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EO4GEO – Towards an innovative strategy for skills development and capacity building in the space geo-information sector supporting Copernicus User Uptake

Curriculum Design Tool (CDT)

EO4GEO Tools User guides

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About

The Curriculum Design Tool (CDT) allows users to create, edit and find educational offers (also known as curricula) in the field of Earth Observation and Geographic Information. Therefore, it is mainly addressed to Academia and training providers. Educational offers are linked to the EO4GEO Body of Knowledge (BoK) using EO/GI-specific concepts and skills: the CDT allows the reuse of concepts and skills (i.e., learning outcomes) contained in the EO4GEO BoK.

The Curriculum Design Tool is part of the EO4GEO ecosystem of tools, and was developed by the Geospatial Technologies Research Group (GEOTEC) from the Universitat Jaume I, Castelló de la Plana, Spain, in the context of the Erasmus+ Sector Skills Alliance project EO4GEO.

1. How to start working with CDT

The Curriculum Design Tool (CDT) allows users to create an education offer, at any level of granularity: a study program, module, course or lecture.

The hierarchy of the items is as follows:
Study program, *composed of*
      Module (s)*, composed of*
            Course (s), *composed of*
                  Lecture (s)

Where:

- A Study program is a curriculum of one or more courses (grouped or not in Modules) that is intended to lead to a degree, diploma, or certificate.
- A Module is a collection of courses, grouped for some reason. The grouping could be based on year or semester, topic, elective or not, or any other criterion.
- A Course is a unit of teaching, a set of lectures or a plan of study on a particular subject, usually leading to an exam or qualification.
- A Lecture is a formal talk on a serious subject intended to display information or teach people about a particular subject (also known as lessons or classes)

The CDT is versatile and provides full modularity. Therefore, - and because of different educational systems in different European countries - a user can start creating content from every level of the hierarchy and can skip any level. Thus, an educational offer can be a study programme or a complete academic degree, which will be composed by modules, courses and lectures, or it can be just a single lecture.

2. Anonymous users, login & registration

The CDT works in view mode for anonymous users, and extended functionality is added for logged in users. Without being logged in, an anonymous user can see all public Educational Offers, search and share them. (See Home page section).

Figure 1 shows the login page for all EO4GEO BoK-related tools, including CDT. If you already have an account, type in your email (1), your password (2) and click button 'Login' (3).
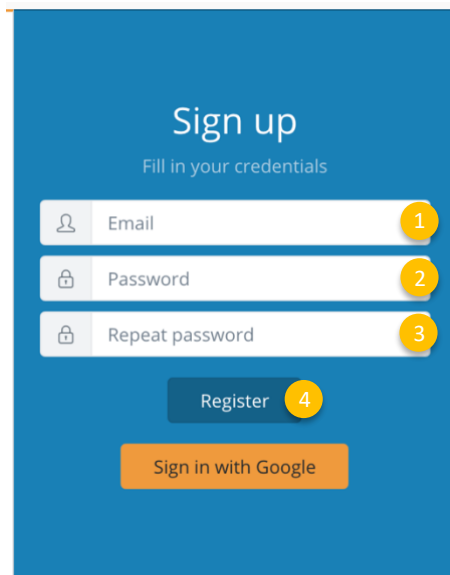
If you **forgot your password**, type in your email (1) and click 'Forgot password?' (4). You will receive an email to recover your password. If you don't have an account click 'Register Now!' (5) and proceed to the Registration form (see Figure 2). It is also possible to sign in using a Google account (6).

Figure 1 EO4GEO Tools login page

To **create a new account** , fill in your email (1), your password (2) and repeat your password (3). The password you chose should contain at least 6 characters.

Then click the 'Register' button (4) and you will be immediately redirected to the Home page.

Figure 2 Registration form

When registering, if you see the error 'The email address is already in use by another account', it means your email is already registered. Write your email in the login part of the form and click 'Forgot password?' to receive a link with instructions to recover it.

