Enhancing competence development for social inclusion
Using the TENCompetence Web tools

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ABSTRACT
This paper describes the study of two pilot studies centred on technology-enhanced competence development in lifelong education carried out in the challenging context of the Association of Participants Àgora. The comparison between both pilot studies reinforces the first conclusion drawn from the 1st pilot experience, which puts in evidence that the use of the TENCompetence infrastructure provides significant learning benefits for adult participants with low educational profiles and who are traditionally excluded from the use of innovative learning technologies and the knowledge society. The participants had the opportunity to develop and improve competences related to English language, ICT and Basic Spanish (only 2nd pilot). The tools employed switched from being a Rich client to a Web client also integrating new functionality related to self-assessment, activities organization and resources sharing. The paper introduces the context and the pilot scenario, indicates the evaluation methodology applied and discusses the most significant findings and the comparison of the two pilot studies. The results of the second pilot reinforce the conclusion that TENCompetence provides a relevant solution for competence development in support of social inclusion.

Keywords
Lifelong competence development, Self-organized learning, Social inclusion, Pilot study, Non-formal learning, Web tools

Introduction
This paper focuses on two pilot studies which were carried out in the Association of Participants Àgora in the framework of the TENCompetence project, a four-year project in the European Commission's 6th Framework Programme, priority IST/Technology Enhanced Learning. The aim of the project is to design a technical and organizational infrastructure for lifelong competence development. The pilot studies were carried out in order to see to what extent people with low educational profiles might benefit from these innovative technologies and be responsible for their own learning. In this context, the TENCompetence infrastructure was employed in order to provide the participants with a set of self-training functionalities to support their competence development process, like goal setting, self-assessment, planning and self-regulated learning.

An important outcome of the 1st pilot is that the TENCompetence infrastructure can be successfully applied in the challenging context of Àgora, despite the low educational levels of the participants and the diversity in their profiles, i.e. educational background, professions, computer skills, gender and age. The Personal Development Planner in a Rich client version (see section 2.2.) offered the participants a new way of learning which fostered their self-organization and increased their motivation. Despite the limited time spent on competence development and the technical problems suffered, most of the participants discovered new competence development opportunities, which led them to create several competence development plans associated to different profiles of competences. The participants' reflection and self-confidence was enhanced by the activities during the pilot. In this line, they also realised the existence of a world of further competence development opportunities. More information on the
characteristics and results of the 1rst pilot are detailed in the paper *Self-Development of Competences for Social Inclusion Using the TENCompetence Infrastructure* of the Special Issue of the Journal of Educational Technology & Society (2009, accepted). The second pilot of Àgora was carried out in the same context, though with an enhanced Web PDP and new tools, thus allowing the actors within the TENCompetence project to understand in depth the effects of its outcomes in this challenging context.

The paper is organized as follows. The first section describes the Àgora pilots by presenting the Àgora setting and the TENCompetence tools deployed. The second section focuses on the methodology employed for evaluating the pilot studies. The third section summarizes the results drawn from the study and comparison between both pilots. Finally, the paper presents the conclusions of the pilot studies.

**Description of the Àgora Pilots**

**Àgora setting**

Both Àgora pilots took place in the OMNIA computer room (see Figure 1) of the association equipped with 9 computers. The 1\textsuperscript{st} pilot was carried out during 6 weeks from September 19\textsuperscript{th} to October 30\textsuperscript{th} and the second one lasted 10 weeks (including 2 weeks of holidays) from March 9\textsuperscript{th} to June 12\textsuperscript{th} 2009. In both scenarios, the computer room was reserved for using the TENCompetence infrastructure during 14 weekly sessions of 1 hour. Participants also had the possibility to use the TENCompetence tools whenever the OMNIA was free, including week-ends and after the end of the pilot. In addition, the participants also used the tools at home. The main aim of the pilots was to implement, test and investigate the benefits of the TENCompetence infrastructure and its support for the participants’ competence development. The participants were expected to reinforce and improve their competence level in ICT and English language (basic and advanced levels) according to their needs and interest. In addition, a new competence profile was created in the second pilot (Basic Spanish) addressed to immigrant participants. All in all, the learning resources provided in the pilots were mainly related to functional and communicative skills. The learners also had the possibility to develop reflective skills through the use of the different TENCompetence functionalities.
Both pilot studies comprised more than 100 learners and 7 experts/observers (Àgora staff), apart from the researchers involved in the investigation. The wide range of adult learners who participated in the pilots varies in terms of origin (second pilot), age, gender, profession, computer skills but also in the variety of needs and interests. Most of them have low academic levels and are characterized by their intrinsic motivation to learn. A TENCompetence expert was in charge of each of the self-training session to assist the users with any technical or content-related issue.

