

ATAPO: Automatic Tailoring of an Actor Profile Ontology

User manual (v.2.0)

Aida Valls
Karina Gibert
Montserrat Batet
Sergio Martínez

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1. Introduction

The tool described in this document is a result of the European Research project K4CARE. In this project, a medical model for HomeCare (HC) assistance of senior and disabled people has been defined [1]. In addition, a web system has been designed as a tool for offering better medical services to that kind of patients at home. The system relies on the medical model, which has been formally represented as an ontology called APO (Actor Profile Ontology).

The APO stores the knowledge about the roles, functionalities and permissions of the different kind of actors involved in a HomeCare assistance system, regarding the K4CARE model defined in the project [2]. This model states the common and basic HC structures shared by the main sanitary systems in Europe as the minimum elements needed to provide a basic HomeCare assistance. They are referred as HCNS (HomeCare Nuclear Services). The model allows enlargements with HomeCare Accessory Services (HCAS) with specialized services such those coming from Oncology or Rehabilitation units.

One of the issues addressed in the project is the customization of the system. In particular, **tailoring** has been defined as the action of adapting general knowledge to a particular case. It is related to one of the objectives of the K4CARE project, which states:

*“**Personalize the access to the K4CARE platform.** Adapt the APOs to the user requirements in order to **customize the access to the EHR and the assistance provided by the K4CARE model**, because not all the patients wish their care in the same way (in terms of services, treatment, explanation, terminology, etc.). The developed personalising methods will also be applied to the care-givers ontologies in order to represent the fact that not all the professionals interact with the healthcare system in the same way. The particularized ontologies and the interface technologies, together with **usability and security** aspects, will play a crucial role in the acceptance and socialization of the K4CARE platform.”*

So, in the K4CARE platform there are different aspects to be tailored and they involve different elements of the knowledge layer of the system. In particular, a tailoring mechanism for the Actor Profile Ontology has been defined and implemented, obtaining a tool called ATAPO (Automatic Tailoring APO) [3,4]. The user manual of this tool is given in this document.

ATAPO is a tool with a friendly graphical interface that facilitates the automatic extraction of particular views of the Actor Profile Ontology (APO), called sub-ontologies or sub-APOs. These sub-ontologies allow the user to see the information regarding on a specific area of the general Actor Profile Ontology. In particular, ATAPO helps to create subAPOs by actor's role and by Care Unit.

The ATAPO tool helps the users to have a more comprehensive view of the contents of the K4CARE Actor Profile Ontology. This ontology is quite large, and may incorporate the knowledge of many different care units. The ATAPO permits to separate the concepts and relations of each individual care unit, allowing to the user to analyse this information separately. In the same way, the knowledge regarding each type of actor (i.e. user's role) can be seen also extracted to

have a view of the permissions that each type of actor has inside the K4CARE model (e.g. the services that can initiate, the documents that can read/write, the actions that can perform, etc).

In addition, using ATAPO any user can personalise the contents of the subAPO of his/her role/s in order to customize his/her profile into the K4CARE system. Two types of personalisation are available: to request read access to some documents that initially are not available to a specific role, and to request for not doing some specific actions that for default could be assigned to a person according to his/her general duties.

The ATAPO is a tool not integrated to the K4CARE web platform. It is installed and executed in any computer where users must be able to do tailoring.

ATAPO tool automatically connects to the K4CARE database to validate the users and to store the ontologies which have been created or personalised. Moreover ATAPO automatically loads from the K4CARE the APO, required for the tailoring.

1.1 Installing

Download the file **atapo.zip** from the K4CARE private web area and decompress it in any folder on the hard disk.

For executing ATAPO tool it is necessary to have installed the Java Virtual Machine and have an Internet connexion. For installing the Java Virtual Machine, download it from www.java.com and follow the detailed instructions of installation.

For accessing to the ATAPO tool, you must have a K4CARE user account.

1.2 Starting

Execute the atapo tool doing double click on the archive atapo.bat located in the installation folder, once the program is executed, a log-in window appears. Only the users of the K4CARE system are allowed to use this tool (Figure 1). The user login name and password are the same than the ones used in the K4CARE system.



Figure 1. ATAPO - User Log-in window.

The user name and the password must be introduced in the corresponding fields. When both have been written, the button *Validate* or the key *enter* must be pressed.

1.3 Available functions according to each type of user

Some of the functions of the ATAPO are not accessible to some users. This depends on the role of the user in the K4CARE model. In particular, some functions are only available to Physicians in Charge and Head Nurses. The next table indicates the functions of the ATAPO tool available for each type of user (Table 1).

Function \ User	Actor profile creation	Actor profile visualization & personalization	Care Unit profile creation	Validation of personalization
Physician In Charge & Head nurse	YES	YES	YES	YES
Rest of Users (f.i. Family Doctor, Nurse, Patient, Continuous Care Giver, etc.)	YES	YES	NO	NO

Table 1. Available functions according to each type of user

2. Functions for all users

2.1 Generation for a SubAPO

In the next screen after log-in (Figure 2) the user must select the role he wants to view or personalise. When the role has been selected, the *create* button is activated. Click on the *create* button to create the corresponding profile (subAPO).

The area in the right hand side of the window provides some information about the state of the profile creation. This process can take a few minutes depending on the Internet connection. A progress bar is displayed during the process (Figure 3).

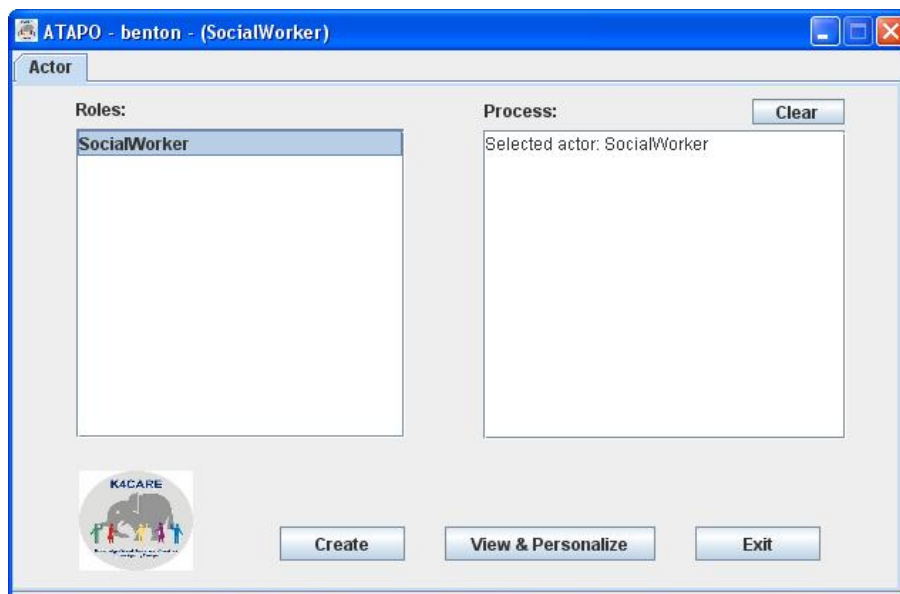


Figure 2. ATAPO - Choosing the role

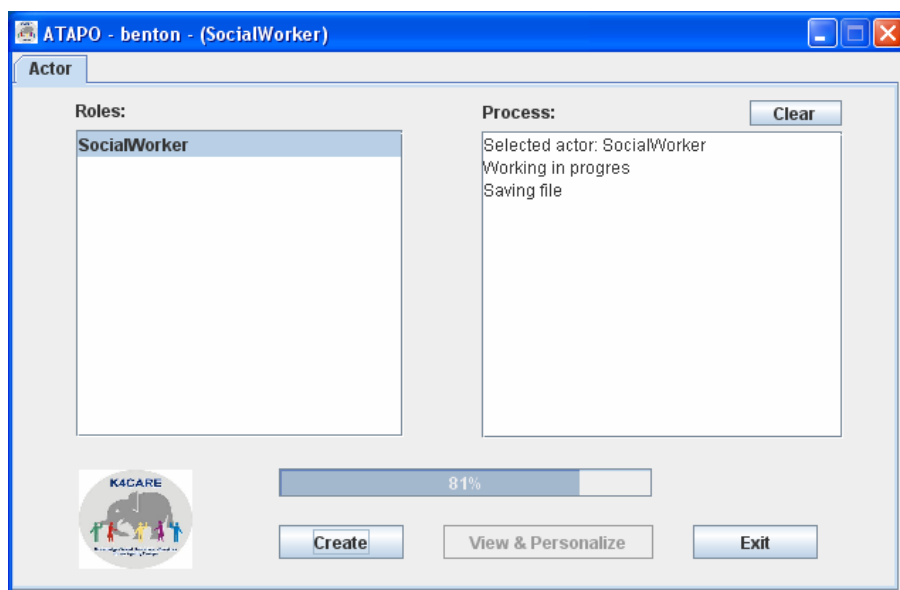


Figure 3. ATAPO – Create subAPO saving process

When the profile has been created a pop-screen indicates that the process has finished (Figure 4). At this moment, it has been automatically stored into the K4CARE storage and it becomes available for the rest of the system.

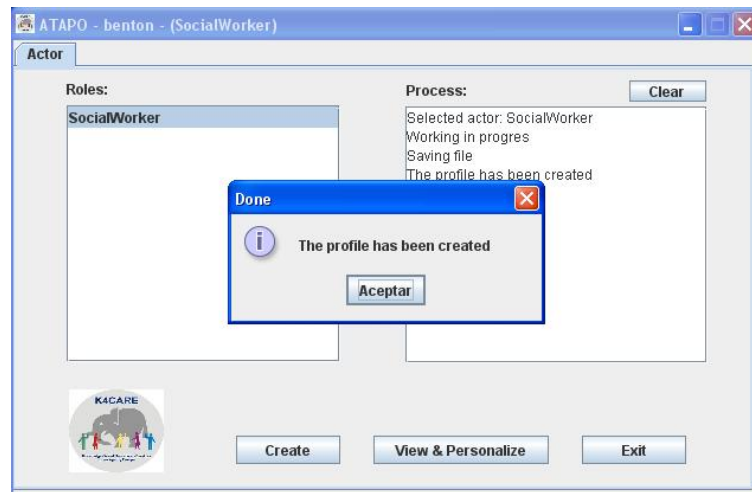


Figure 4. ATAPO – The SubAPO has been created.

2.2 Visualisation of the SubAPO

Once an actor profile has been created, clicking on the *View & Personalize* button, the user can see the contents of this specific actor profile. In the left area, the main classes are displayed. Selecting an item of this tree shows the hierarchy of classes that belong to that concept, in addition, in the middle and right areas, the properties and restrictions of the selected concept are shown. In Figure 5 we can see an example.

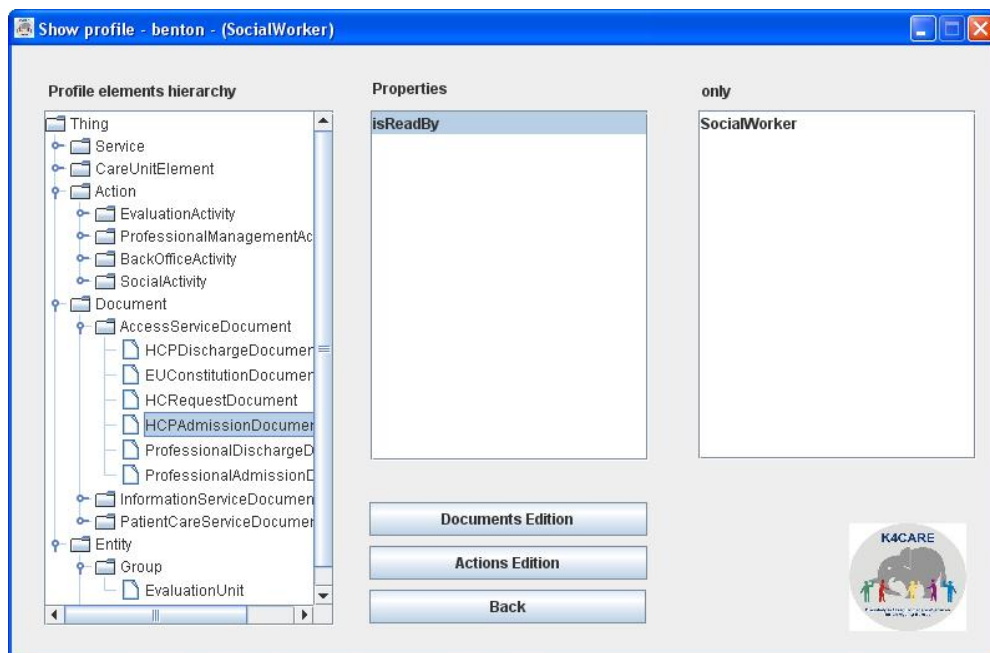


Figure 5. ATAPO – View & Personalize screen.

This window always displays the full contents of a particular profile. If the user has personalised his/her profile, this information can be seen in this window. More details about personalised elements can also be seen in Figure 7 and Figure 15.