3. User details and organizations

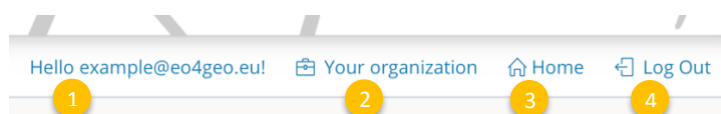After logging in, the user will be able to see his/her email address in the top navigation bar (Figure 3).

Figure 3 Navigation bar

Clicking in the email address (1) the user will be able to save his / her name and recover the password.

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Clicking on 'Your organization' (2) the list of organizations a user belongs to is displayed. These organizations are important in order to be able to create content and to collaborative edit of content created in the tool, as users belonging to same organizations are able to edit content created by other users of this organizations. Also, private content can be seen by users belonging to the same organization; it cannot be seen by anonymous or other users.

To create new content the user needs to belong to at least one organization.

The 'Home' button (3) goes to the list page, overviewing all educational offers.

The 'Log Out' button (4) logs the user out and brings him/her to the login page.

To **join an organization** , click on the 'Your organization' button (2). In the organizations page (Figure 4) click on the dropdown (1) to search for the desired organization. You can type to filter by text. Once you find the desired organization, select it and click Join button (2).
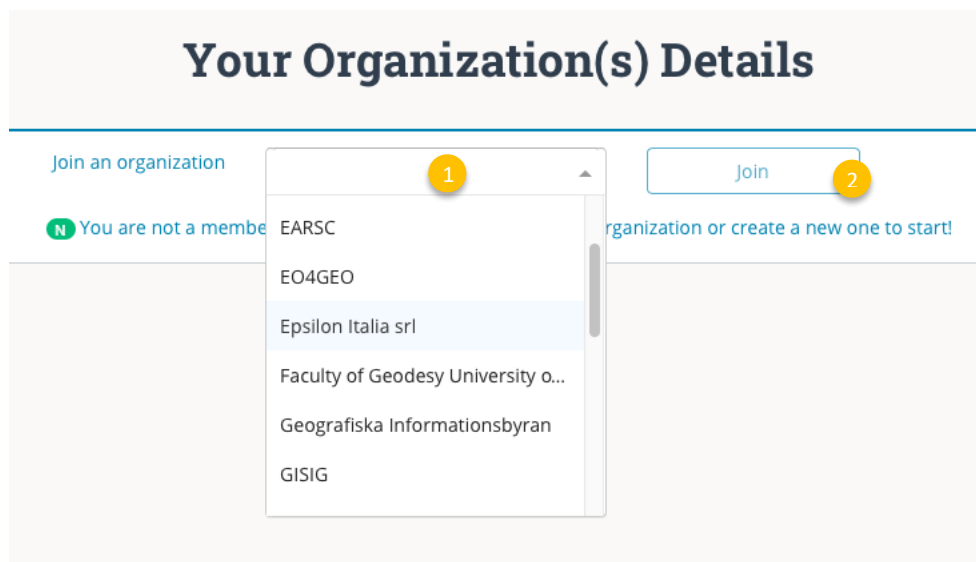

Figure 4 Dropdown in organizations page

You will be automatically added to that organization as a regular user. You can click on the **leave organization** button to be removed from it (1) (Figure 5Figure 5 A regular user being member of an organization).

Figure 5 A regular user being member of an organization

If you want to **create an organization** select the 'Create a new one' option and click on the 'Join' button (1) (Figure 6). Since you've created the organization, you are automatically an admin user, with full rights to fill in your organization name and description (2) and save changes (3) or you can **delete your organization** (4).

To help in organizing the content inside your organization you can create 'Divisions' under an organization. As an Admin, you can **create or delete divisions** , by typing the name and 'Add division' button (5).

You can change a user role (Admin / Regular) inside your organization by clicking the associated button (6). An Admin can also **remove users** (7) of an organization.

Finally, you can **add users** to your organization by typing the email address they used to log in and click 'Add user' button (8). After an organization is created, new users can also join themselves.

