An interactive e-learning tool for the fashion industry to enhance the knowledge sufficiency of professionals in supply chain visibility

Nitsos I. [1], **Stalidis G.** [1] **And Towers N.** [2]

[1]*International Hellenic University, Greece, 17th km Thessaloniki-Sindos*
[2]*University of Gloucester, UK, The Park, Cheltenham*

Abstract:
Supply chain visibility between all partners of a supply network has become a reality for consumers, retailers and different tiers of suppliers, especially in the fashion sector. Sharing accurate information among all companies involved in a supply chain in a timely and meaningful way on the changing consumers' needs, enhances the understanding of customers' needs and improves supplier material integration, productivity and cost. Employability of fashion workers requires specialised knowledge and culture on behalf of the people involved in several different posts in the fashion industry, including marketers, retail commercial managers and visual merchandisers (Busse, 2017, Somapa, 2018).

The work presented in this paper is part of the ongoing EU-funded project "European Fashion Retail Supply Chain Visibility Training Resource (SCVis)". The aim of SCVis is to create a vocational training (VET) resource including a web based digital tool and training materials that address an established knowledge gap in supply chain visibility and provide an accessible resource for career-orientated learners, and those that are least likely to take part in learning opportunities. In particular, SCVis is developing a digital e-learning tool, where a wide field of learners evaluate and enhance their knowledge levels, following an interactive and modular testing process.

The first step was to capture, codify and model knowledge and experience on the knowledge areas that a person working in the fashion industry should possess, in order to be effective in supply chain visibility principles. This knowledge content has been extracted from the literature and has been extended with synthesized material by the project partners, who are experts in the fashion industry. The developed content includes not only the identification of the general and specialized knowledge areas involved, but also related training resources and a series of evaluation modules, suitable to identify the sufficiency of a professional according to his/her role. A solid process has been followed to structure the content, based on a multi-level mapping among professional roles, activities related to each role, knowledge areas required for each activity, as well as management levels (i.e. strategic, tactical or operational).

The focus of the current paper is on the specialised digital tool, which was developed within the SCVis project to facilitate the personnel evaluation process. Important special requirements of this tool were (a) to allow interactive learning paths with conditional branching, (b) to be open enough to allow the implementation of the SCVis information structure and (c) to allow standardization of the content and exporting of the testing data for analytics purposes.

A review of existing Learning Management Systems (LMS) and Learning Content Management Systems (LCMS) has been performed in order to select a suitable platform to be used as a basis for the SCVis tool. It came out that the most efficient solution was to develop the required functionality as a dedicated application, based on a high-level LMS development environment, specifically Drupal (Drupal, 2019). This platform is a Content Management System that offers several development tools and allows for the rapid creation of complex applications. It can easily adapt to end-user requirements, reducing the need for custom source code. Specific requirements can usually be addressed through the use of its Application Interface (API) and existing system processes can enrich their functionalities through the use of hooks implemented in custom modules. Furthermore, Drupal offers a wide variety of community contributed modules that developers can choose from, to take advantage of high-quality solutions provided to common user needs. Security is also of great concern; thus, the Drupal core source-code and all community contributed modules are covered by security advisory policies.

Our implementation of the interactive e-learning tool described in this paper uses Drupal 8.7.3 core, a custom created module, as well as several community contributed modules (e.g. Backup and migrate 8.x-4.0, Devel 8.x-2.1, IMCE 8.x-1.7, Private files download permission 8.x-2.1, Token 8.x-1.5, Webform 8.x-5.2). We take advantage of

the Drupal built in system for creating roles and assigning permissions. We have identified four groups of user roles, namely:

- Trainees: Trainees should be able to log in to the system, take tests depending on their business roles, view the progress, receive feedback and learning material according to their needs. A final report is presented upon the completion of specific learning paths.
- Content editors: Content editors are responsible for contributing content to the trainee tests (building questionnaires and providing learning material)
- Moderators: Moderators should be able to supervise the training process by viewing trainee results and overviewing the learning paths.
- Administrators: Administrators are responsible for maintaining user accounts, for adding content, and, also for providing regular maintenance services (backup etc).