Next section explains and stresses the main differences of the TENCompetence tools employed in both pilot studies.

**TENCompetence tools used in the pilot studies**

In the 1st pilot, the participants used exclusively a Rich client version of the Personal Development Planner (PDP) whereas in the 2nd pilot the PDP switched to a Web client version and new tools were employed, i.e. Liferay, LearnWeb and the forum.

In both pilot studies, the participants used the PDP as the central tool for planning their learning process and accessing the different activities available in the pilot studies. Figure 2 illustrates the PDP tool (Rich client) used in the 1st pilot. After creating their own personal plans by selecting a competence profile, the users had the possibility to state their goal and motivation, follow a self-assessment, create their learning plans and eventually perform the activities. In the second pilot, the PDP switched from a Rich client to a Web client. The main functionalities of the tool were improved, i.e. re-organization of the activities and competences, improvement of the self-assessment functionality, additional support provided to help the users in defining their own proficiency level and proficiency level assigned to each activity.

In the 2nd pilot all the TENCompetence tools were integrated as iframes (lightweight front-end integration) in a Liferay portal dedicated to the Àgora pilot. Figure 3 presents the Liferay portal including the TENCompence tools and functionalities, i.e. the WebPDP, the “Self-assessment activities”, the dictionaries, the forum, LearnWeb, and the user guides, which are further detailed in this section. The figures below are all screenshots of the TENCompetence tools used in the 2nd pilot.
Figure 3: Liferay portal with the integrated tools as iframes

WebPDP:
Figure 4 presents the WebPDP tool as it was employed in the 2nd pilot as a Web client. The WebPDP is integrated as an iframe in the Liferay system together with the other tools used in the 2nd pilot.

All the activities available in the WebPDP were organized in a logical order so as to facilitate the learning process of the participants. In this sense, the activities were listed by competences and subjects and in an alphabetic order. The activity title included the proficiency level assigned (4 sub-levels) and a “♫” symbol if the activity was a listening activity.

Figure 4: Web PDP tool including the “Select goal”, “Self-assessment”, “Plan activities” and “Perform” functionalities.

“Self-assessment activities” (Liferay):
Figure 5 shows the “Self-assessment activities” functionality of Liferay. It is based on tests that the participants can take in order to help them determining their own proficiency level for a specific competence.
Forum:
The forum was used for different purposes: to share ideas and exchange impressions, to seek information on the PDP and to be updated with regard to the latest news regarding the tools and activities.

LearnWeb:
Figure 6 represents the LearnWeb tool which was used, only in the 2nd pilot, as a container of Web 2.0 tools to manage and share resources (photographs, videos, etc.), make group work, etc.

Evaluation of the pilot studies

Evaluation methodology

The main findings and outcomes resulting from both pilot studies are further explained in the next section. In both cases, results were obtained using a mixed evaluation methodology which combines qualitative and quantitative data gathering techniques (Creswell, 2003; Zelkowitz & Wallace, 1998) as listed in table 1 below. On one hand, the quantitative data came from a questionnaire which the participants had to complete at the beginning of the pilot studies (pre-test) in order to know their personal profile and expectation and a questionnaire at the end of the pilot (post-test) to understand to what extent the participants appreciated the tools and functionalities employed. In addition, the log files generated by the TENCompetence infrastructure also provided quantitative data for the
analysis (Glahn et al., 2008). Google analytics made it possible to measure the number of visits made to Liferay and the integrated tools. On the other hand, qualitative data was gathered in order to deepen the trends resulting from the analysis of the quantitative data. The data sources included observations made by the experts during the self-training sessions in the Àgora computer room. Post-observations (see Table 1) were also collected in order to take into account the informal and hindsight perception of the participants with regard to any issue related to the pilot studies. One focus group with the participant and another one with the experts were conducted before the end of the pilots in order to deepen the data results collected through the observations. Based on these evaluation techniques, the data obtained was triangulated in order to obtain trustworthy conclusions (Guba, 1981; Creswell, 2003).

