

FINAL REPORT – DEMONSTRATION PROJECT ANTALYA, TURKEY, 2016

IMPROVING TECHNICAL DRAWING SOFTWARE SKILLS OF VET TEACHERS/TED-VET

1. RATIONALE

Improving Technical Drawing Software Skills of VET Teachers (Ted-VET) Project was supported by the European Training Foundation (ETF). The project duration was for one year from January 2016 to January 2017.

The objectives of the TED-VET Project were: the organisation of trainings to introduce Adobe Illustrator as a Technical Drawing Software to technical VET teachers; development of the capability of Akdeniz University and academic personnel to provide appropriate and high quality CPD for VET teachers and trainers on Technical Drawing Skills with ICT; development of practitioner networks among technical VET teachers who give technical drawing courses and support their continuing professional development; development of partnership between the Provincial Directorate of National Education, VET schools, industry and university to contribute to the CPD of VET teachers.

Technical drawing is a linear-based language used by technical staff to express shape, measure, and unit of what is being produced. If a unit needs to be produced, exact measurements of that unit need to be drawn and scaled by the technical drawing rules, and the features of that unit shown with numbers or letters. This is why technical drawing is crucial for an easy and fast manufacturing process. In Turkey, VET Schools have technical drawing courses as major area courses in the 10th grade. The curriculum includes not only drawing of polygons with basic lines and features, but also drawing the perspective of 3D figures, and based on these perspectives, producing 3D drawings. Technical staff who graduated from VET schools should be

qualified in technical drawing which is an accepted work tool for transferring ideas in the mind of an engineer, architect, or designer. Developments in computer technologies and especially in two-dimension and three-dimension applications now permit designers to perform and edit drawings quickly with error. In Turkey VET teachers and trainees are expected to make use of new pedagogies, teach new competences, work more closely with their colleagues and employers and make extensive use of new technologies. Moreover, the Turkish Government has obtained a national agreement with Adobe to make Illustrator software available in every school in Turkey. Informal discussion with teachers of technical drawing showed that there was an appetite to make use of this software.

There is also an expectation from employers and from teachers to go beyond the competences of graduates specified within the curriculum given the availability of software and hardware further highlighted the professional development needs addressed by this project.



2. ACTIVITIES

Activity 1: “Technical Drawing with Adobe Illustrator” Educational Program

The project team, consisting of academics from Akdeniz University and the lead ICT teacher from Antalya Province Directorate of National Education, designed the training programme both for the trainers and for vocational teachers. English and Turkish versions of the program can be downloaded from the project website (<http://www.ted-vet.net/documents-en.html>).

Activity 2: Training for Trainers of VET teachers

15 VET school teachers, who would then proceed to give technical drawing courses to other VET teachers, were trained for 40 hours to be a “trainer”. The course plan for the trainings and questionnaires for evaluation of the trainings can be reached from the project website (<http://www.ted-vet.net/documents-en.html>). The phases of the training are:

- a) Preparation of training contents and approval from Antalya Provincial Directorate of National Education
- b) Selection of 15 teachers who would be “trainers” from Antalya Provincial Directorate of National Education
- c) Obtaining official permission and organizing training location
- d) Applying pre-test to 15 trainers before “Training of Trainers”
- e) Applying 40-hour training
- f) Applying post-test to 15 trainers after “Training of Trainers”
- g) Doing interviews with 15 trainers after training and collecting data.
- h) Interpretation of content and functionality of training after the “Training of Trainers” with doing content analysis of the interviews.

Activity 3: Training of VET teachers

15 trainers delivered the training to 303 teachers who worked at VET schools in Antalya. The phases of the training are:

- a) Selection of schools and teachers who would participate in training with Antalya Provincial Directorate of National Education
- b) Obtaining official permission and organizing training location
- c) Applying pre-test to teachers who will participate in the study
- d) Applying 40-hour training
- e) Applying post-test to teachers who would participate in the study
- f) Analysing Paired Samples t-test between pre- questionnaire and post-questionnaire and interpretation of the difference between opinions about integration of computers on technical drawings before and after the training

3. EVALUATION

- a) Evaluation of “Training of Trainers”

Semi-structured questionnaires were used for the evaluation of the training of trainers. In interviews, teachers commented on their expectations from training, the preparation before training and the effects of the training.

Most teachers stated that they participated because they wanted to improve their vocational knowledge. Teachers did not see themselves qualified enough about technical drawing and technical drawing with computers. Some teachers stated that they did not expect anything before the training because they did not get enough information about the training content.

More than half of the participants made no preparation before the training because they were unable to access either software or written guidance. Analysis suggests that ICT teachers were better prepared than other teachers: because they were more likely to be familiar with graphics software.