Figure 6 Creating a new organization

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4. Home page

Figure 7 shows CDT's home page with the list of Educational Offers available in the tool (1). Name, hierarchy of the offer, organization (and division) under which the offer was created, affiliation, its description, EQF level and last updated date is shown for each offer listed. An educational offer can be public (visible by everybody) or private (visible by members of the organization under which it was created).
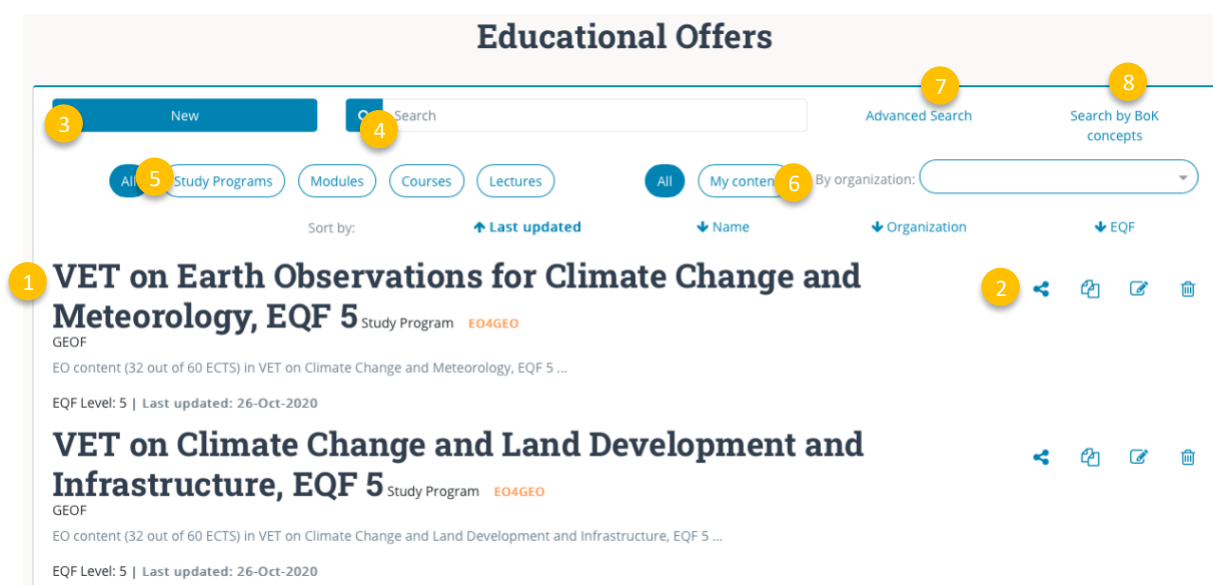

Figure 7 Home or list view of the CDT

Each educational offer has a toolbox menu (2), in which the user can find the following options from left to right: share, duplicate, edit and delete. Some actions may be disabled depending on the type of user (anonymous or logged in), see Figure 8.

Figure 8 Toolbox with some actions disabled as in the anonymous view

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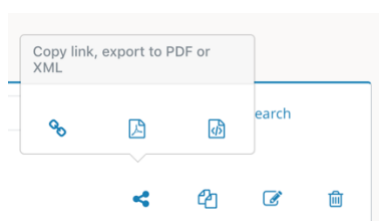
Figure 9 Options to share an curricula

To **share an educational offer** , click the 'Share' option and select one of the alternatives (from left to right) 'copy link', 'export to pdf' (an pdf file annotated with BoK concepts) or 'export to xml' format (Figure 9).

To **duplicate an educational offer** , the 'Duplicate' option creates a new offer which is prefilled with all information from the original offer. You can then edit this information, rename the educational offer and save it. This new offer is owned by you, so you can later modify it.

To **edit an existing educational offer** , the 'Edit' option allows the user to modify those offers he/she previously created. Finally, the 'Delete' option allows to **remove an educational offer**. Educational offers created by other users out of your own user organizations cannot be edited nor deleted.

To **create a new (blank) educational offer** , click the 'New' button (3). This button is only active when the user is logged in.

Educational offers can be filtered by text typing in the search box (4). The **default search** looks for the text typed in title and description of the educational offers and filters according to it.

To **filter contents** by its level in the hierarchy (study programme, module, course or lecture), select the desired level in the buttons group (5). The list will then only show the items created under the selected level.