2.3 Personalization of Sub-APO

Clicking on the *Documents Edition* or *Actions Edition* buttons in the previous window (Figure 5) give you access at the processes that permit the personalisation of the information, in order to customise the permissions in the K4CARE system.

Any request of personalisation must be validated by the Physician in Charge or the Head Nurse, before it becomes available to the K4CARE system. If the request is denied, the change does not become effective into the system.

2.4 Documents personalization.

Click on the *Documents Edition* button to access at the Documents Editing screen (Figure 6). Then, the window in Figure 6 is displayed.

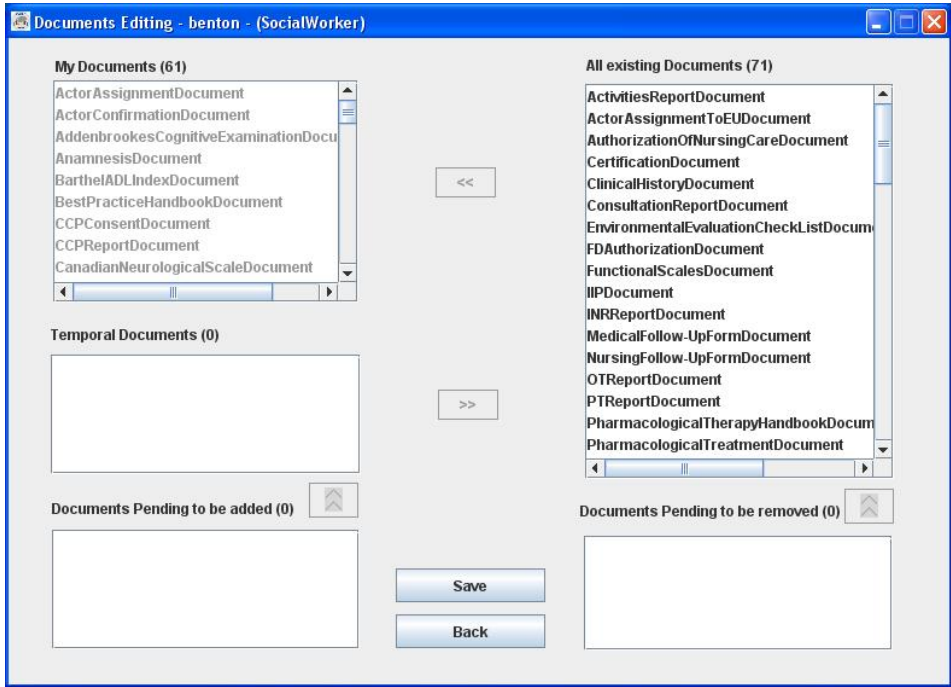


Figure 6. ATAPO – Documents personalization.

The documents personalization consists in adding some of the documents available to other users to the own profile. If the Physician in Charge or the Head Nurse authorise this personalisation, the user will have read access to those documents temporarily. When the user decides

that the visualisation of those documents is no more required, he can use again the ATAPO to remove these documents from his/her profile. The documents that are in the user's profile by default cannot be never removed (these are the ones in the list "My Documents" Figure 6).

2.5 Add documents to the user profile.

To add documents with read permission, select them in the "All existing Documents" area and click on the << button (Figure 7).

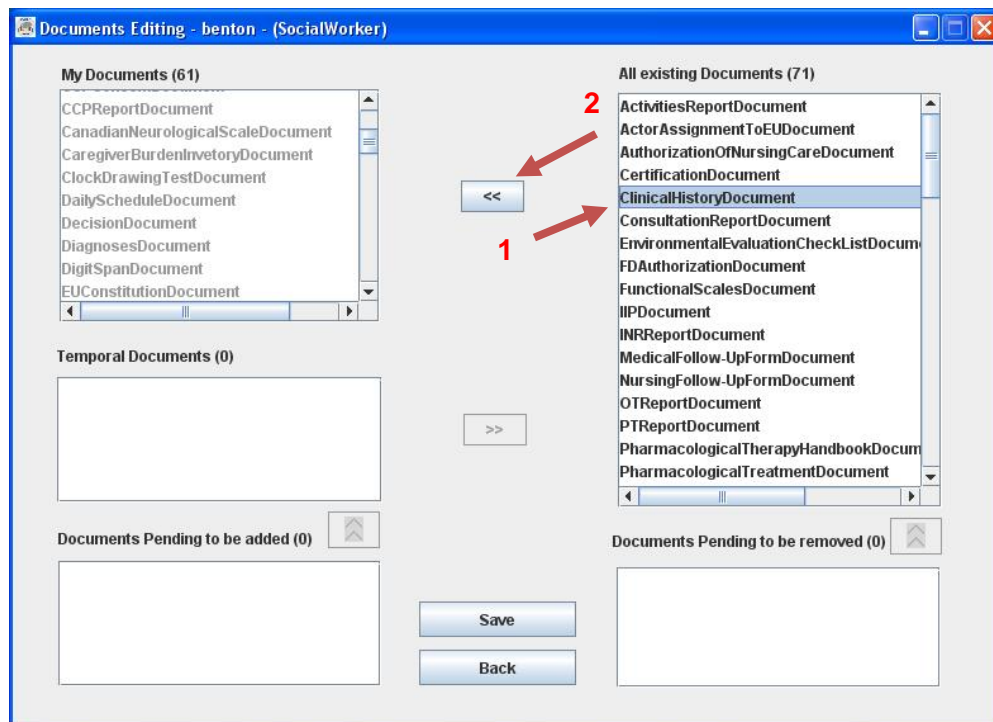


Figure 7. ATAPO – Steps to add documents.

The added documents will appear in the "Documents Pending to be added" area. They cannot be accessed until they are validated (Figure 8) and appear in the "Temporal Documents" area. In this example, two documents (red documents) have been added and are pending to be authorised.

The user must save the changes before exiting this window (Figure 9, Figure 10). After this, the user can see the documents pending to be validated in the ontology visualization window (Figure 11).

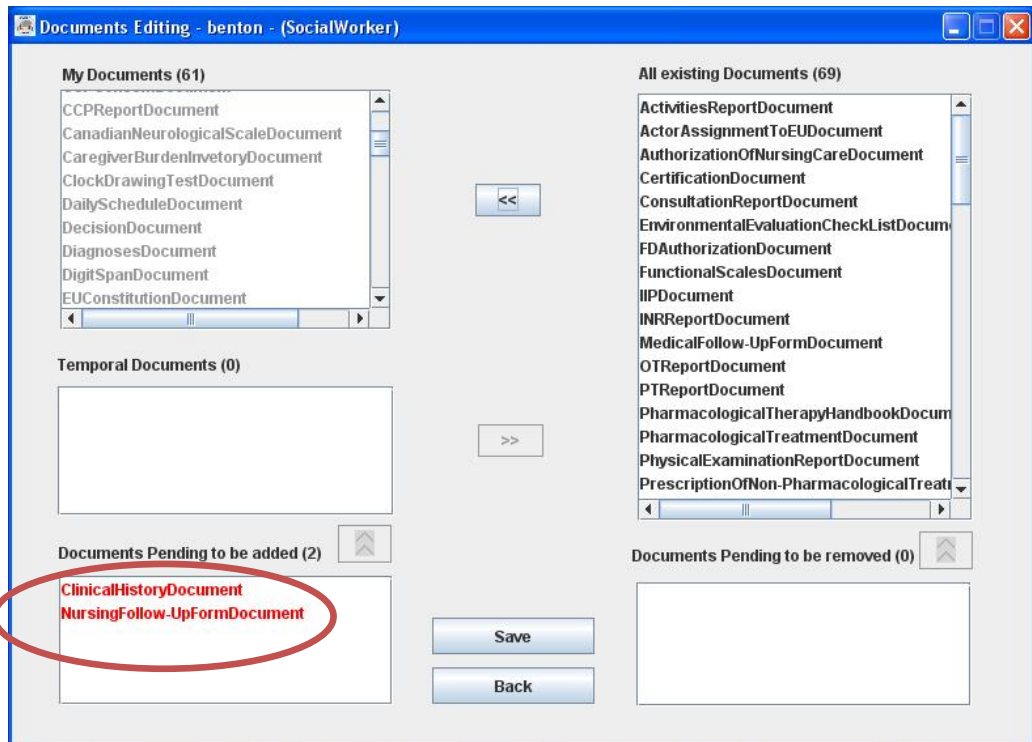


Figure 8. ATAPO – Documents added.

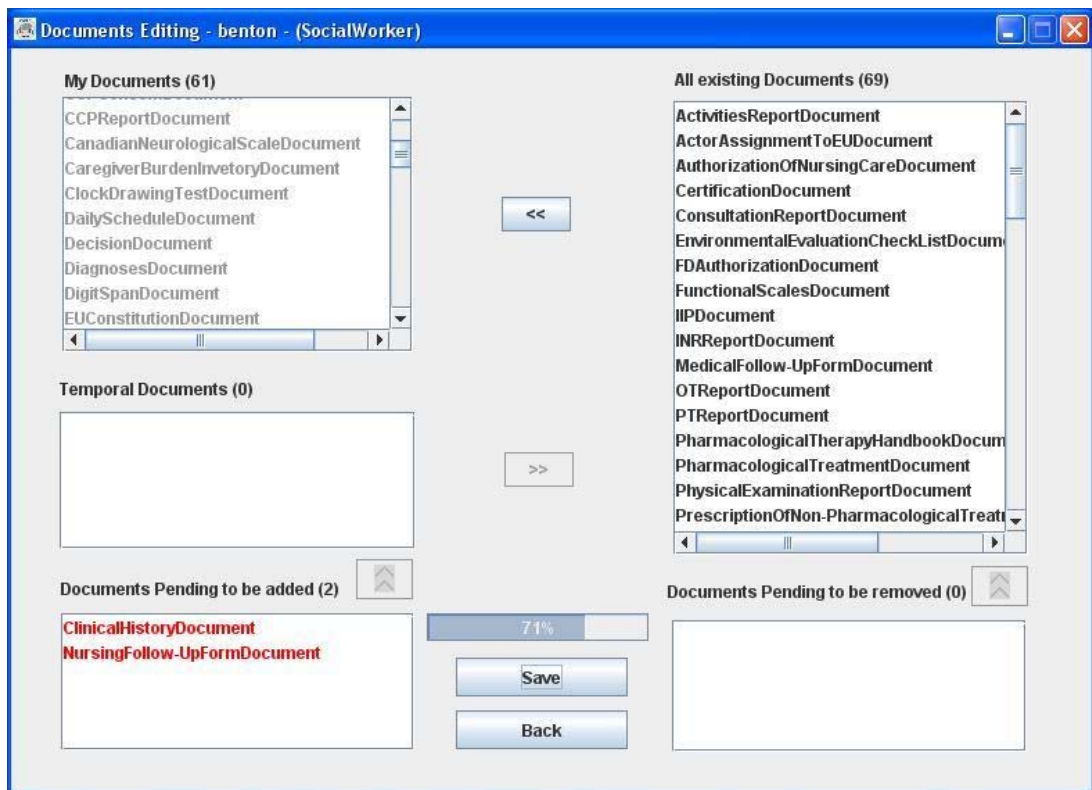


Figure 9. ATAPO - Documents editing saving process

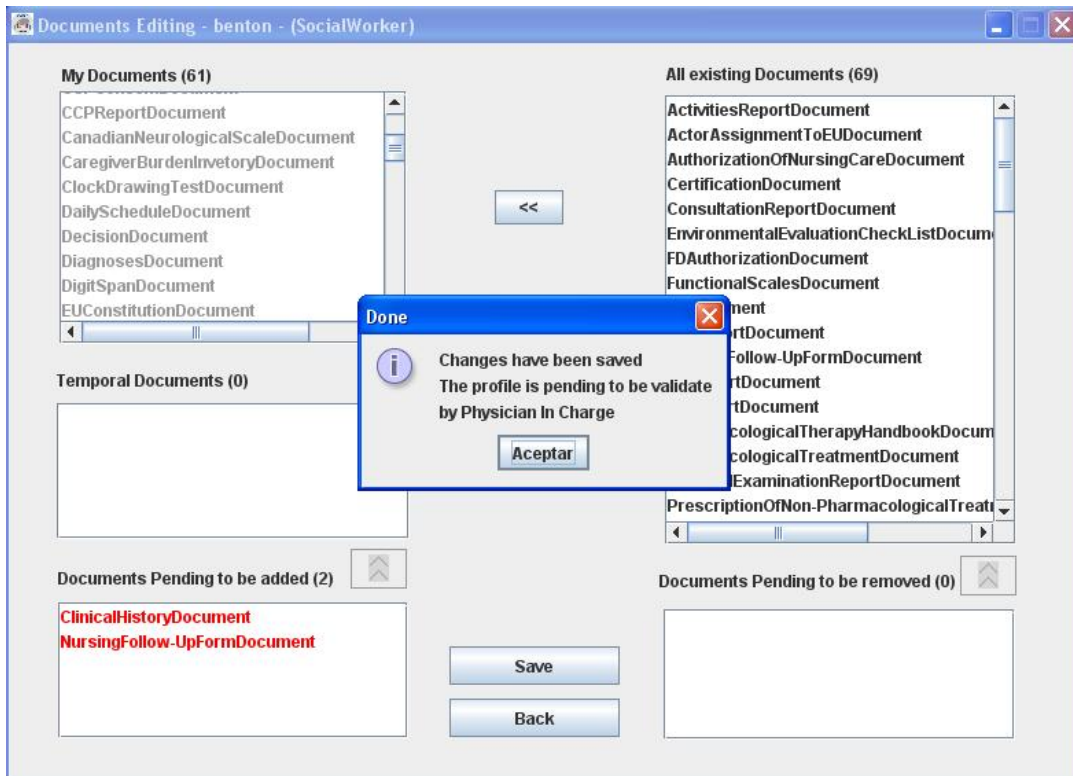


Figure 10. ATAPO - The SubAPO has been saved.

