars, it is clear that many of the achievements are closely linked to the learning infrastructure, to its performance and spread inside the population.

UNESCO defines a learning city [4] as a city that:

- effectively mobilizes its resources in every sector to promote inclusive learning from basic to higher education;
- revitalizes learning in families and communities;
- facilitates learning for and in the workplace;
- extends the use of modern learning technologies;
- enhances quality and excellence in learning;
- fosters a culture of learning throughout life.

By doing that, the smart city will enhance individual empowerment and social inclusion / cohesion, economic development and cultural prosperity, as well as sustainable development.

All those benefits will be a result of defining and implementing a clear strategy of “lifelong learning for all” as the city’s future, that will bring wider benefits for people.

Correspondingly, the major building blocks of a learning city are defined as [4]:

- Inclusive learning in the education system
- Revitalized learning in families and communities
- Effective learning for and in the workplace
- Extended use of modern learning technologies
- Enhanced quality and excellence in learning
- A vibrant culture of learning throughout life

But, the fundamental conditions for achieving the goal of building a learning city would include:

- Strong political will and commitment
- Governance and participation of all stakeholders
- Mobilization and utilization of all needed resources

Of course that it should be recognized that:

1. “Change begins with the citizen”. Citizens must be empowered to anticipate and tackle constantly changing social, environmental and economic challenges.
2. “Lifelong learning is an important way of empowering citizens”. Providing citizens with a broad array of learning opportunities helps them develop the skills, competences and attitudes needed for sustainable development.
3. “Implementation happens at the local level”. Cities have the facilities and potential to motivate and enable citizens to learn.

