Section 1 - Summary

1.1 Author

Doinița Bălășoiu, „Ștefan Odobleja" Technological High School, Craiova., teacher

Title:
STE(A)M curriculum in vocational education (SteamonEdu 2020/2021 Blended Course Assignement)

Purpose
At the moment this is not an officialy approved policy. It is an assignment done as part of the STEAMonEdu Blended Course 2021. It contains useful insights and might be adopted at a later stage by national or local authorities.
The purpose of this document is to describe possible directions for action for the revision of the curriculum in local development, from the perspective of integrating STEAM education in initial vocational training. In Romania, the curricular component accessible to schools is the curriculum in local development, designed and approved at the local level, depending on the economic development trends in the region where the school is located.

Policy approval authority
County School Inspectorate

Author
Doinița Bălășoiu, „Ștefan Odobleja" Technological High School, Craiova., teacher

Related sources:
Strategia educației și formării profesionale din România pentru perioada 2016-2020 (Romanian education and training strategy for the period 2016-2020)
https://www.edu.ro/sites/default/files/_fi%C8%99iere/Minister/2016/strategii/Strategia_VET%2027%2004%202016.pdf

CEAE – Centrul de Evaluare și Analize Educaționale România:
Disciplinele STEM ar trebui să constituie o prioritate a învățământului din România –
(STEM subjects should be a priority of education in Romania)
https://ceae.ro/disciplinele-stem-ar-trebui-sa-constituie-o-prioritate-a-invatamantului-din-romania/

Comunicarea Comisiei către Parlamentul European, Consiliu, Comitetul Economic şi Social European şi Comitetul Regiunilor „Regândirea educației: investiții în competențe pentru rezultate socio-economice mai bune”
(Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "Rethinking education: investing in skills for better socio-economic performance")
http://www.gnac.ro/wp-content/uploads/downloads/2012/12/Reg%C3%A2ndireaeduca%C8%9Biei-investi%C8%9Bii-%C3%AEn-competen%C8%9Be-pentru-rezultate-socioeconomice-mai-bune.pdf

1.2 Background
I am Doinița Bălășoiu, technical subjects teacher at the “Ștefan Odobleja” Technological High School from Craiova and I present this proposal as the head of the county

commission for approving the programs for the local development curriculum drawn up at the level of each school unit that provides professional training.

1.3 Descriptive title

STE(A)M curriculum in vocational education

The point of this policy is the integration of STEAM education in initial vocational training, through an appropriate curriculum, designed in schools, according to local/regional economic development trends, with the support of partner economic operators.

1.4 Abstract

This educational policy applies to schools that provide initial vocational training for local / regional economic operators. The curriculum structure includes a component that is designed at school level, in collaboration with partner economic operators, directly involved in ensuring practical training according to their concrete requirements. This component is the only one in which STEAM education can be integrated, the rest of the curriculum being designed and approved at national level by the relevant ministry.
The beneficiaries of this policy are graduates of vocational and technical education, for whom the acquisition of skills and attitudes specific to STEAM education is desirable in order to ensure a successful socio-professional insertion in the labor market and the flexibility required by the dynamics of professions.
The policy will be applied at county level, during a training cycle (3-4 years, for the vocational school, respectively, for the technological high school).
After the approval at county level, by the School Inspectorate, the policy can be included in the Activity Plan of the department for vocational and technical education issues within the Inspectorate, as well as in the Activity Plan of the interested school units. The involvement of the County School Inspectorate is, moreover, necessary for the coordination, guidance and control of the implementation of this policy.

Section 2 – Goals

2.1 General goal

The general problem addressed in this document is the low share of STEAM education in initial vocational training. At national level, specialized training for initial training is organized in a modular way, which is a first step in the multidisciplinary approach. But the STEAM approach requires moving to a higher level through a transdisciplinary approach.
Schools and local communities can intensify this process, for the benefit of students, through the curriculum in local development: its design and implementation are the decision of the school and thus, even if partially, the share of STEAM education in vocational training can increase.

2.2 General goal description

Through the modular organization of the national curriculum corresponding to the initial professional training, the relevant ministry facilitates a training process in which elements of STEAM education are partially found. From the point of view of the contents, it is obvious that all the components of STEAM education are found in the specialized training, through the very specificity of this training. However, in terms of skills and attitudes, their training/development from the perspective of STEAM education remains the decision of the teacher, being directly dependent on his experience, the degree of coverage of the areas involved and especially his desire to apply STEAM education tools in teaching-learning and assessment activities.
The projective strategic documents elaborated at national level take into account the STEAM education but it is necessary to intensify the efforts to put into practice the planned

actions, all the more so as the reality of the labor market dictates this: graduates need the flexibility offered by 21st century skills training in order to successfully adapt to constantly evolving professions (due to technological advances) and these skills must be trained and practiced through initial training in high school / vocational school. The framework provided by the local development curriculum is conducive to achieving this goal by leaving to the schools the content to be approached and the application methodologies, in close collaboration with local economic operators, directly interested in a well-trained workforce.

2.3 Strategic goals

1. Drafting, by the end of 2021, a Structured Guide for curriculum design in local development, promoting STEAM education, specifying the specific contents of the various areas addressed and the recommended teaching strategies for the formation of desirable software skills

2. Organizing, in the first quarter of 2022, for 2 teachers from each school, a regional program for the development of skills needed by teachers in the implementation of STEAM education (skills described by knowledge, skills and attitudes)

3. Designing, in partnership with local / regional economic operators and approving the curriculum in local development from the perspective of promoting STEAM education, according to the themes established at national level (March 2022)

4. Designing, between April and May 2022, the tools for evaluating and monitoring the implementation of the curriculum in local development; collecting examples of good practice during the application of the designed curriculum (in the school year 2022-2023)

5. Establishing, organizing and enriching the online library of documents developed in schools on the implementation of STEAM education through the curriculum in local development, starting with April 2021 and until the end of the school year 2022-2023.