To filter contents by who created them (i.e., your content, from a specific organization/division, all), select the desired option in the buttons group (6) or in the organizations dropdown. The list will then only show the items created under the selected

organization/division. If you also need to search by 'Affiliation', 'Knowledge annotated', 'Learning outcomes' or 'Field of study', use the ' **advanced search** ' button (7). Then, enable the options you want for your search by clicking on the corresponding sliders. Educational offers will be filtered according to your defined search criteria.

The CDT also allows to ' **search by BoK concepts** ' (8). You can explore the BoK and select one or more concepts to filter the educational offers. Click the link 'Search by BoK concepts' and the BoK Visualiser and Search component will open to explore and search for BoK concept. Once you found the required concept(s), select it and click on 'Finish' to show the filtered results or continue searching to refine the results.

5. Educational offer detail view

The user can see an educational offer by clicking its title (Figure 10). In the detailed view, the screen is divided in two parts: graphical view (1) and textual view (2).

Figure 10 Detail view of an educational offer

The **graphical view** (1) is a visual representation of an educational offer. It was designed to help the user during the description of an offer and to navigate through the content using an

interactive graph, where each node can be clicked to see its associated information in the textual view (2).

The graphical view is composed of nodes and links, hierarchically ordered in a tree structure. Links thus represent the parent/children relation between nodes. From top to bottom, a node can be a Study programme, Module, Course or Lecture (see also 'How to start working with CDT' section as reference). The upper node represents the starting point of an educational offer, and all other nodes are its children. For instance, if a user creates a Module, the Module will be in the upper level, zero or more Courses at the middle level, and zero or more Lectures at the lowest level.

You can hide or show a node's links and associated nodes by clicking on it twice.

Colours in the nodes give an indication of the composition, in terms of the EO4GEO BoK top level concepts (e.g., Cartography and Visualization in orange: Platforms, sensors and digital imagery in red, etc.)

The right side of the screen (2) contains the **textual view** of an educational offer.

Whereas the graphical view provides an overview of the whole educational offer, the information shown in textual view refers to only one node. Clicking the different nodes in the graphical view will update the information in the textual view. Different fields describing the node are shown depending on its level in the hierarchy. Some of these fields can be expanded or contracted with the arrows present at the left of the field's name (3).

6. Create or Edit a Curriculum

When clicking the 'New' button an information page is displayed before starting the edits. (see section How to start working with CDT). In this page the starting point of the educational offer should be selected using the dropdown (Figure 11).

If the logged in user does not belong to any organization, it will need to create or join one first, as explained in User details and organizations section.

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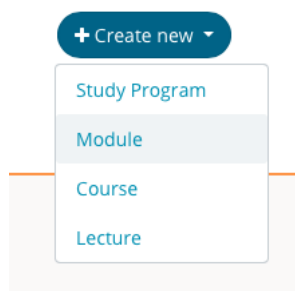
Figure 11 Dropdown to select starting point of educational offer

Once the starting level is selected, the edit view is shown. In this view the user is able to fill in all details corresponding to the educational offer and save them under an organization / division.

The top menu (Figure 12) allows to **create child nodes** of the current selected node, by clicking the 'Create new' button (1) and selecting the desired level. Only lower levels will be active, as only lower levels can be children of your selected node.

Apart from creating new nodes, you can re-use existing content (nodes) and incorporate them in your own educational offer. By clicking the 'Explore existing educational offers' button (2), the user can search for existing offers, add them as children of the current node and, if needed, customize them.

You can save at any point using the 'Save' button or, once finished, clicking the 'Save and Exit' button (3), which will save and redirect you to the List view.

By default, a job offer is saved as 'Public'. If you want to keep your content 'Private', you can turn off the visibility switch (4) before saving. Remember that other members of your organization will be able to see it even if it's private.

In order to be able to save, an organization must be selected (5), by default the first one is selected but it can be changed. Optionally a division can also be selected (6) to keep your content better organized. Division is not mandatory.

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Figure 12 Edit view of CDT

To **reuse existing educational offers**, a side view with content appears (Figure 13). This is the content that can be added to your educational offer as a child of the current selected node. You can filter by type of content clicking on the desired type (1) and you can search typing in the search box (2).

You can close this view with the 'Close' button (3).