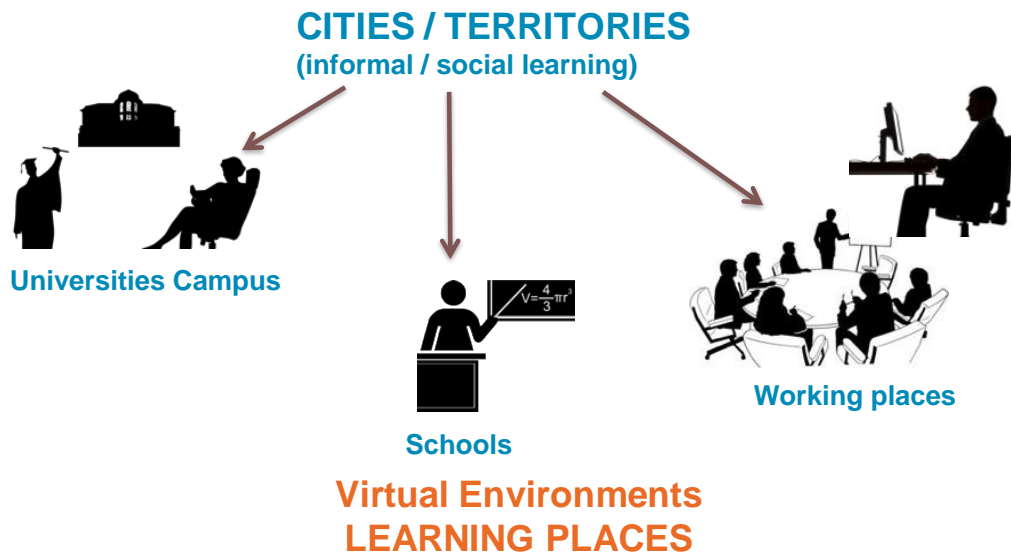


Fig. 2. Formal and informal learning places

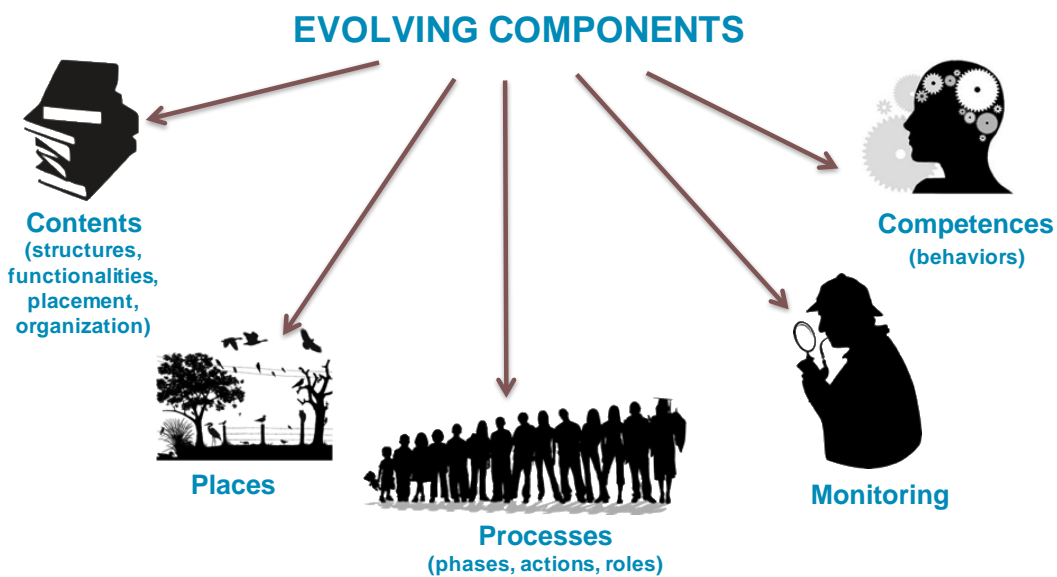


Fig. 3. Factors influencing / facilitating learning quality

4.4 Smart Learning Observatory

The study on the “smartness” level of education provided in Timisoara, Romania by the Politehnica University, has been conducted as part of a European collaboration with the University of Rome Tor Vergata, under the name of Smart Learning Observatory [5].

An online questionnaire has been opened to the students and staff of the Politehnica University, through the online platform of the university called Virtual Campus. All responses are anonymized, but saved in the data base according to the affiliation of the respondent. All respondents have been asked to provide a score between 1 (the lowest) and 10 (the higher) for the level of satisfaction with different questions.

Some very preliminary results are discussed here below. The questionnaire has been answered by 249 people, from which: 119 bachelor students (47.80%), 35 master students, 11 PhD candidates, 2 owners of a research scholarship or grant, 69 professors and lecturers (27.70%), 5 technicians and 6 administrators.

Most of the students are living in the campus, which is located quite central to the city and is a common campus with that used by students in other 2 state universities in the city (the University of West and the University of Medicine).

According to the field of study / work, the respondents are representing:

- Faculty of Electronics and Telecommunications Engineering: 69 (27.70%)
- Faculty of Automation and Computers: 50 (20.10%)
- Faculty of Mechanical Engineering: 29 (11.70%)
- Faculty of Civil Engineering: 28 (11.20%)
- Faculty of Management in Production and Transportation: 24 (9.60%)
- Faculty of Industrial Chemistry and Environmental Engineering: 16 (6.40%)
- Faculty of Communication Sciences: 12 (4.80%)
- Faculty of Electrical and Power Engineering: 7 (2.80%)
- Faculty of Engineering in Hunedoara: 7 (2.80%)
- Administration services: 3 (1.20%)
- Other: 4 (1.60%)

As far as accommodation needs, the university and the city seems to offer a good level of services (average score between 7 and 8, for the satisfaction provided by the student campus accommodation or the rented house in the city). However, there are remarks such as: renting is expensive, there are few parking places, or it is too noisy. The location of the campus is very close to most of the university buildings (the rate is 10 for how easy it is to move within the Campus ? University area and within the university buildings).

When they have to spend all day long at the university, they mainly take lunch at the university/campus canteen (30.90%) or they bring their own lunch-box (28.90%). The availability of enough basic facilities like bar, canteens, restaurants and access to drinking water is appreciated with an average of 6.8, which means that there is still room for improvement.

