Androgogy of Education 4.0 for university lecturers of technical subjects

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Abstract. The tutorial experience gathered in the high school subjects of the industry practical usefulness is morally old now. The tutorial methods and instruments should be changed as much as the tutor knowledge engaged in the tutorial process. To correct the old tutor staff experience they apply an additional education of inter-university environment. To re-prepare the tutor means to give them new knowledge of the Education 4.0. To re-educate the established tutors they apply soma andragogy methods to establish some new inter-subject connections in the tutor mind, which are included in the student preparation education plan. The technical disciplines tutor must be re-educated because there is a contradiction of the existing tutors capital and the time requirements. The continuous education through the entire life is the base component of the tutor occupation. There is a high school tutor re-education resource center ecosystem with some perspectives of high results of the Education 4.0. The additional tutor education specifics are explained with a base technical preparation.

1. Introduction

The high school adaptation to the incoming Industry 4.0 reality requires to change profoundly the education process like the education format, education content, tutorial technologies and other. An important circumstance is the tutor preparation engaged in the education subjects of technical profile \([1, 2]\). The student professional success of their working activity is highly related to the tutor academic success who in time took away their own new knowledge gaps, which continuously appear in the industry segments \([3, 4]\).

The modern academic society faces unprecedentedly high number of academic personnel who are not ready in their competences to explain the subjects of useful student knowledge in the production sphere \([5, 6]\). The current high school tutor knowledge and skills gaps for the new production industry specialists cannot guarantee the student qualified preparation as the base working company resource. The tutor own education lack leads to the competence level fall, which are acquired in the student education process \([7, 8]\).

To increase tutor professional knowledge through the entire life is an effective tool to enhance the education environment, which was proved to be right in practice \([9, 10]\). To re-prepare the tutor is for elimination of industry cadres hunger by forming in high school tutors the knowledge component
adapted to modern reality. The tutor own competences development is a subject of inter-university society interest interested in workers professional qualities cultivation [11].

To re-prepare the tutors is done through the additional education system supporting inter-university interaction corporative format. The existing traditions to isolate the base university, which realizes the tutor re-preparation proved to be ineffective which in first place means the modern technologies diversity, which is out of any education facilities competences including the poly-technical format [12]. The tutor necessities to grasp new knowledge makes to be actual the self-learning university paradigm to justify the tutor re-preparation new mechanisms search to eliminate the interests conflict of interests between the Education 4.0 and the Industry 4.0 [13, 14].

2. The high school tutors industry re-preparation
The high school tutors re-preparation has two main objectives:

- to make the tutors acquainted with new inner subject knowledge which students urgently need in their work activity;
- to establish in the tutor mind inter-subject connections oriented for education content integrity understanding which the student preparation education plan contains.

Inter-subject course content is defined by unsatisfied workers with their competences and knowledge, which are used in a production but yet only to be used in a high school. The inter-subject course education content contains didactic cases of independent knowledge fragments, which are useful for the production. The tutors inter-subject courses education is done through the practical and academic selections with production disciplines specifics. The inter-subject knowledge updating pace which tutors must acquire is defined with law acts and new technologies appearance dynamics necessary for the industry.

The inter-subject connections for each field of knowledge have the inter-disciplinary courses character given to student in the high school. The importance to understand the laws which are base of the student preparation education plan gives the tutors a possibility to distribute in time the competences being grasped according to the regulation principles and education system. The indicator to characterize the education content is a competence matrix adapted for the Education 4.0 students preferences and production companies wishes. To rise the tutors culture in re-preparation courses of industrial accent may make closer the reality for yesterday students in their employment and academic knowledge (practical skills) which students grasp in a high school.

In the end to re-prepare the tutors with additional education may help the tutorial staff to improve their tutorial mastery which closely involves student into the subjects being acquired. The tutors actual knowledge is focused on the students education attention in theoretical and practical knowledge and their tutorial skills intensify the education process which lets the student grasp maximum amount of content for a lection limited time.