<table>
<thead>
<tr>
<th>Data source</th>
<th>Type of data</th>
<th>Labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaires before (pre-test)</td>
<td>Quantitative and qualitative participant characteristics,</td>
<td>[pre-test]</td>
</tr>
<tr>
<td>and after (post-test) the pilot</td>
<td>expectations and evaluation.</td>
<td>[post-test]</td>
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<tr>
<td>experience</td>
<td></td>
<td></td>
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<tr>
<td>Observations during the pilot</td>
<td>Record of observations (technical issues, about the activities, interactions</td>
<td>[observerX-date] and [observerX-session], where X represents different</td>
</tr>
<tr>
<td></td>
<td>with experts, behaviour, other incidents, etc.)</td>
<td>observers (from 1 to 7); date is the specific date when the observations</td>
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<tr>
<td></td>
<td>The observations were done by 6 different experts in the 1st pilot and 7</td>
<td>were done in the 1st pilot and session is the specific number of face-</td>
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<td></td>
<td>experts in the second one (Àgora staff, UPF researchers)</td>
<td>to-face session when the observations were done in the 2nd pilot.</td>
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<tr>
<td>Focus group with participants</td>
<td>Qualitative: participants’ opinions before the end of the pilot</td>
<td>[focus-participants]</td>
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<tr>
<td>Focus group with experts</td>
<td>Qualitative: experts’ opinions before the end of the pilot</td>
<td>[focus-experts]</td>
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<tr>
<td>Log files</td>
<td>TENCompetence server logs of the PDP tool (taking into account only the</td>
<td>[logs]</td>
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<td></td>
<td>participants’ logs)</td>
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<tr>
<td>Visits to the Web portal and tools</td>
<td>Google Analytics records about the number of visits to the Liferay site and</td>
<td>[visits]</td>
</tr>
<tr>
<td></td>
<td>the integrated tools as iframes (including visits of the participants and the</td>
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<td></td>
<td>supporting staff)</td>
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<tr>
<td>Description of the Àgora context</td>
<td>Qualitative descriptions of the context characteristics in which the pilots</td>
<td>[context]</td>
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<td></td>
<td>are framed (see “Description of the Àgora pilots”)</td>
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<tr>
<td>Observations post-pilot</td>
<td>Records of opinions and observations of what was being perceived in Àgora</td>
<td>[observations-post]</td>
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<tr>
<td></td>
<td>once the pilots had finished (collected by Àgora staff)</td>
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### Results and comparison between both pilot studies

Table 2 summarizes the results from the evaluation and the comparison between the two pilot studies carried out in Àgora. This section focuses on one of the main findings resulting from the analysis of the quantitative results and qualitative data collected throughout the pilot periods and beyond: Participants appreciated this new way of self-organized learning.

The second finding listed in Table 2 highlights that most participants appreciated this new way of self-organized learning. The positive results drawn from the 1st pilot study were enhanced in the second pilot (75% appreciated this way of learning (very) much versus 54%). This positive appreciation is also supported by the intention of the participants to continue developing competences in the future (90% versus 83%) [post-test].

On one hand, quantitative results reveal that the participants appreciated the PDP functionalities and especially in the 2nd pilot in which most technical problems were solved and the tool elements improved. In this sense, the participants found most of the PDP functionalities useful as they were able to work at their own rhythm, to choose the activities according to their proficiency level and to have a control on their learning process: the “self-assessment” functionalities employed in the pilots were highly appreciated, especially in the 2nd pilot in which the “self-assessment” of the PDP was improved (71% found it useful) and further support provided in order to help the users
in determining their own proficiency level, i.e. “Self-assessment activities” (70% found it useful) [post-test]. In addition, a large majority found the “mark as completed” functionality (83%) useful in both pilots (83% versus 86% in 1st pilot) as they could see how they advanced in their learning process [post-test]. Moreover, the activities and competences were re-organized in a logical order (by competences and subjects, in alphabetic order and with a proficiency level assigned to each activity) in order to facilitate the identification of the activities and the whole learning process. This change had positive repercussions on how the participants felt in control of their own learning (62% versus 38% in the 1st pilot felt in control of their own learning) as they could better identify the learning resources and choose the activities that best suited them. Qualitative results also stress how participants benefited from the functionalities of the Web PDP: “You can work at your own rhythm. You can repeat an activity [focus-participants]”; “I benefit from the program because I can progress on my own and whenever I have time to practice [post-test]”; “All in all, they like to perform the activity at their own rhythm [Observer1-session 5]”; “Several participants comment that they like this way of learning because although they are following a course in advanced English in the school, their think their level is lower and therefore the existence of different levels in the PDP structure allow them to work according to their own needs and refresh basic elements [Observer1-session6].”

In addition, although the new tools employed in the 2nd pilot (LearnWeb and forum) were used by a limited number of users, the participants think these tools are useful and have potential [post-test]. All in all, the appreciation of the tools is supported by the PDP usage tracked in the log files and the Google analytics records of the visits made to the different tools in the 2nd pilot. There was an average of 80 sessions in the PDP tool per week during the active periods of the pilot [logs] and a total of 2,561 [visits] to the Liferay site in which a total of 19,193 pages were viewed, i.e.7,410 Liferay views, 4,949 PDP views, 1490 self-assessment tests views, 353 LearnWeb views, 545 dictionaries views, 335 forum views and 233 user-guides views [visits]. It is worth mentioning that the extended experience of the users who participated in both pilots might enhance the way in which they felt in control of their learning process.