Another question was related to the perception on the “green level” of the Campus (availability of green areas, air quality, separate waste collection, etc). The perception is on an average level of 6.7, with main remarks like: not “alive” in terms of colors used – buildings are “gray”, no ventilation, no thermostats, not enough recycling facilities, danger in case of fire, no seating places on the halls, not enough trash beans.

The respondents seem to feel safe in the university area (not only on a physical level), as the average score to this question was 9.

In terms of how the university infrastructure (classrooms, libraries, laboratories, student areas, WI-FI) are adequate for the activities they are carrying on campus, the perception is at an average score of 8, with the main remarks that there are still too old PCs, it is still used software without license, there are video-projectors out of work and there are problems with the access to wi-fi.

The respondents are mainly using smartphones (68.70%) or laptops (63.50%) to connect to the Internet from within the campus/university. Tablets are used by 11.70% and desktop computers by 31.70% of the respondents. By that time, in the laboratories are practically used only desktop computers for doing the experiments. The connection to the Internet is done through the campus/university wi-fi (69.10%), while only 37% are using the 3G and 35.70% a private provider.

In terms of using the technology, the respondents are telling that they are always connected (33.70%), they are staying online between 2 to 5 hours/day (25.30%) or less than 2 hours/day (20.50%). The rest are staying connected for less than half an hour/day.

The administrative services offered by the university are perceived at an average score of 7, with the main remarks that: info on curricula is unclear, secretaries are having a bad attitude, professors are not responding to the questions on the virtual campus, there are no online administrative procedures, proxy in the campus is not working and the websites are not-updated.

The social interaction was appreciated in terms of how the University supports social interaction (student/worker organizations, web environment, cultural and sports activities, interaction with the surrounding territory, etc.). The perception is quite good, with an average score of 8.

Asked to indicate how much they feel that the University is able to challenge them and/or offer them interesting opportunities (exchanges and scholarships, participation in projects with concrete impact, stages, etc..), the respondents gave an average score of 7.8 and nominalized the student league from the Faculty of Automation and Computers as a best practice example.

Another question was related to the level of satisfaction with the quality of the curriculum undertaken (if student) or the work carried on (if worker), and the results was at the average score of 8. The main remarks on how their satisfaction can be improved were:

- real options to choose from disciplines in other specialties
- different way to learn like video tutorials, other links for study
- curricula in some cases is very old
- more practice and less theory
- more internships and projects involvement
- more support in laboratory equipment and consumable materials

The perception on how the skills and competences they are developing may meet those requested by the working domain in which they operate or wish to operate in the future was quite good, with an average score of 8.2.

Globally, the perception on how the university has been / is able to develop their potentialities, was rated at a score of 8.1.

Overall the University performs reasonably as the environment is concerned but the support to the social interaction is perceived as quite scarce. The existence of room for service improvement is quite evident, as quite evident is also the beneficial

influence that may arise from a better use of the available technological infrastructure and on-line services (administrative procedure, access to information, support to socialization).

Satisfaction and self-fulfillment appear to be strongly correlated to indicate that students feel self-fulfilled when are satisfied with the quality of the curriculum. The average satisfaction and self-fulfillment are quite high, even though the scarce performance of the university on the offer of challenges/opportunities (average score 7.8).

It appears that students wish to be more challenged by the learning eco-systems. Future work should address the possible role of technologies in improving the performance of the learning eco-system. Among other possible research directions we can mention:

- adaptation of the proposed evaluation framework to schools, informal and not formal environments as well to virtual ones;
- extension of the research towards the rest of universities in Timisoara
- investigation of the influence that could be exerted by local culture, especially in the context of Timisoara nominalization as European Capital of Culture 2021;
- integration of this bottom-up approach with the traditional top-down ranking methodologies;
- extension of the framework to other smart cities and territories.

4.5 Conclusions

As seen from analysing the 6 pillars that are defining a smart city, there is a strong correlation and dependence between the smartness of the city as a whole and the smartness of the education provided. This is why, we refer to the ensemble city – learning infrastructure as to a learning ecosystem.

Indeed, a Smart city is a city where the human capital owns not only a high level of skills, but is also strongly motivated by continuous and adequate challenges!

4.6 References

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