The main end user of the SCVis system is the Trainee i.e. a current or potential company employee or in general professional in marketing or management, who is evaluated regarding potential knowledge gaps in supply chain visibility. Trainees log in to the system using the common system interface and they can select a professional role to test their skills and knowledge. In SCVis, 16 professional roles have been identified (i.e. Managing director, Regional-store-depart Manager, etc) which relate to business functions (Activities) and knowledge needs.

Upon selecting a role, the trainee is requested to complete a series of modules. Each module is divided into two rounds consisting of 4-6 questions each. A simple learning path is applied in this case:

- Round 1: If the trainee answers correctly in all questions, a success message is displayed, and the module is marked as successfully completed.
- Teaching material: If the trainee fails to answer all questions correctly, then the trainee is prompted to use the teaching material provided, to be able to proceed to the second round of questions.
- Round 2: If the trainee answers correctly in all questions, a success message is displayed, and the module is marked as successfully completed. In case the trainee fails to answer all questions correctly in the second round as well, then a knowledge gap is identified, and the module is marked as completed.

After completing a single module, the trainee returns to the main role page to monitor his progress and continue with the rest of the modules (Figure 1.a). After the completion of all modules in a role, the trainee can view a final report, consisting of a list with the knowledge areas in which he was successful but, most importantly, with the identified knowledge gaps, as well as a explanation text for each knowledge gap (Figure 1.b). The Moderators can view collectively the completion results for the trainees under their responsibility.
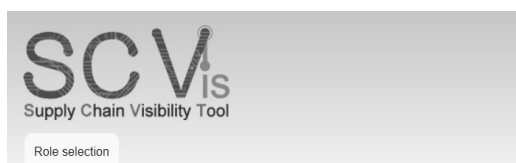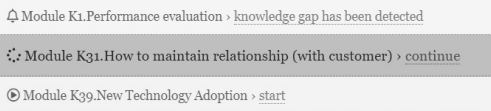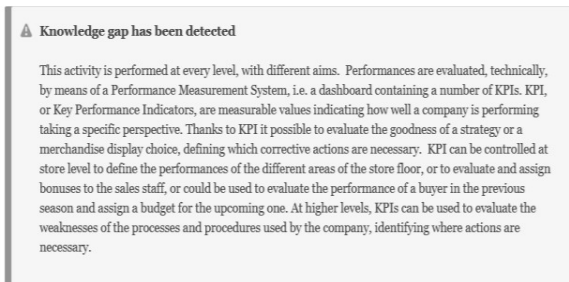

(a)
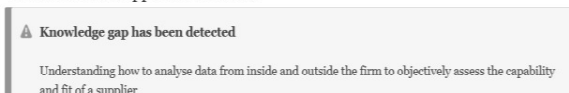
(b)

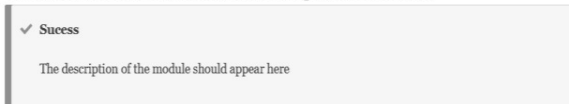**Figure 1:** (a) The main Trainee page, which controls the progress, (b) Final report indicating knowledge gaps and successful knowledge areas

Content editors are the main users of the system's back-end. They have access to an editing environment which is adapted to the SCVis logic, through which they can (a) edit modules (i.e. create, edit and delete modules consisting of questions and answers divided in two rounds as well as create content for the educational resources required to proceed to round 2 and (b) synthesize roles (i.e. define which modules are relevant to a role and insert a description field providing additional information about the role).

The SCVis Digital Tool is currently at the stage of usability testing by the participating experts, towards trials with real end users (i.e. fashion industry professionals and students). The feedback received until now is encouraging, both regarding the approach and the implementation. The next step is full scale evaluation through trials with real users in UK, Italy, France, Ireland, and Greece. The SCVis project is coordinated by University of Gloucester and the partners are MIP-Politechnico di Milano, Ecole Superieure de Sciences Commerciales d'Angers Association, Dublin Institute of Technology and International Hellenic University (former Alexander TEI of Thessaloniki).

Keywords: interactive e-learning, vocational training platforms, supply chain visibility

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