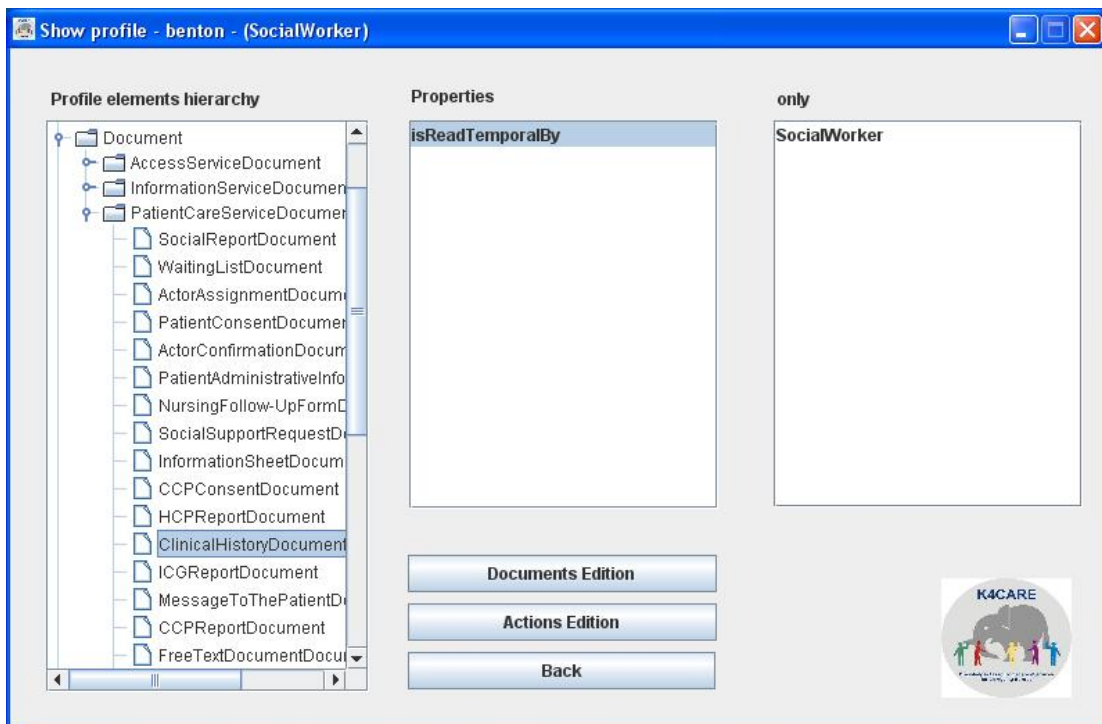



Figure 11. ATAPO - New property in the requested read document.

2.6 Remove documents of user profile.

To remove documents previously added temporarily to the user profile, select it in the “Temporal documents” area and click on  button (Figure 12).

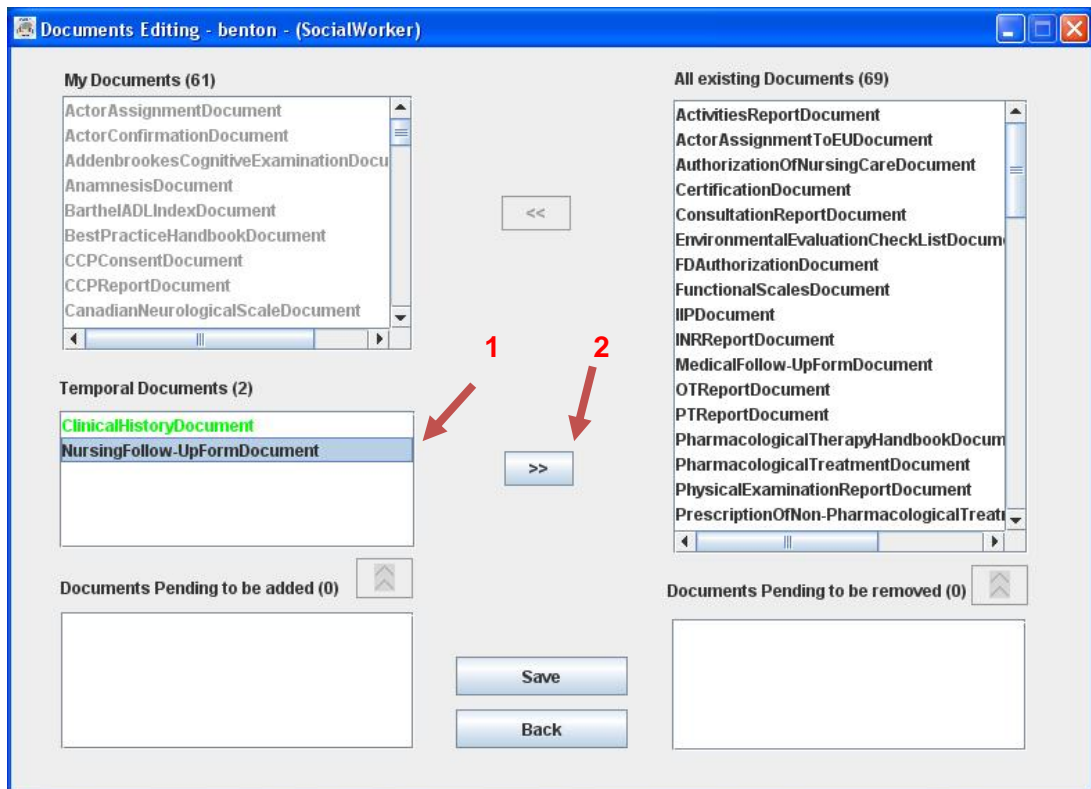


Figure 12. ATAPO – Steps to remove documents.

The removed documents will appear in the “Documents Pending to be removed” area because they are pending of validation for removing them of the profile (Figure 13).

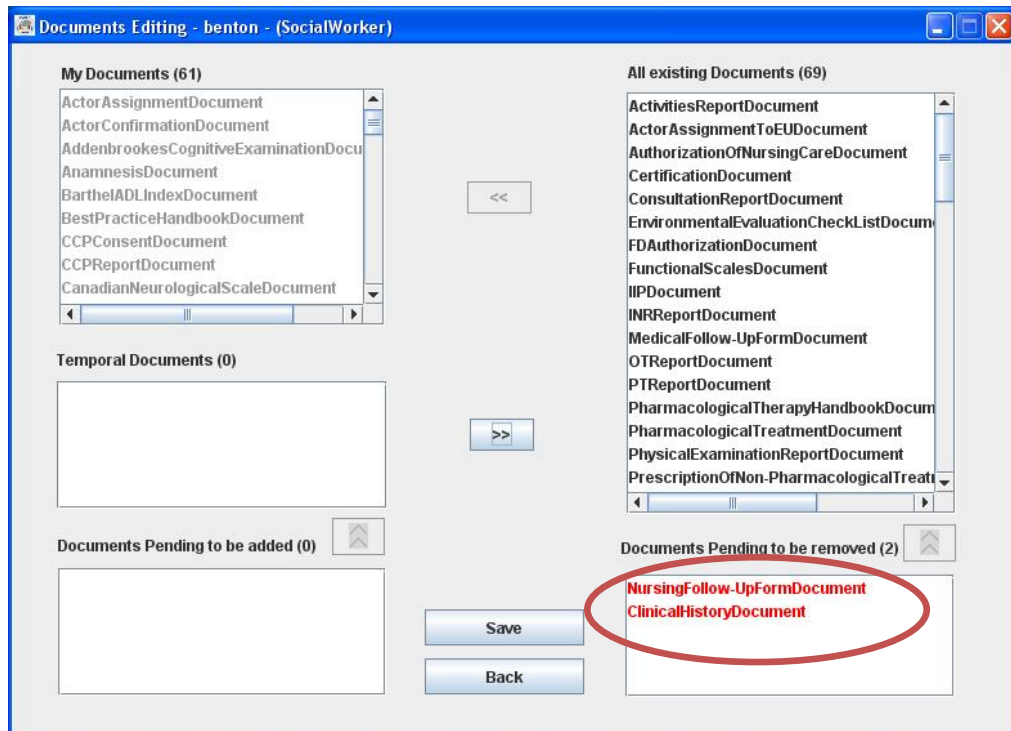


Figure 13. ATAPO – Removed documents.

Click on *Save* button to save the profile personalization, when it has been saved a pop-screen appears (Figure 14). Click on *Back* button to return to previous screen. If the *Back* button is pressed, and the personalization do not has been saved, the changes will be lost.

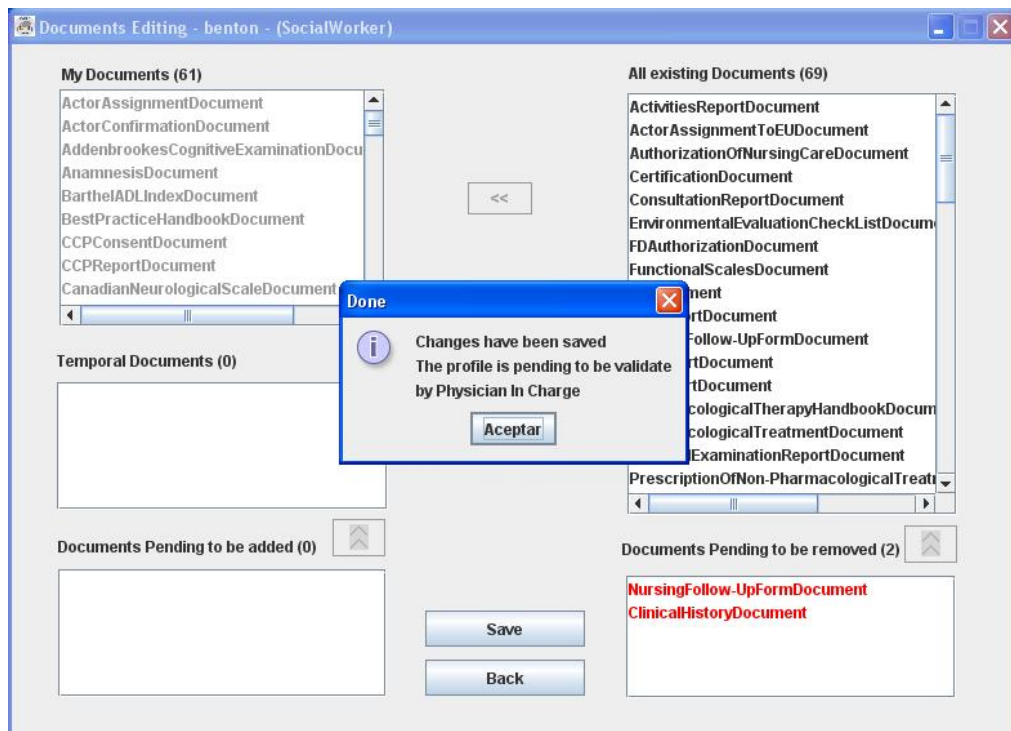


Figure 14. ATAPO – Saving personalization of documents.

2.7 Actions personalization.

This type of personalization works in a similar way to the documents personalisation.

Click on the *Actions Edition* button in the Visualisation Window (Figure 5) to access at the Actions Edition screen (Figure 15).