All but two of the participants said that this training helped them to improve their vocational knowledge in various ways. Nearly half of the teachers said that they learned new software to improve their vocational knowledge. Participants also stated that they had learned new drawing techniques. Some participants stated that they would produce materials in and outside of the course. Especially in this theme, teachers thought computers would increase the efficiency in technical drawing courses. It is crucial that teachers also tried to learn how they could use it more effectively outside the courses. It can be concluded that using computers in technical drawing courses affected both teachers and students positively. Moreover, by using computers in technical drawing courses, students do not spend money on stationery expenses. They also learn to use technology in every part of their lives.

All participants except one said that this training was a step forward for their professional development. As requested by the evaluation the metaphors used to describe the training and its impact related to nature, life or building to further advance their career. Thus, supporting the view that VET teachers need such training for their professional development. Moreover, it can be said that computers are now seen as a necessity in technical drawing courses. Training photos can be seen from <http://www.ted-vet.net/photos-en.html>

"the course impacted on my professional development positively...I think that being able to use a drawing program ..will be..very useful. I believe I will make use of it especially in modeling and project studies. Besides that I think I will use it on creating graphics on web sites"
Teacher

b) Evaluation of 2nd Training

Pre-training and post-training questionnaires were applied to 303 teachers. Paired Samples t-Test analysis was applied on the average scores of the pre- questionnaire and post- questionnaire which investigated the skills, knowledge and intentions of trainees.¹ According to the analysis, there was a significant statistical difference between these scores. In particular participants judged that their technical drawing skills had improved and they were more likely to favour the use of computers for technical drawing.

c) Evaluation of the Seminar

After the seminar, a questionnaire was completed by participants in order to evaluate the seminar. The analyses was done by calculating arithmetic means of the questions. General average of the questions was 4.35, which meant participants thought that seminar, ETF, TED-VET Project and the implementation of the Project was satisfactory. When the questions were analysed one by one, it was understood that participants' knowledge about ETF had increased (Arithmetic mean: 4.63). It was also understood that participants had information about the Project aims (Arithmetic mean: 4.26), Project activities (Arithmetic mean: 4.31) and the usefulness of the Project (Arithmetic mean: 4.18). This showed that seminar participants thought that TED-VET Project was a successful demonstration Project for CPD.

4. DISSEMINATION AND NETWORKING

The project website has had 712 visitors up to now (15th of January, 2016. <http://www.ted-vet.net>). The project team put regular postings on progress of training using the project website (<https://www.facebook.com/groups/tedvet>), Facebook and Twitter accounts to share resources and experiences. A small Whatsapp group was set up to encourage the teacher trainers to collaborate. Moreover, the Project team shared the events on CPD Platform of ETF.

A seminar was held at Akdeniz University Faculty of Education with the participation of 202 people including university students and staff, administrative staff from Ministry of Education, and ETF (by video) and other stakeholders on 20th of December, 2017. [See images](#).

A scientific article was written and submitted to IJVET (International Journal of Vocational Education and Training) and presented at the Association for Career and Technical Education/ACTE Vision 2016

¹ Pre-test average is X= 2.17 Post-test average is X=4.52. p= .000.

Conference in USA between 30th November and 3rd December, 2016 to disseminate the project on international level.

The project was presented at an event on professional development at the Ministry of Education in Ankara by a senior manager from the Antalya Provincial Directorate in the context of strategic development of professional development across Turkey in 2016.

5. CONCLUSIONS

Main achievements

- The project increased the technical and pedagogical competences of 15 teacher trainers and more than 300 teachers in Antalya, Turkey
- The project encouraged and enabled vocational schools in Antalya to enhance the competences of graduates of technical drawing and thus better meet the needs of employers
- The project demonstrated a model for identifying, designing, delivering and evaluating professional development at Province level in Turkey which is effective, economic and responsive to need.
- The project disseminated a model for professional development - locally, nationally and internationally – to practitioners and policy makers, using multiple channels, and obtained positive feedback.
- The project successfully identified a 'realistic' development need – and was able to concentrate on training that could lead to changes in instruction that fitted with the curriculum and met the needs of learners and employers.
- Teachers in Antalya will be able to carry forward this initiative – supported by the training materials and the networks the project created and has placed online.

Challenges and Learning

- Some teachers would like additional face to face training in order to develop technical skills and pedagogies
- The project was not designed to support teachers to actually make use of the new skills and approaches with their students: teachers may need further support to **apply** new skills
- Most teachers have not been ready to make use of the virtual networking opportunities to support the use of new skills in practice
- The evaluation does not reveal whether the **instructional** practice of teachers has changed
- Although the model has been successful in Antalya, it appears that other Provinces are not yet able to replicate this success.

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