Figure 13 Reusing educational offers

Once the desired content is found click on the name to see full details (Figure 14), if you want to add it to your educational offer click on the 'Add to my educational offer' button (1), it will be automatically added to your current selected node including all information it contains. Once imported, at can be customized. Then you can go back (2) to close this view.

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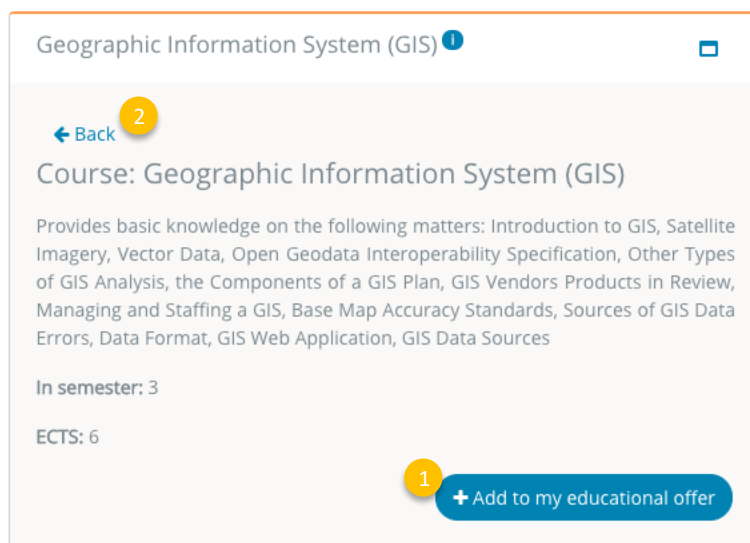
Figure 14 Detail of a course when exploring existing content

To **add content to your offer** you can directly type your own information in the fields, or you can reuse content from the BoK, simply clicking on the corresponding 'Re-use BoK …' buttons that allow to do so. For example, to reuse BoK content in the description of your educational offer, you can click on the 'Re-use BoK description button (1) to open the BoK Visualization and Search (Figure 15) and select a BoK concept of which you want to re-use the description for your educational offer. Each field contains a tooltip that helps you understand the information to be filled in in each of the fields.

The BoK Visualization and Search component (Figure 15) allows to graphically navigate and textually explore the BoK and to search by typing in the search field (1) for concepts matching your search. Once you find a suitable concept, click on 'Details' (2) to see full concept details and click the 'Re-use' button at the bottom to select the concept information.

Figure 15 BoK Visualizer and Search

After re-using a concept, the BoK visualizer closes and the text is placed into the field. This text can be edited afterwards.

You can **re-use content from the BoK** (Figure 16) for the title (the BoK concept title), the description (the BoK concept description) (2), the learning outcomes (the BoK concept's skills), the bibliography (the BoK concept source documents) or you can set a concept to be a prerequisite for your current selected node.

Re-using content from the BoK creates a link between your offer and the BoK concept you selected, which allows comparison of information contained in the EO4GEO tools. These links are known as annotations.

Figure 16 Editing an educational offer

Every time content from the BoK is re-used the educational offer is annotated with the corresponding BoK concept (Figure 17). You can see a list of **annotated concepts** next to the 'Annotate with BoK concepts' (1). This list can be edited, you can remove an annotation by clicking on the 'x' button next to it (2), and you can add more annotations representing the content of the current node, even if no content is re-used with the 'Annotate with BoK concepts' button (3). Adding annotations is done using the same BoK Visualization and Search component as used to re-use content, and allows you to select one or more concepts to annotate with.

Figure 17 Annotated concepts in the educational offer

Click in the dropdown to **select the study area(s)** related to the educational offer. These are the list of the Fields of Education and Training by UNESCO's ISCED-F. Type to search by name of the Field and select the most suitable one(s).

After one area is added, it can be removed with the 'x' button (Figure 18).