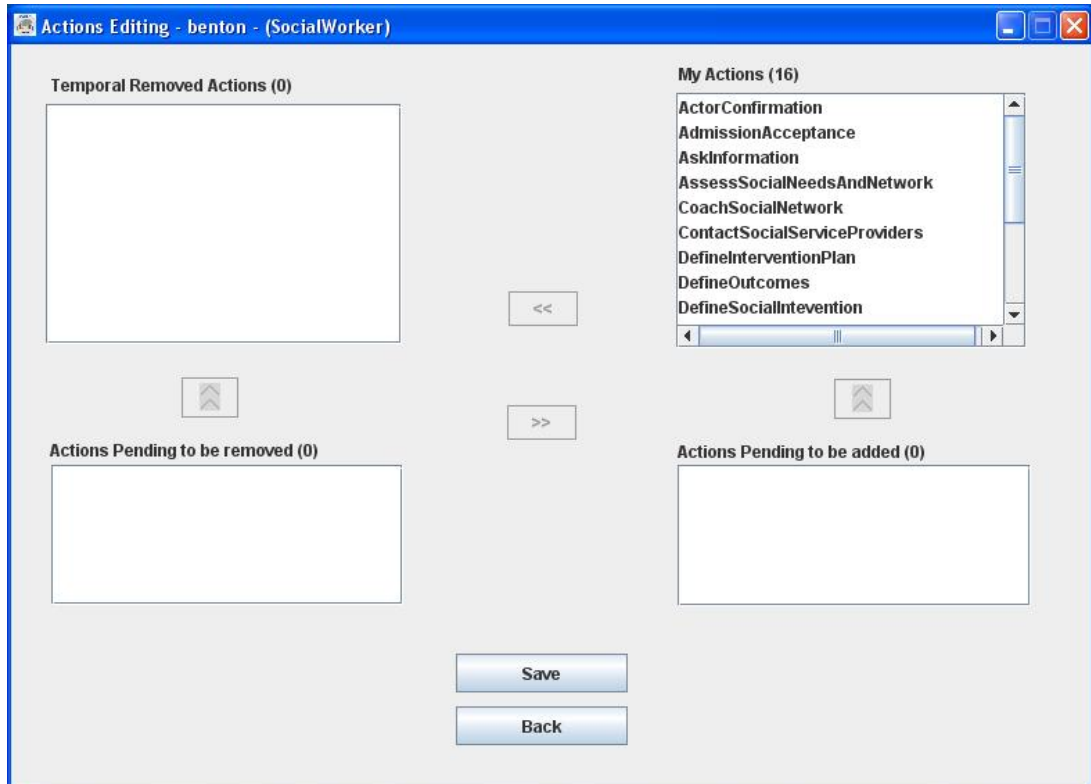



Figure 15. ATAPO – Actions editing screen.

The personalization of actions consists in removing temporarily some actions from the user profile, because the user agreed with other colleagues that those actions will be performed by someone else in the medical team. When the agreement finished, the actions can be add again to the user profile.

2.8 Removing actions from the user profile

To remove actions, select those actions from the “My Actions” area and click on  button (Figure 16).

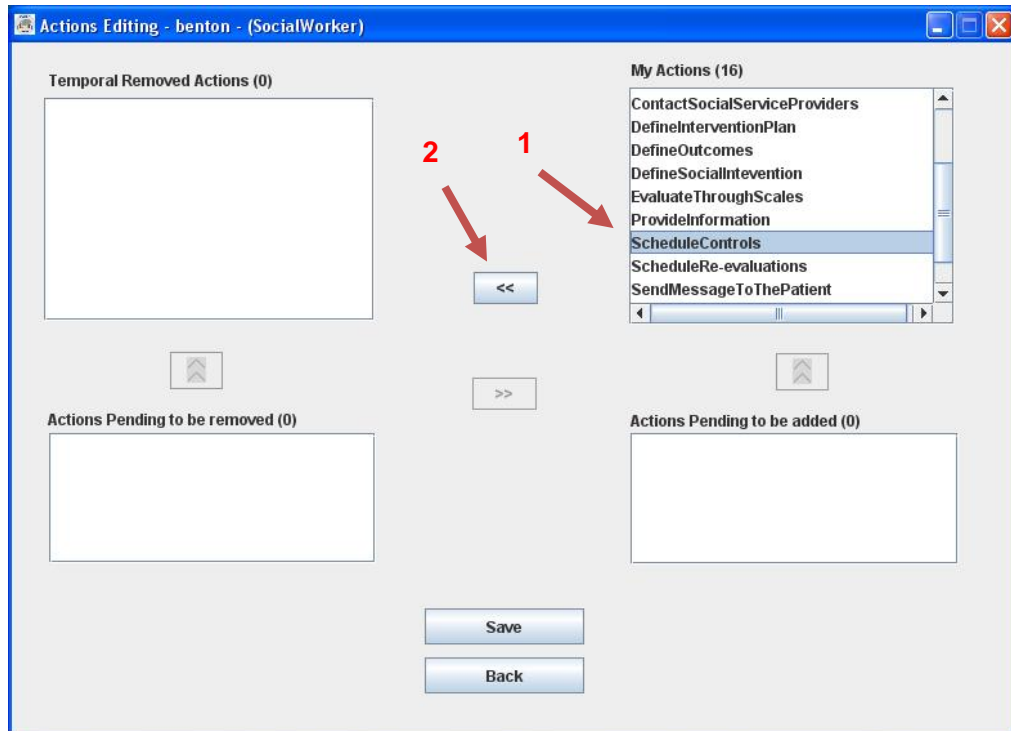


Figure 16. ATAPO – Steps to remove actions.

The removed actions will appear in the “Actions Pending to be removed” area (Figure 17). The removing is pending to be authorised by the Physician in Charge or the Head Nurse, which are in charge or organising the medical teams of their care units. In this figure, one action (red action) has been removed and this change is pending to be validated.

Click on *Save* button to save the profile personalization, when it has been saved a pop-screen appears (Figure 18). Click on *Back* button to return to previous screen. If the *Back* button is pressed, and the personalization do not has been saved, the changes will be lost.

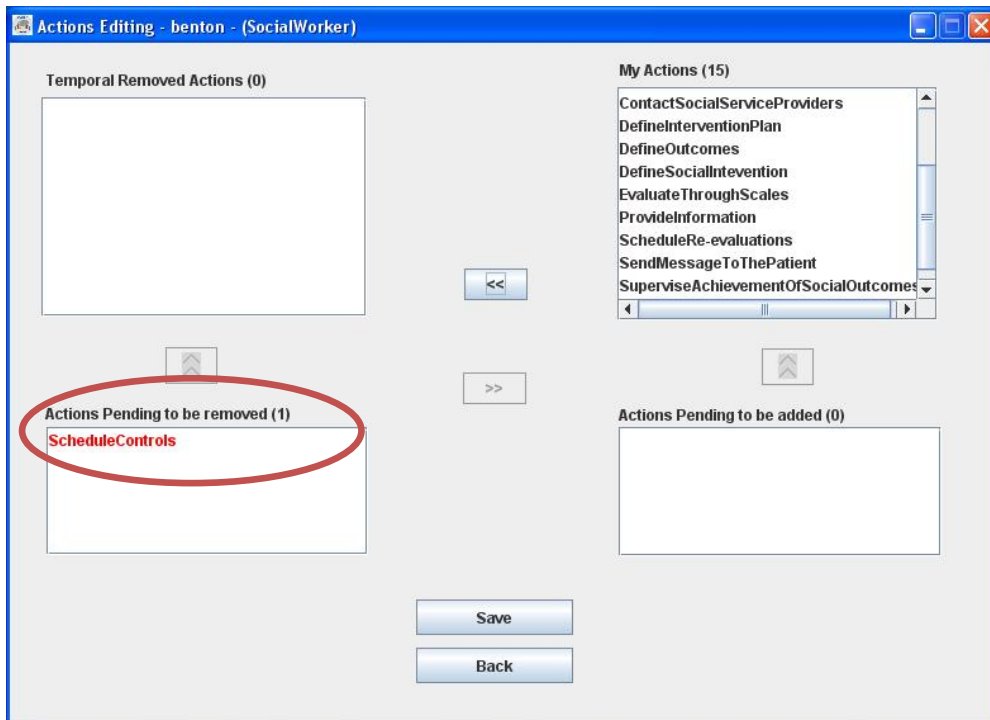


Figure 17. ATAPO – Removed actions.

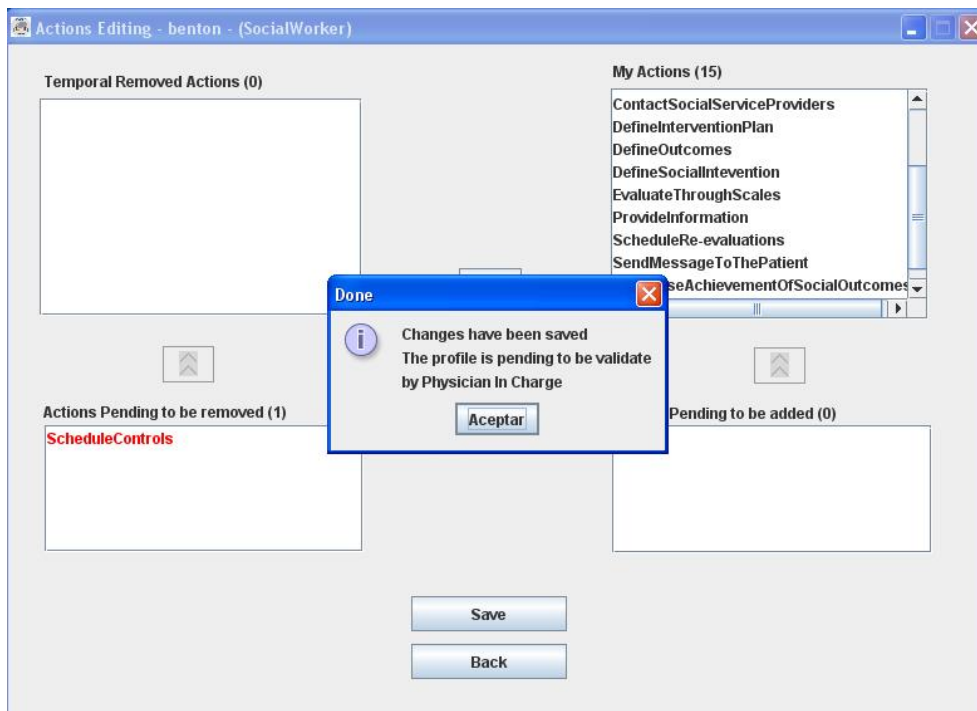



Figure 18. ATAPO - Actions changes saved.

2.9 Adding actions to the user profile

To add actions previously removed, select them from the “Temporal removed actions” area and click on  button (Figure 19).

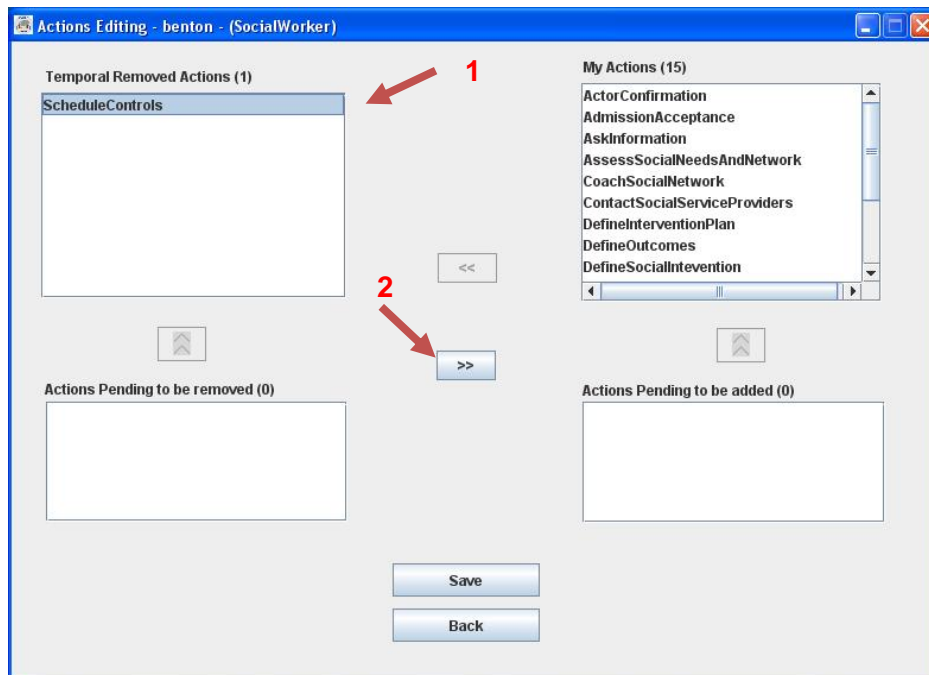


Figure 19. ATAPO – Steps to add actions.

Then, those actions will appear in the “Actions Pending to be added” area until this change is validated (Figure 20).