To re-prepare the tutors is not only the knowledge component of one or several subjects. A complex approach to re-prepare the tutors in regular base includes tutorial practices with education specifics and person habits with some development or health restrictions. Immersive experience acquired by the tutor which is translated temporarily in courses is of high importance for inclusive education which helps students to study. A motivation pulse which student got in time lets them remember for a long period the education content which has some positive effects for the person employment.

3. The high school asynchronous re-education
To re-prepare the high school tutors is done in a consulting format project, which is realized in State or private sectors with a university society. The tutor staff asynchronous education is done by the preparation resource center functioning with an education technical park. The electronic education environment is an immersive web-portal providing the tutors attention concentration for the subject being grasped. The web-portal content and function supporting the communication technology, which are equal to the inter-university hub technologies with different profile education content (technical and humanitarian). The high school tutors resource re-preparation center ecosystem for Education 3.0 is
given in figure 1. The high school tutors resource re-preparation center ecosystem for Education 4.0 is given in figure 2.

![Figure 1. The high school tutors resource re-preparation center ecosystem for the Education 3.0.](image1)

![Figure 2. The high school tutors resource re-preparation center ecosystem for the Education 4.0.](image2)

The tutor asynchronous re-education based on an electronic web-portal provides:

- when the tutor staff reaches in a short time the necessary indicators from the competences matrix of an additional education program;
- attendance control (electronic diary) and tutor re-education results with test exercises;
- the remote seminars as video conferences and theoretical knowledge using online courses;
- education tracks variation identical to the education plan which ramification point corresponds the tutor subject specialty;
- when the tutors non-directly grasp complex IT (Information Technologies)-technologies directly related to the education environment settings and web-portal functionality;
• to improve the education content with empirical data collected from web-formularies after the tutor electronic inquiry;
• the tutor staff re-education low cost accessible for budget education facilities and some tutors who have additional subjects faculties;
• theoretical knowledge and practical experience connection in their application to make electronic education environment approach real for some virtual auditorily with unlimited number.

The electronic web-portal gives the tutors new subject knowledge in a ready form out of the education facility walls. The education groups are formed from the tutorial staff representatives with some kind of similar tutorial experience because of their personal or business traits including some professional skills. The additional education student contingent feature is the tutor personal experience with some scientific degrees and recognitions in the given subjects. The technologies and education means being used familiar to the tutors from their professional activity let the student tutors see the education content critically including the way it was given.

To develop the tutorial staff cognitive abilities to acquire new knowledge is the difference between the classical student and tutor being educated social positions. The additional education tutors and students changed roles (reasonable education) is explained with useful information mental perception capability, which let tutors instantly and unmistakably sort out the result methods and online courses. The web-portal ways to re-educate the tutors includes the andragogy correct application methods with tutor experience maximum application and is done in evenings or non-visual form of the education process.

4. Conclusion
The Education 3.0 conservative way showed up that the new academic environment is not yet ready to the youth demand for new knowledge with some practical significance for cybernetics production. In the crossing of industrial centuries the most important thing is the high school professional tutors capital made after some tutorial staff re-educations in actual technical disciplines.

Fragmented knowledge learnt by tutors can hardly be used for systematic students concentrated on fast applications of their industrial competences. To solve the tutor re-education problem they apply the additional education interests done in inter-university environment, which today mostly include the electronic education. To renew the morally old tutor knowledge is done in best andragogy traditions integrated into an immersive web-portal to educate the tutors with new competences necessary for successful life and occupation.

The technical disciplines tutors re-education specifics engages the andragogy and frontal education tutorial methods, which include:
• to combine the high school tutor work activity and their learning done initiatively by the order of the employer or new profile law changes of norming acts acceptance;
• the tutor reasonable attitude to grasp additional education content which is useful for tutorial work;
• the tutor uses their own studying and tutorial activity experience (social behavior in academic environment) to grasp new knowledge;
• the deeper tutorial processing of some subject cases for narrow specialty knowledge;
• the tutor grasping with humanitarian education (tutorial) of technical accurate sciences disciplines and other.

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