Section 3 – Targets

3.1 Beneficiaries

The final beneficiaries of the proposed policy are
- students in vocational and technical education (high school and vocational school).
- partner economic operators in initial vocational training, local or regional

The benefits of each category are:
- students acquire desirable software skills according to forecasts related to the future of the labor market

Thus, in 2016, Romania was close to the international average of tertiary education graduates in science and technology, under 28 years (10.6% compared to the average of 11%), and in the Global Innovation Index 2018 the score at this chapter was an even better one. According to the Global Competitiveness Index 2019, Romania is making progress in terms of innovation (55th place out of 141 in 2019 compared to 96 in 2018), as well as in terms of research and development (53rd place out of 141 countries in 2019).
- partner economic operators can recruit a well-trained workforce for the economic fields in which they operate

In the area of human capital, in Romania there are significant problems. For example, according to the Global Competitiveness Index 2019, on the sub-dimension “ease of companies to find qualified employees”, Romania is on the 133rd place out of 141 countries in 2019. Similar difficulties are observed under the dimension “employee skills baggage” , Romania ranking 113 out of 141. In other words, although statistics show that

there are more graduates in top fields (science and technology), their level of qualification is still below the needs of the Romanian market.

3.2 Recipients

The recipients of the policy are the same with the beneficiaries.

3.3 Special needs

This policy involves beneficiaries with special needs in the category of students from disadvantaged backgrounds (single-parent families, low-income families, Roma, rural students) Their needs are related to the lack of opportunities to attend school (increased risk of dropping out). The partner economic operators are willing to support them financially and offer them accommodation and meals.

Section 4 – Value Proposal

4.1 Value proposal

The main value proposal of this policy is a curriculum in which the principles of STEAM education are integrated.

4.2 Results

R1: Structured Guide for curriculum design in local development, promoting STEAM education
R2: 5 teachers from each vocational and technical education unit will participate in the regional program for the development of skills needed in the implementation of STEAM education
R3: In each vocational and technical education unit, for each specialization, a curriculum that integrates STEAM education
R4. Criteria lists for evaluating the implementation of the designed curriculum
R5: IT application for online library of useful resources

4.3 Impact

The long term impact that we hope to achieve is to extend the integration of STEAM education to general education disciplines, especially from the perspective of training skills in students through appropriate teaching strategies.

Section 5 – Costs

5.1 Cost structure

- Labor (internal staff)
- Travel & Accomodations
- Rental of premises
- Furnishing
- Hardware
- Software
- Miscellaneous services

5.2 Funding opportunities

The state budget
The local budget
European funds
The budget of the school unit - the chapter of expenses with the continuous training of the staff.

Section 6 – Action Plan

6.1 Activities

A1: Establishment, at county level, of the working group for the Guide for curriculum design in local development (listing conditions to be met by applicants, selection call, evaluation of offers, announcement of group composition)
A2: Organizing 5 workshops for drafting the Guide for curriculum design in local development
A3: Preparation of the thematic list of the training program for teachers (topic, duration, form of organization, criteria for evaluating students)
A4: Carrying out the training program for teachers (announcement, registration, request for event organizer for accommodation, meals, training facilities, running the program)
A5: Establishment, at school level, of working groups for the local development curriculum, including representatives of the partner economic operators.
A6: Organizing 3 workshops for curriculum design in local development
A7: Organization of 2 workshops for the design of tools for evaluation and monitoring of curriculum implementation in local development, which will be attended by members of the design working groups and representatives of school management
A8: Purchase the domain for the online resource library
A9: Selecting materials to upload, organizing them into an easily accessible and suggestive structure and uploading them to the online library

Section 7 - Risks

7.1 – Risks/Competition

For A1: Establishment, at county level, of the working group for the Guide for curriculum design in local development (listing conditions to be met by applicants, selection call, evaluation of offers, announcement of group composition)
Risk:
Small number of offers, difficult selection, high workload for each member of the group, low quality results
b. Probability 1
c. Severity 3
d. Mitigation strategy
Resume announcement and reschedule

7.2 – Risks/Opposition

For A4: Carrying out the training program for teachers (announcement, registration, request for event organizer for accommodation, meals, training facilities, running the program)
Risk:
Delays in setting up the target group, due to the resistance of teachers to the new
b. Probability 2
c. Severity 3
d. Mitigation strategy
Resumption of the recruitment procedure and rescheduling of deadlines

7.3 – Risks/External Menace

For A6: Organizing 3 workshops for curriculum design in local development
Risk:
Organizational difficulties (availability of financial and space resources)
b. Probability 1
c. Severity 3
d. Mitigation strategy

Reprogramming

For A7: Organization of 2 workshops for the design of tools for evaluation and monitoring of curriculum implementation in local development, which will be attended by members of the design working groups and representatives of school management
Risk:
Organizational difficulties (availability of financial and space resources, disponibility of representatives of school management)
b. Probability 1
c. Severity 1
d. Mitigation strategy
Representatives of school management will contribute outside the workshops

For A8: Purchase the domain for the online resource library
Risk:
The funds needed to purchase the domain are unavailable at the allotted stage
b. Probability 3
c. Severity 3
d. Mitigation strategy
Identifying alternative sources of funding