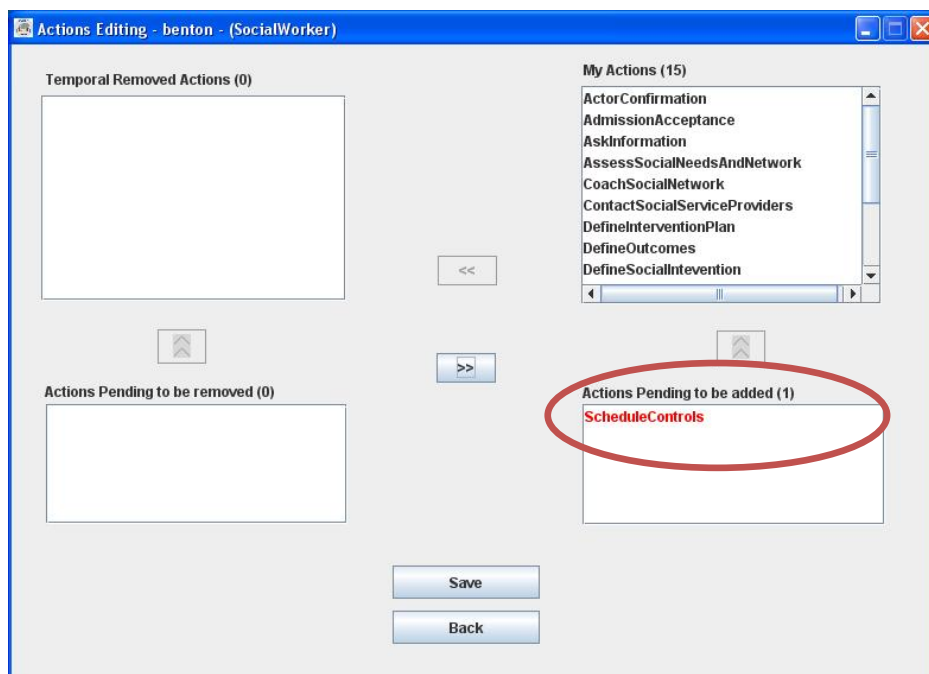


Figure 20. ATAPO – Added actions.

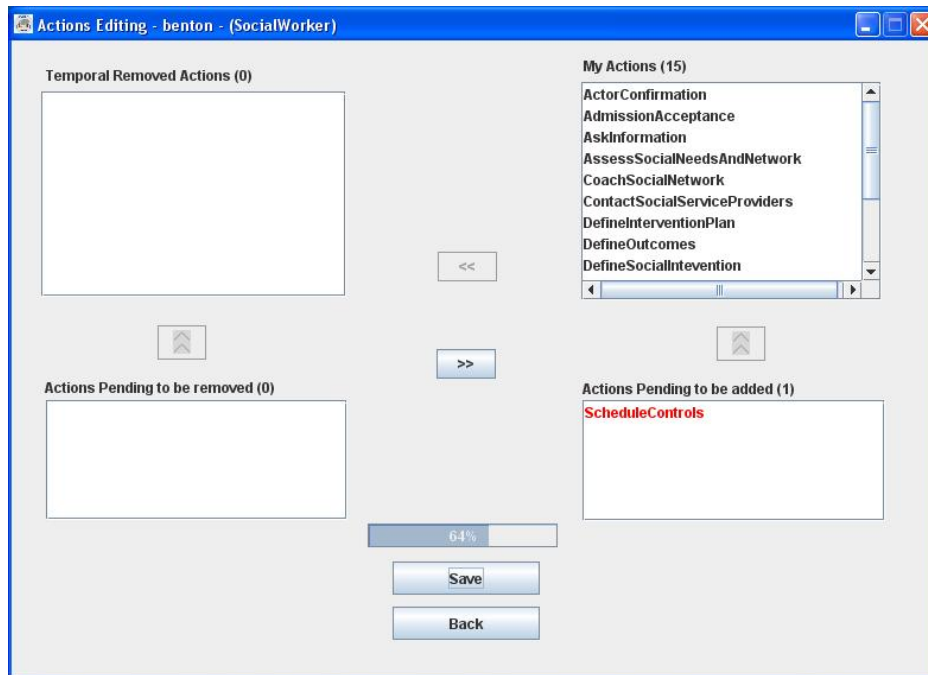


Figure 21. ATAPO - Actions editing saving process.

Click on *Save* button to save the profile personalization (Figure 21), when it has been saved a pop-screen indicates them (Figure 22). Click on *Back* button to return to previous screen. If the *Back* button is pressed, and the personalization do not has been saved, the changes will be lost.

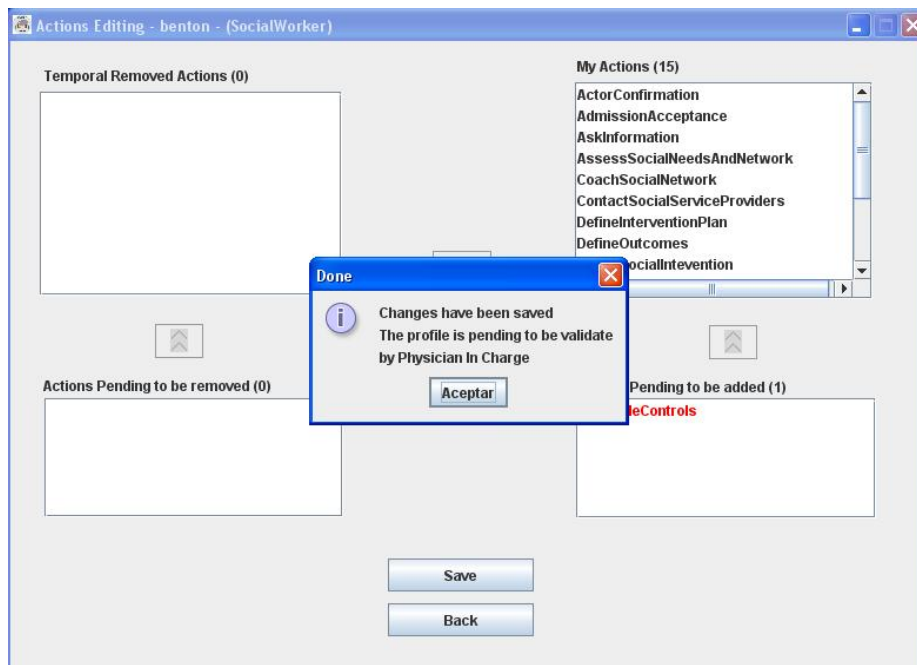


Figure 22. ATAPO – Saving personalization of actions.

The user can always look at the current state of the action's permissions in the visualization window. In Figure 23, the user can see that the action Schedule Controls is pending to be added to his/her personal profile, after being temporally deactivated.

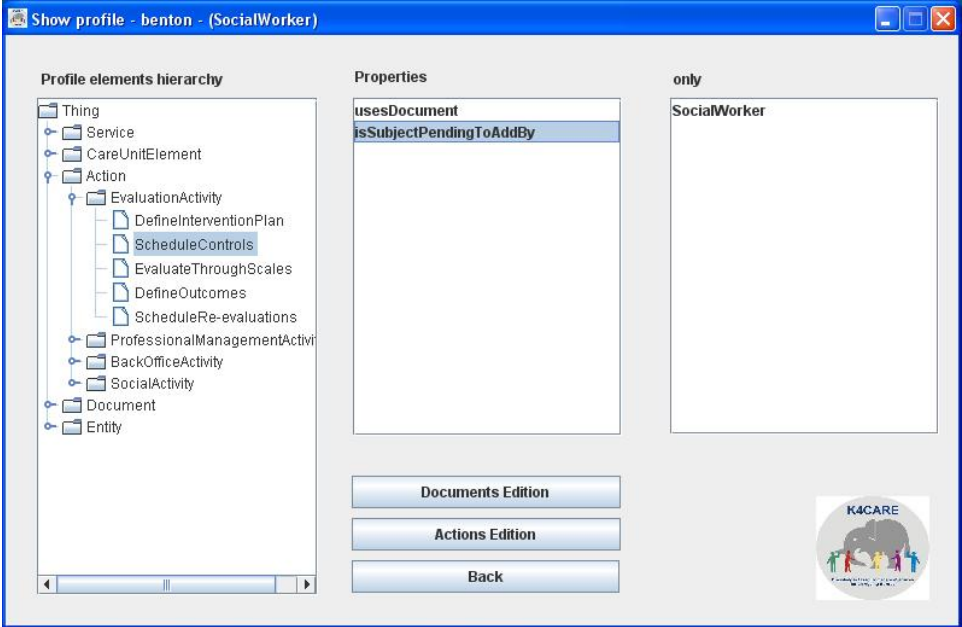


Figure 23. ATAPO - New property subject pending to be added.

3. Additional functions for the Physician in Charge and Head Nurse

3.1 Validation of personalization requests

The Physician in Charge and the Head Nurse have permission to validate the changes requested by the users. They have access to the Validation tab on the main screen (Figure 24).

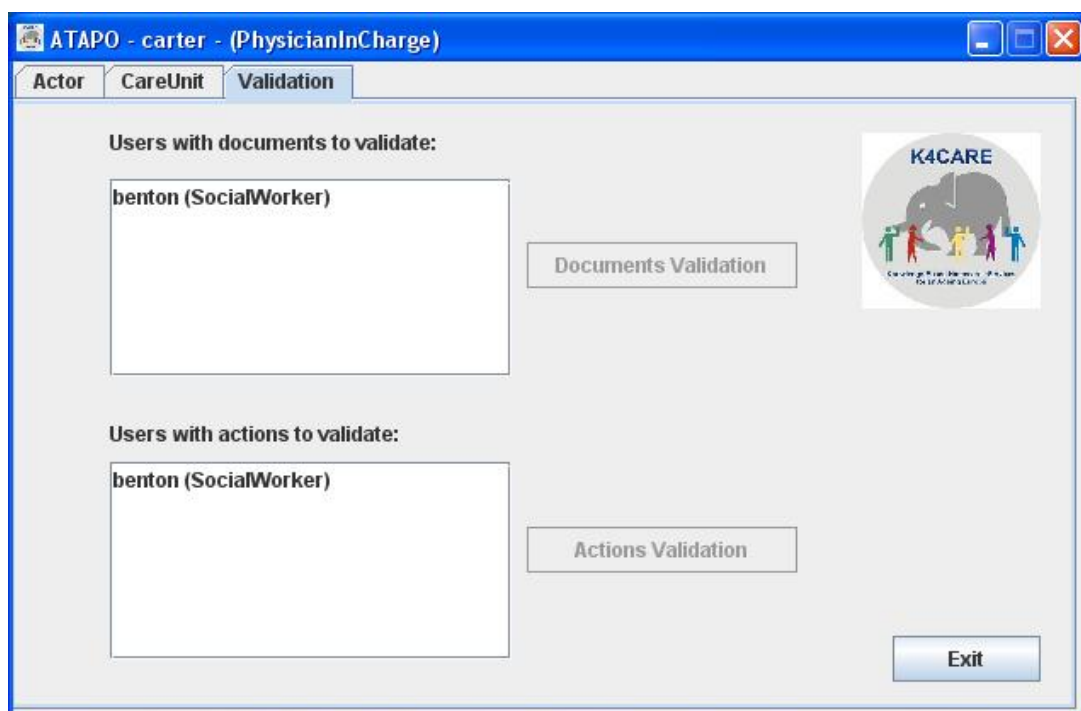


Figure 24. ATAPO – Validation screen.

This window displays the list of users that have requested any change in the documents read access (up) and the users that want to modify the set of actions they are available to do (down). These lists indicate the name of the person and its actor type.

Select a name in the upper list and Click on the *Documents validation* button to access to the documents validation window (Figure 25), or select one name in the lower list and Click on the *Actions Validation* button to go to the window for validating actions (Figure 31).

The authorization windows display the name of the user that is being validated in the title of the window.

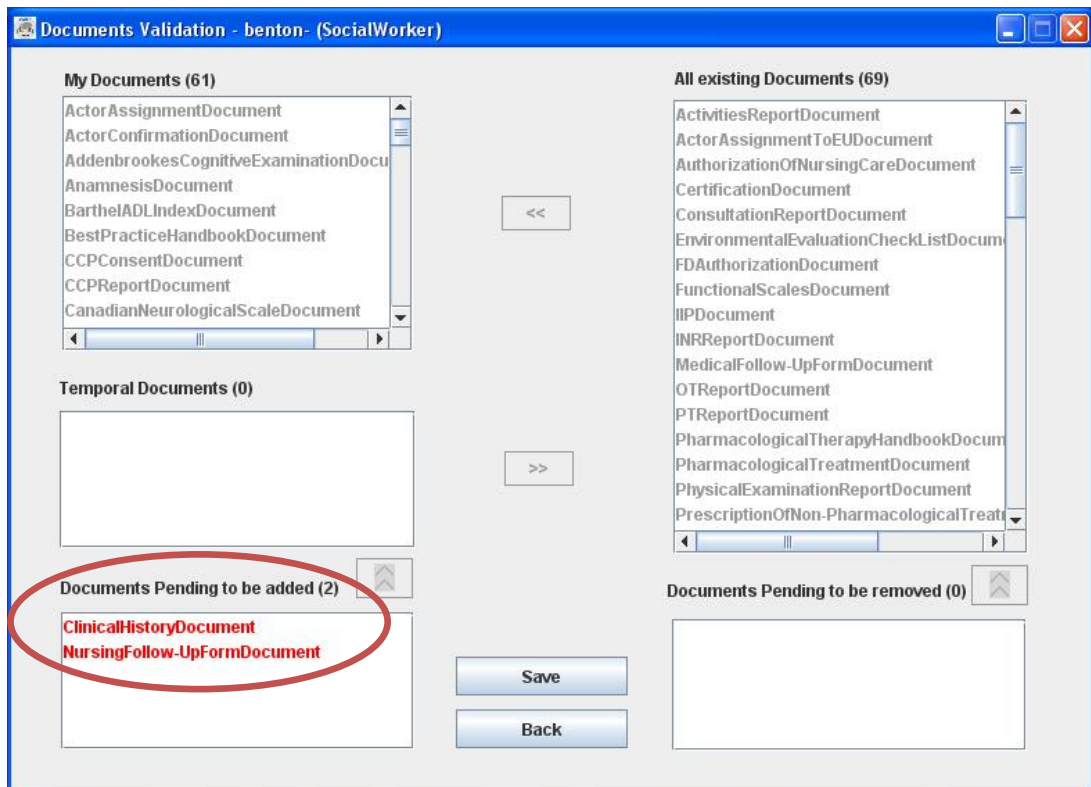




Figure 25. ATAPO – Documents validation screen.