On the other hand, the participants appreciated that the tools were web-based (2nd pilot) as their wishes to work from home and to be more autonomous in their learning process could be satisfied [observation-all]. They particularly appreciated the possibility to choose themselves when to work on their competences development and not be constrained by attending a course with fixed timetable: “I think this course is interesting because you can use the program whenever you want and because there is no obligation to attend the self-training sessions in the school as you can do it at home at any time [post-test]”. The experts confirm this tendency “Some of self-training sessions had little assistance as for instance the time-slot from 3pm to 4pm. Participants explained that it was not a convenient time for them. For this reason, some of them preferred continue working from home [observer6-session3]”; “The time to practice in the computer room was insufficient. One hour is too short. For those who have Internet at home, no problem [focus-experts]. It was also observed that learning supported by Web tools also enable people to better combine family life and the will to learn “A participant that this way of learning is very convenient as she hasn’t got much time because of her 3 children. Therefore, this way of learning helps her to combine her family life with the possibility to learn” [Observer1-session10].” As a consequence, the participants spent more hours on their competence development at home (10,9 hours versus few hours in the 1st pilot) and learned more with regards to the different competence types, i.e. functional skills, cognitive skills, reflective skills (except social skills) [post-test]. Last but not least, the participants used the tools during the Easter holidays, at weekends and after the end of the pilot (especially after the 2nd pilot), which is a good indicator of the long standing value of the tools beyond the scope of the supported pilots [visits] [logs].
### Table 2: Main results drawn from the research carried out along the two pilot studies