3.2 Validation of added documents for personalization

The documents that need read permission authorization appear in the Documents Pending to be added area (red documents) (Figure 25). Select the document to authorize and click on  button to accept the validation or click on  button to reject the authorization of the document. In this latter case, the user will not have read access to this document (Figure 26).

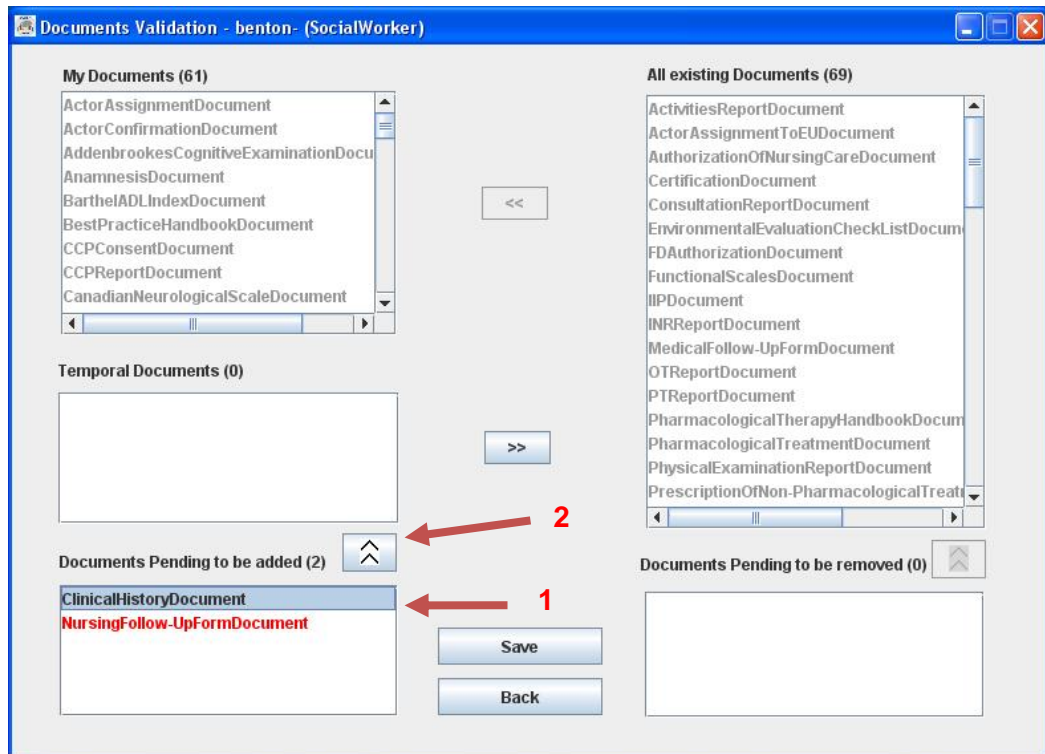


Figure 26. ATAPO – Steps to authorize the added documents.

In the example in Figure 27, two documents have been authorized and they appear in the “Temporal documents” area.

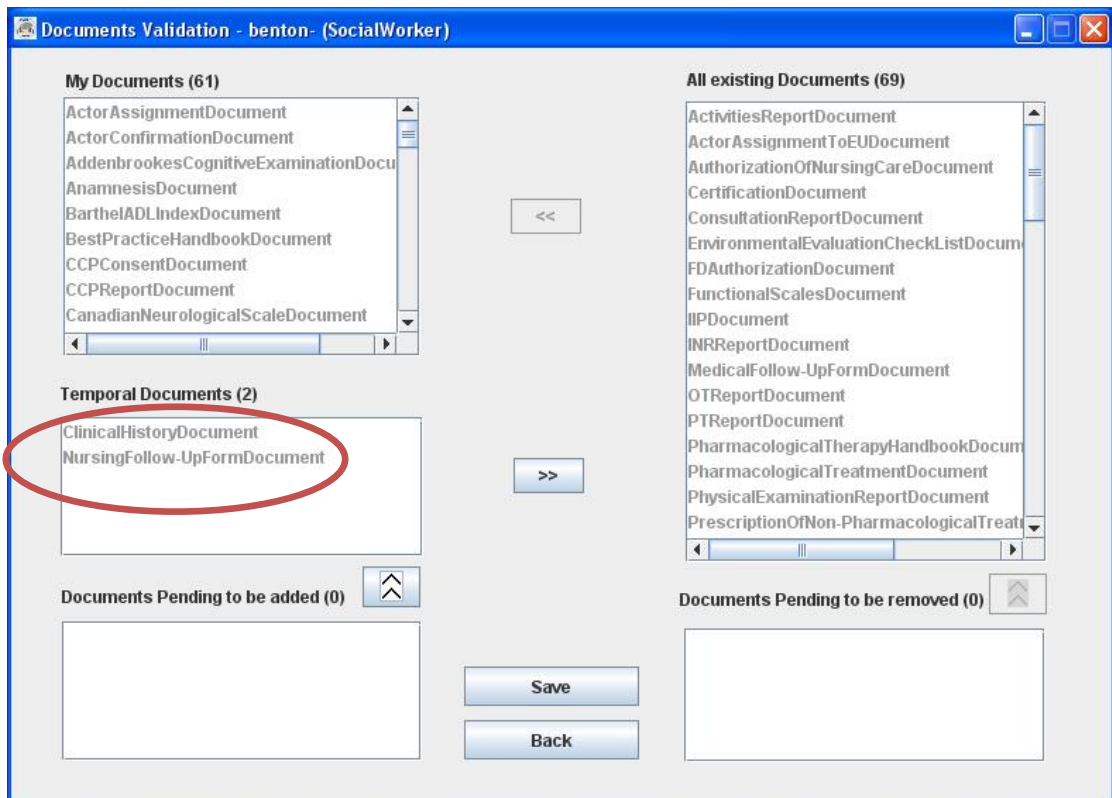


Figure 27. ATAPO – Validated documents.

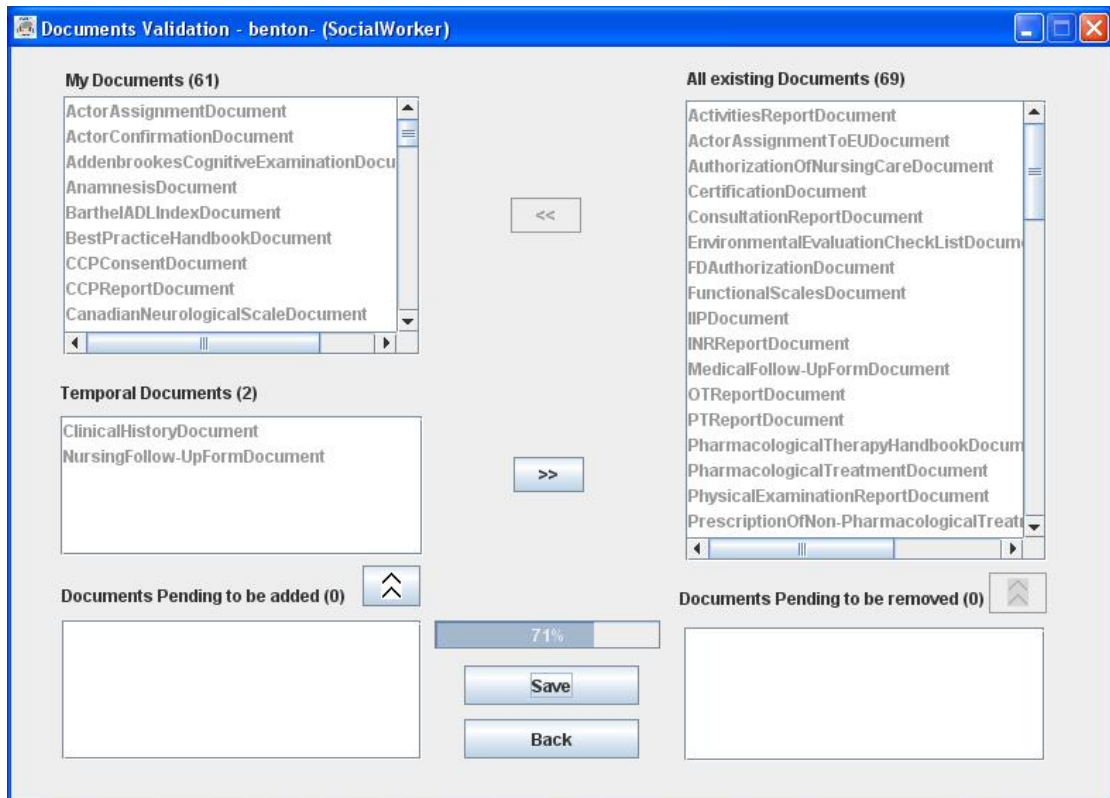




Figure 28. ATAPO - Document validation saving process.

3.3 Validation of removed documents for personalization

The documents that some user does not need to read any more, must also be validated by the head of the care unit. Those documents appear in the “Documents Pending to be removed” area (red documents) (Figure 29). Select the document and click on  button to accept the validation, or click on  button to reject the validation of the selected document if you believe that the user still needs to have read access to that document for more time.

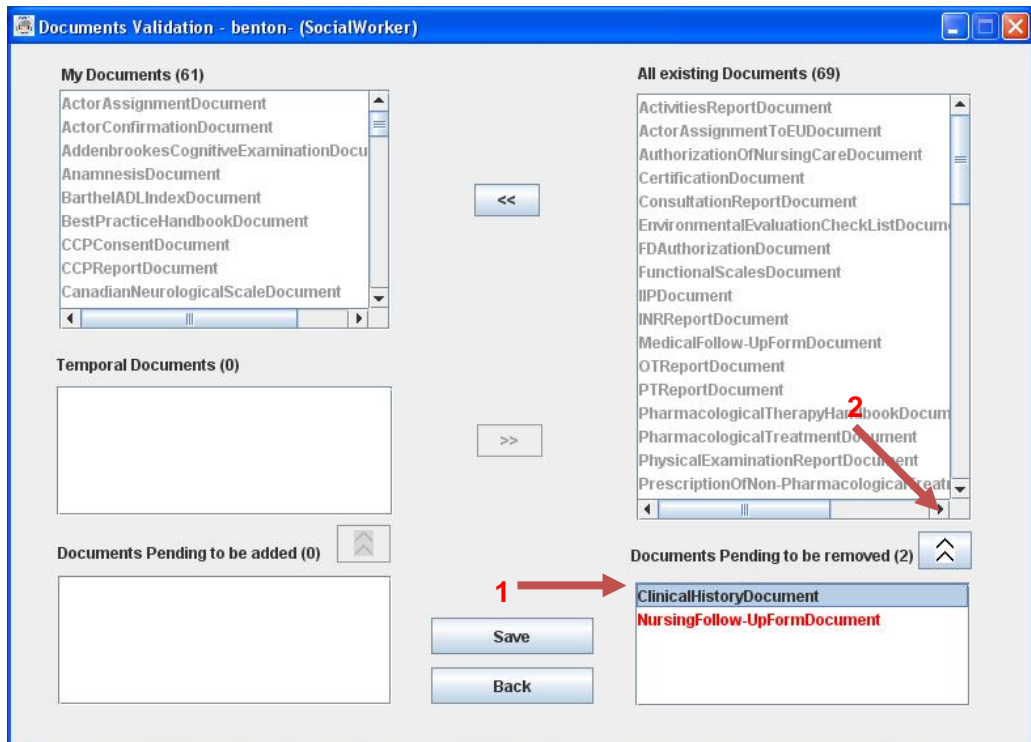


Figure 29. ATAPO – Steps to validate removed documents.

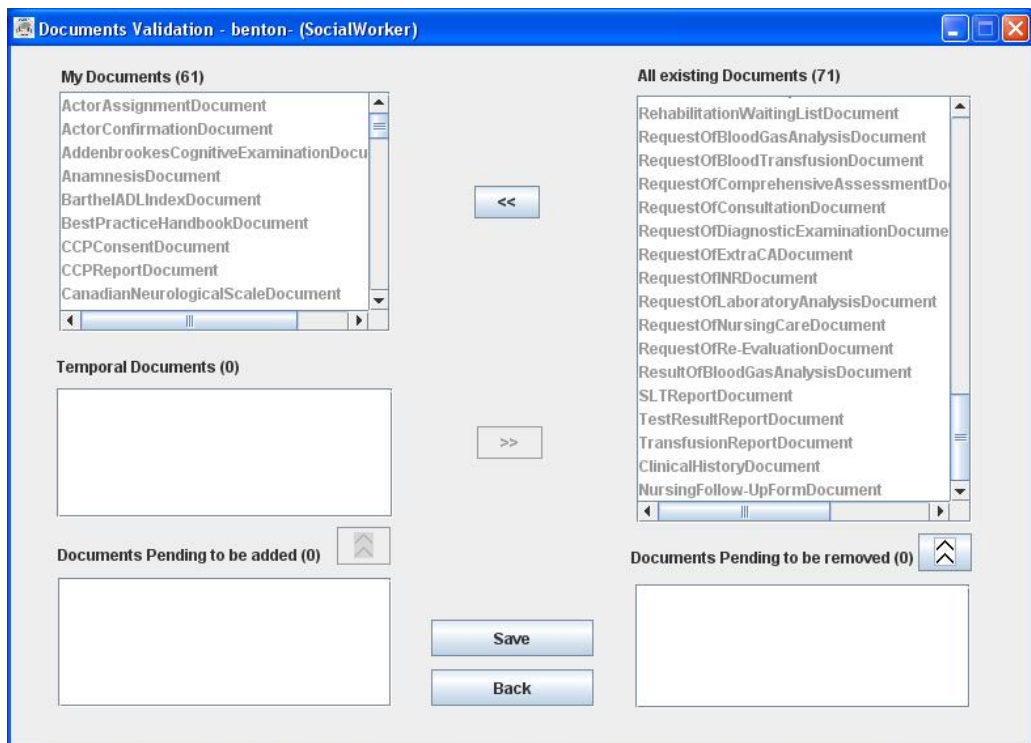


Figure 30. ATAPO - Documents have been removed.

Click on *Save* button to save the validation, when the profile of the corresponding person has been saved a pop-screen indicates them. Click on *Back* button to return to previous screen. If the *Back* button is pressed, and the validation do not has been saved, the changes will be lost.

3.4 Validation of removed actions for personalization

Select a user name in the validation window (Figure 24) and Click on the *Actions validation* button to access to the actions validation screen (Figure 31).

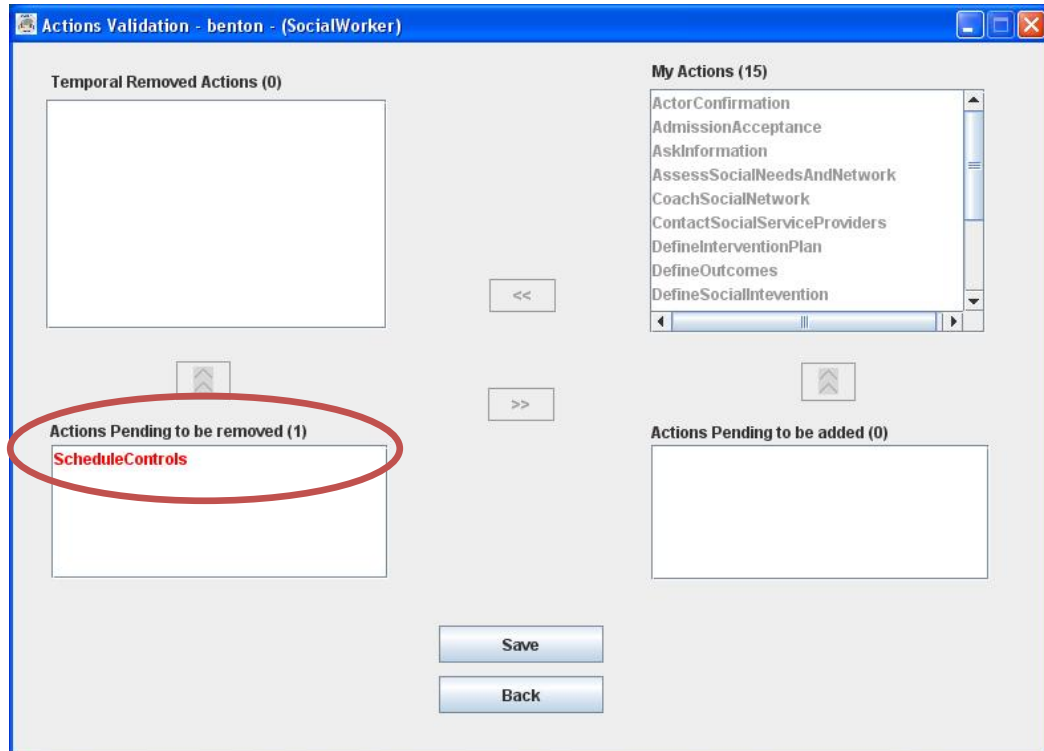




Figure 31. ATAPO – Actions validation screen.

The actions to validate appear in the “Actions Pending to be removed” area (red actions). Select the action and click on  button to authorize that this user will not do that action for some time, or click on  button to reject the authorization (Figure 32).

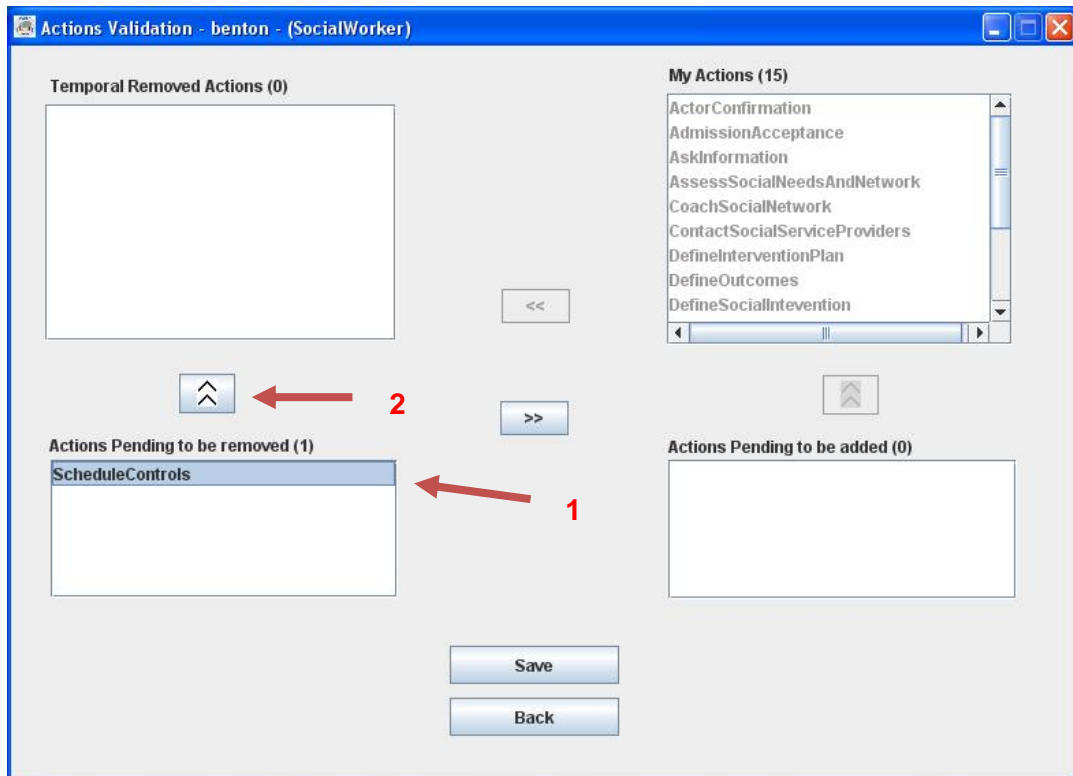


Figure 32. ATAPO – Steps to authorize to remove actions.

In the example in Figure 33 the action has been validated and it appears in the “Temporal removed actions” area.

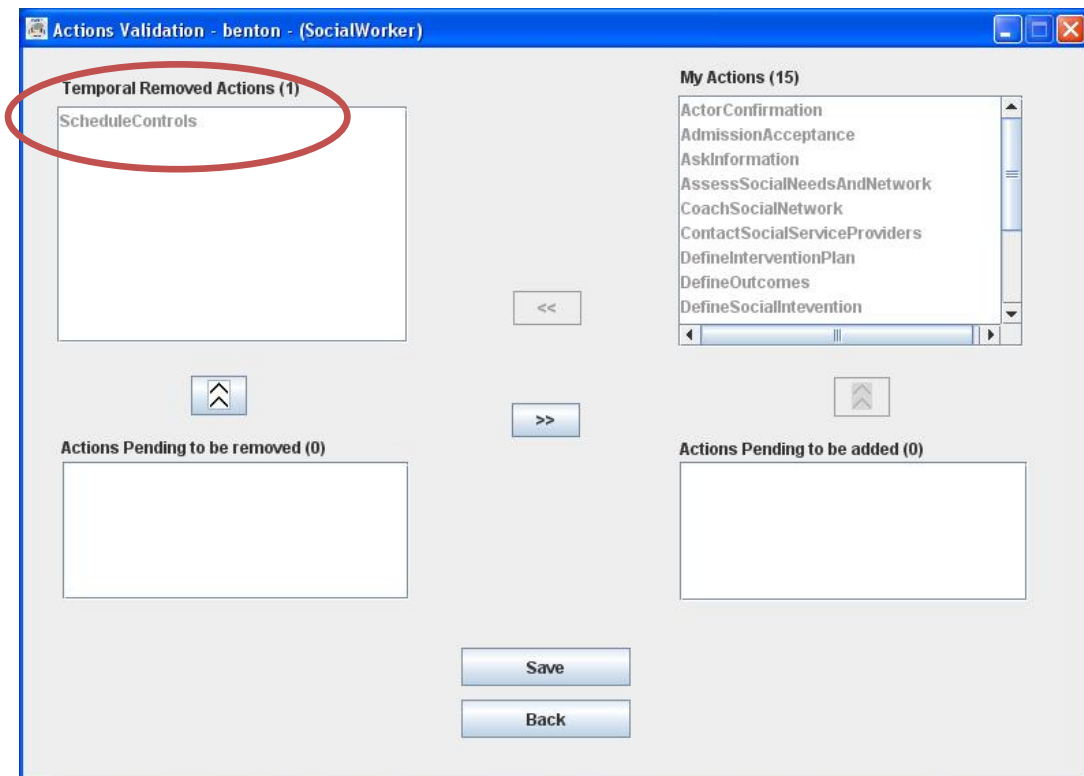


Figure 33. ATAPO – Validated removed actions.

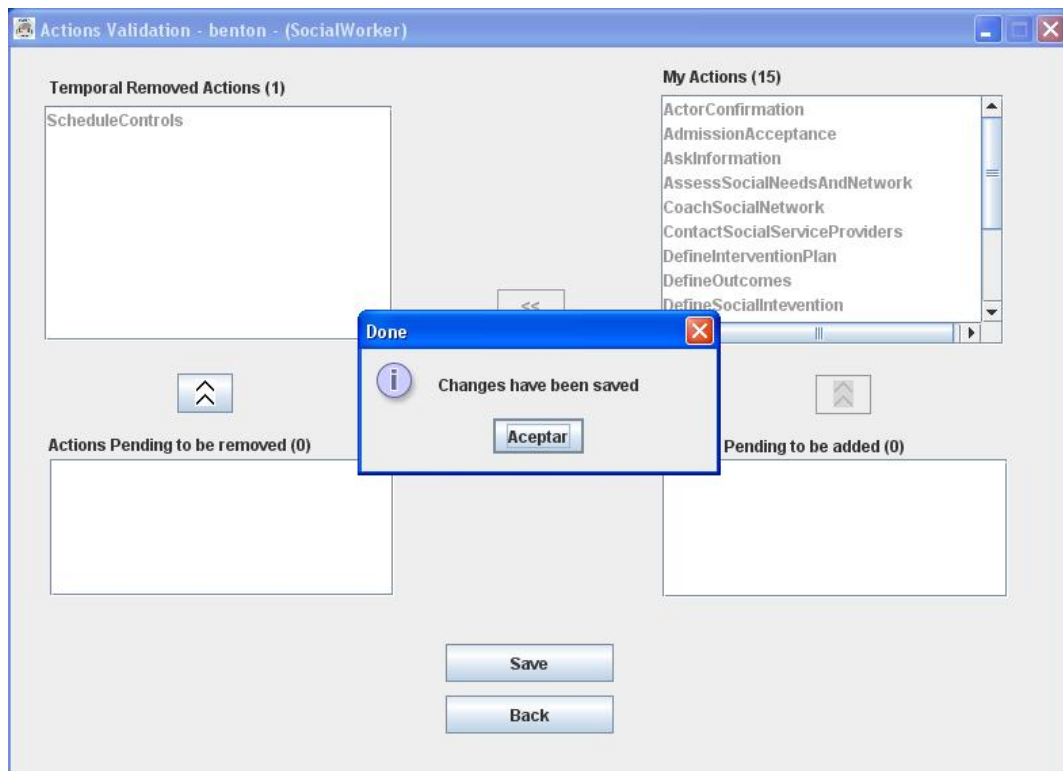




Figure 34. ATAPO - Validation saved.