<table>
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<th>Findings</th>
<th>Results and comparison between the pilot studies</th>
<th>Support data</th>
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| 1. Technology supported self-competence development can be useful and beneficial despite the diversity in the participants’ background, even when most of them have low educational levels. | The participants’ characteristics are quite similar in both pilots. 38% of the learners in the 1st pilot also participated in the 2nd one. Despite the wide diversity in the participants’ profile with regards to age, gender, origin (2nd pilot), profession, educational levels (the large majority does not have any university degree), computer skills (mainly low), interests and needs and their little experience with regards to competence-based learned:  
  - Most of them completed the pilot in Agora computer room or at home (especially in the 2nd pilot as the tools were web-based).  
  - The technical problems (particularly in the 1st pilot) and the complexity to use the tools (2nd pilot) did not hinder the participants’ involvement;  
  - They used most of the PDP functionalities in the 1st pilot and were active users of the TENCompetence tools in the 2nd one (literacy and integrated tools). | Based on the analysis of the pre-test, post-test, context, observations, visits and log files. |
| 2. Participants appreciated this new way of self-organized learning        | The positive results with regards to the appreciation of this new way of learning in the 1st pilot were enhanced in the second pilot (75% versus 54% enjoyed this new way of learning). Their appreciation of this way of learning is reflected in the intention of the participants to continue developing competences in the future and at an even higher scale in the 2nd pilot (90% versus 83%).  
  - The following facilities of the tools were appreciated in both pilots but especially in the second one  
  - Being able to work at their own rhythm  
  - Being able to choose the activity in accordance to their own proficiency level (improved in 2nd pilot). They found the activities more easy, interesting and useful as it was easier for them to identify the competences and associated activities  
  - Being able to have a control on their own learning (note that the extended experience of the users who participated in both pilots might enhance the way in which they felt in control of their learning process)  
  - The participants appreciated that the tools switched from a Rich client to a Web client as their will to work from home could be satisfied. As a consequence:  
  - They enjoyed the possibility to choose themselves when to work on their competences development (flexible timetable, no time restraints, etc).  
  - They spent more hours on competence development at home (10.9h versus few hours in the 1st pilot) than in the computer room (6.7h versus 5.3h)  
  - They learned more with regards to the different competence types, i.e. functional skills, cognitive skills, reflective skills (except social skills).  
  - They keep on using the tools after the end of the pilot (especially after the 2nd pilot), which is a good indicator of the long standing value of the tools beyond the scope of the supported pilots. | Post-test, focus group with participants, observations, visits and log files support these results. |
| 3. The experience fostered the participants’ reflection and self-confidence. | In both pilots, the different functionalities of the tools fostered the participants’ reflection and self-confidence:  
  - The self-assessment possibilities (“self-assessment of the PDP, definition of the different levels and “self-assessment activities” (2nd pilot) helped the participants to reflect on their previous experiences and on new learning possibilities provided in the system. It had an effect on their motivation as they realized what things they are able to do.  
  - They highly appreciated the possibility to see how they advanced in their own learning process (81% in the 2nd pilot versus 86% rate the “Mark as complete” functionality as (very) useful)  
  - The creation of new activities as the pilots went along (2nd pilot) upon the request of the participants made them reflect on their real needs in terms of learning and created motivation.  
  - The participants discovered what they could learn and improve in the future, which opened a door to further competence development opportunities. Through the competence profile list of the PDP, they found out that they could develop more competences and also new competences they did not think of before.  
  - Some participants explained how they lost their fear of the computer and new technologies as a results of the pilot experience. | Supported by post-test, observations during the pilot and post-pilot observations, focus groups with participants and experts. |
| 4. The recommendations for the improvement of the TENCompetence tools and functionalities (better organization of the competences and activities, more interactive activities, better support in the identification of the proficiency levels resulting from the 1st pilot experience were taken into account in the 2nd pilot and have shown facilitate and optimize the participants’ learning process. | The main technical issues suffered in the 1st pilot were solved and the recommendations taken into account in order to improve the tooling. New problems appeared but more related to the complexity of the structure of the tools and little experience of the participants.  
  - The users found it easier to choose the activities that best suit them and to advance in their learning process due to the re-organization of the activities in a logical order (by competences and subject) and by assigning a proficiency level (4 sub-levels) to each activity. In this sense, they found it easier to perform the activities and to select the next activity to perform as they could better identify the activities and choose the one that best corresponds to their proficiency level.  
  - The re-organization of the competences and activities also had an effect on the control of their own learning (62% versus 38% in the 1st pilot) and as a consequence choose the activity less randomly in the 2nd pilot (19% versus 34%) in the 1st pilot.  
  - There was a better appreciation of the learning resources as all English activities were interactive upon request on the participants themselves, which had a positive effect on their motivation and autonomy to perform the activities.  
  - The difficulty to perform the non-interactive activities (ICT related activities) was confirmed in the 2nd pilot and was mainly due to the fact the learners had to perform the activities separately, outside the tools.  
  - It was easier for the participants to identify their own proficiency level thanks to the new self-assessment functionalities created (“self-assessment activities” tests), definition of the levels of proficiency of the PDP “self-assessment” tab).  
  - Further recommendations arising from the 2nd pilot experience would be to simplify the structure of the tools; i.e. less log-in and log-out requirements, less tabs and more visual help to facilitate the identification of the tool functionalities. | Observations during and after the pilots, post-tests and focus group with participants and with experts lead to these results and recommendations. |
Conclusion

The paper presented the main results emerging from the evaluation of two pilot studies which investigated the benefits of the TENCompetence infrastructure in its support for self-competence development in the challenging context of Ágora where most participants have low educational profiles. More than 100 people participated in each pilot and used the PDP (Rich client in the 1st pilot and Web client in the 2nd pilot) as a central tool for planning their learning process and develop competences. In the 2nd pilot, the participants had the opportunity to use new tools, i.e. Liferay, LearnWeb and the forum. All in all, the positive results of the 1st pilot were enhanced in the 2nd pilot due to the improvement of the tools and functionalities.

The main conclusions drawn from the two pilot studies put into evidence that the TENCompetence infrastructure can be beneficial and useful for the self-competence development of learners with low educational levels. Although the participants had little computer skills and were not familiar with the self-training properties, they enjoyed this way of learning and expressed their wishes to continue developing competences in the future. The participants appreciated particularly the possibility, through the use of the main functionalities of the WebPDP, to work at their own rhythm, to choose the activity in accordance to their own proficiency level and to have a control on their own learning. As a consequence, the participants have learned much with regard to reflective skills and especially regarding finding out what things they could learn/improve in the future.

The main requirements for the improvement of the TENCompetence tools and functionalities resulting from the 1st pilot experience (self-assessment support, further functionalities for communication and sharing, and better organization of the competences and activities within the PDP) were taken into account for the development of the 2nd pilot and have shown to facilitate and optimize the learning process of the participants. Further recommendations emerging for the 2nd pilot are based on the need to simplify the general structure of the tools (less log-in and log-out requirements, less tabs, and more visual help to facilitate the identification of the tool functionalities). Last but not least, the participants used the tools during the Easter holidays, at week-ends and after the end of the pilot, which is a good indicator of the long standing value of the tools beyond the scope of the supported pilots.

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