3.5 Validation of added actions for personalization

When a user requests to add some previously removed actions, those actions appear in the "Actions Pending to be added" area (red actions) (Figure 35). Select the action to validate and click on  button to accept the validation or click on  button to reject the validation if you believe that the user must not do that action for some more time.

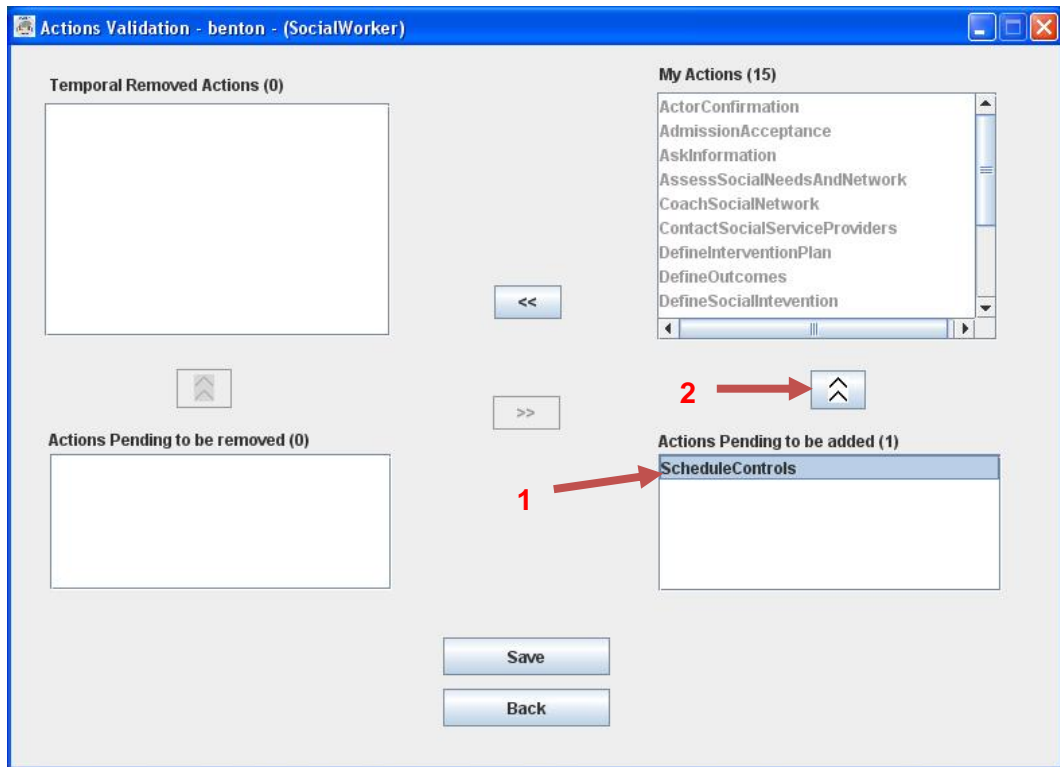


Figure 35. ATAPO – Steps to authorize to add actions.

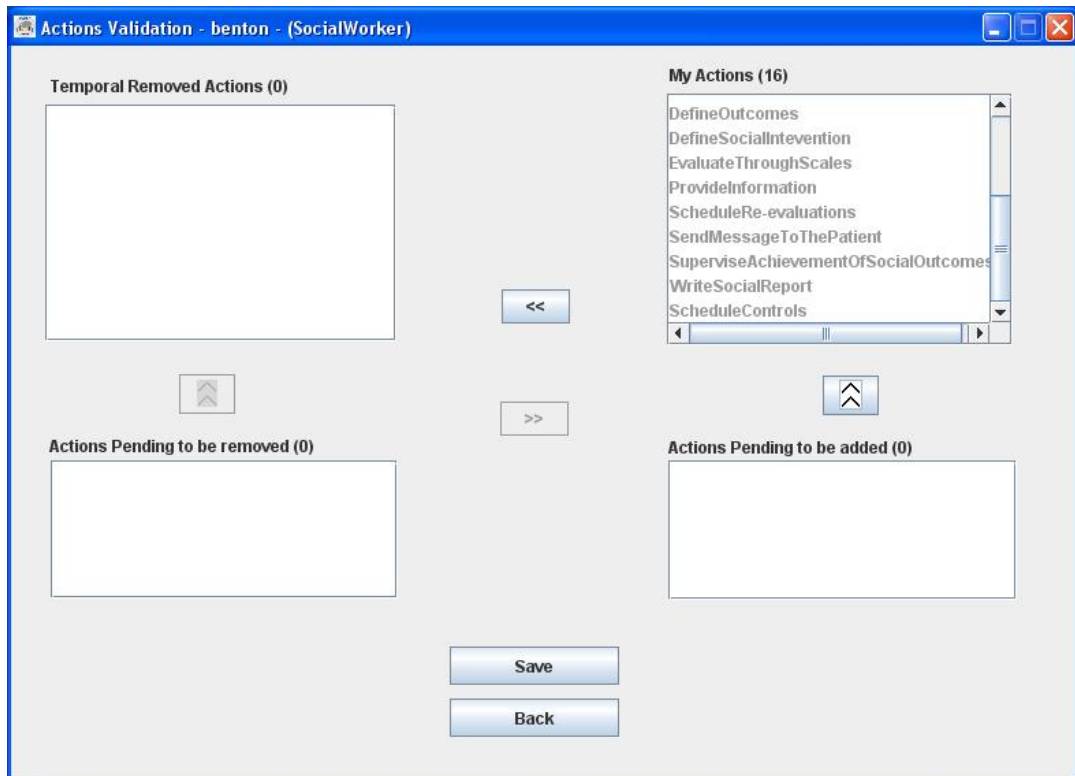


Figure 36. ATAPO - Actions added.

Click on *Save* button to save the validation, when the profile has been saved a pop-screen indicates them. Click on *Back* button to return to previous screen. If the *Back* button is pressed, and the personalization do not has been saved, the changes will be lost.

3.6 Generation of CareUnit SubAPO

The Physician in Charge and Head Nurse have permission to generate a sub-ontology for a particular care units (HCNS or HCAS). This will allow them to store the knowledge regarding a care unit as a separate module, in order to be analysed individually, or to be incorporated to any other software system that uses knowledge represented by ontologies.

This tailoring option is available in the CareUnit tab on the main screen (Figure 37).

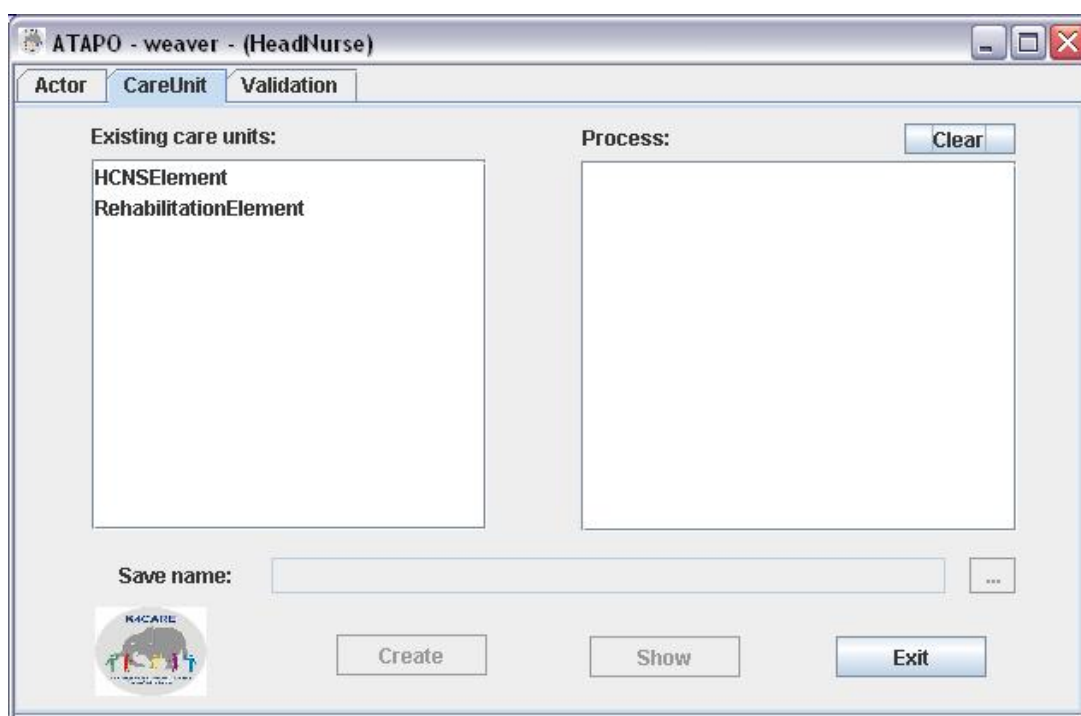



Figure 37. ATAPO – Generating a CareUnit SubAPO.

The window shows the available Care Units in the K4CARE model. Select a Care Unit. Once selected, the *Create* button is enabled.

Then a file directory must be indicated, because the ontology is saved into the personal computer of the user, not into the K4CARE database storage.

An initial file directory is proposed. It will be the actual directory plus “selected-Name_APO.owl”. We can change it by pushing  and then selecting a new directory.

Click on the *Create* button to generate the selected Care Unit sub-ontology, when it has been created a pop-screen indicates that the process has finished.

The ontology is stored in the OWL language. OWL language is used when the information contained in the documents need to be processed for applications; it can be interpreted and displayed in a friendly way by some special tools. ATAPO also permits the see the contents of the sub-ontology by clicking on the *Show* button.

Then, a new window displays the contents of this care unit (Figure 38). In the left area it shows the hierarchy tree of the classes. Selecting an item of this tree, the interface shows the properties (central area) and restrictions (right area) of the selected class.

The Care Unit knowledge cannot be personalized.

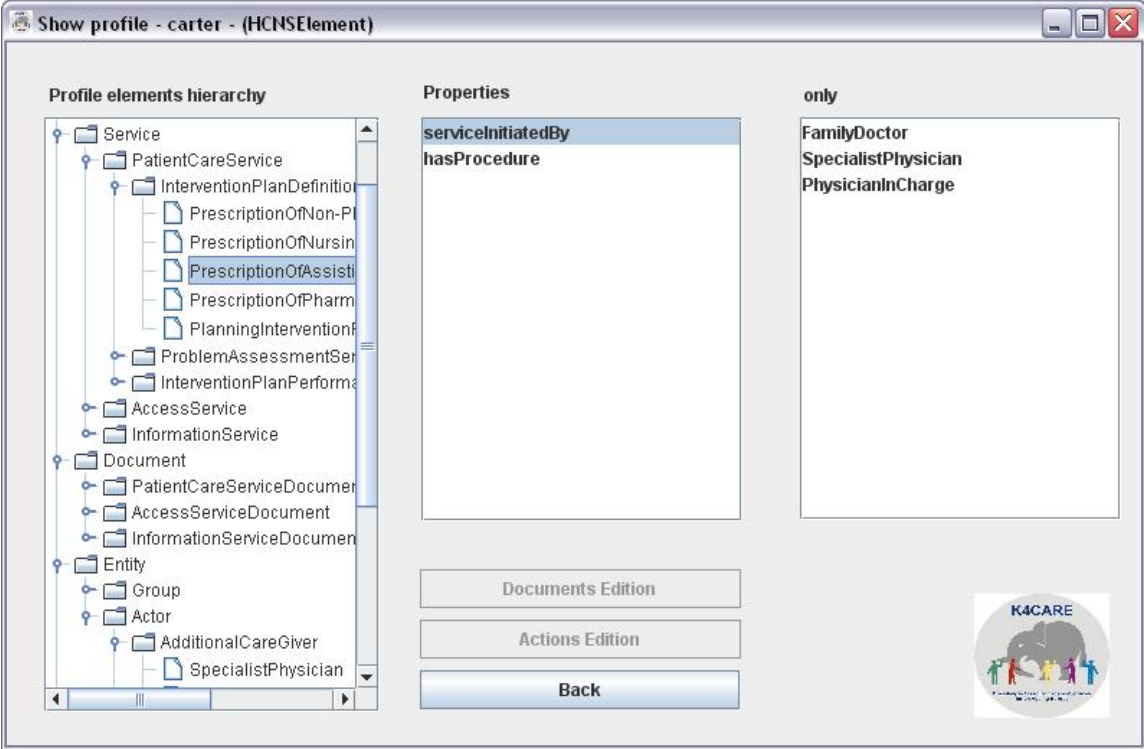


Figure 38. ATAPO – Displaying the contents of a care unit.

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