Figure 18 List of study areas

As mentioned before, skills associated with BoK concepts can be reused as learning outcomes in an educational offer. Once you select a BoK concept, all its skills are added (Figure 19), forming learning outcomes for the current educational offer. However, this list of learning outcomes can be customized by removing them with the 'x' button (1). Custom learning outcomes can also be added in case no suitable skills are not found in the BoK. To **add custom learning outcomes** type it in the text field (2) according to the guidelines (3) and click the 'Add custom LO' button. Clicking in a linked BoK-learning outcome opens the BoK concept it belongs to. Custom learning outcomes are not linked.
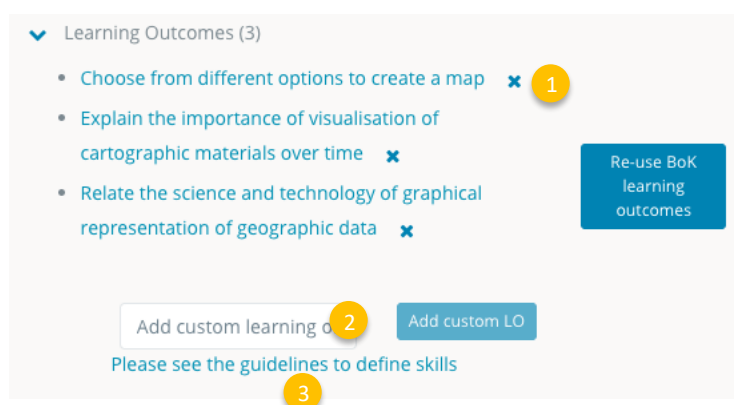

Figure 19 Learning outcomes

To **add transversal skills** (Figure 20) – skills not bound to specific knowledge (i.e., BoK concept) – select them from a closed list that contains a useful selection of skills from the ESCO classification (1). Typing in the text box filters in the list. Clicking on the switch (2) allows to search in the full list of ESCO skills. If a desired transversal skill is not found, it can be added as a custom transversal skill, by typing it in the custom skill text box (3) and then clicking the 'Add custom transversal skill' button. To remove a transversal skill, click the 'x' symbol and

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the list will be updated (4). In the list of selected transversal skills, those linked (in blue) are the ones originating from the ESCO list, whose links open the related ESCO skill page, whereas those in grey are custom transversal skills.

Figure 20 Transversal skills

The CDT allows to **promote a node** (Figure 21) by pressing the 'Promote' button (1). A promoted node (which can be a module, course or lecture) and all of its children is saved as a new, independent educational offer, and it becomes searchable and re-useable. Promoting nodes thus provides an easy way to reuse and adapt existing nodes.

The newly created educational offer (i.e., the promoted node) can be accessed from the link 'edit it here' (2).

Figure 21 Promoting a child node

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Glossary of terms

Body of Knowledge (BoK) is the complete set of concepts and relations between them, that make up a professional domain, (in this case EO/GI BoK) and the related learning outcomes as defined by the relevant learned society or a professional association.

CDT. Curriculum Design Tool

ESCO. Classification of European Skills, Competences, Qualifications and Occupations. https://ec.europa.eu/esco/portal/skill

EQF. The European Qualifications Framework for Lifelong Learning. The core of the EQF concerns eight reference levels describing what a learner knows, understands and is able to do, ranging from basic (Level 1) to advanced (Level 8) https://ec.europa.eu/ploteus/sites/eac-eqf/files/broch_en.pdf

Field. Term related to a specific area of study, following the ISCED-F classification

ISCED-F. International Standard Classification of Education: Fields of Education and Training 2013, maintained by UNESCO. https://ec.europa.eu/esco/portal/escopedia/International_Standard_Classification_of_Education_58__Fields_of_Education_and_Training_2013__40_ISCED-F_41_

Knowledge. The body of facts, principles and theories and practices that is related to a field of work or study

Learning outcomes are statements of what a learner knows, understands and is able to do on completion of a learning process. In EO4GEO They are described in terms of Knowledge and Skills. They should be characterized by: A time frame, a performer and an action verb (observable and measurable)

Skills means the ability to apply knowledge and use know-how to complete tasks and solve problems.

Transversal Skills are those typically considered as not specifically related to a particular job, task, academic discipline or area of knowledge but as skills that can be used in a wide variety of situations and work settings since they are a combination of people skills, social skills, communication skills, character or personality traits, attitudes, career attributes, social intelligence and emotional intelligence quotients, among others, that enable people to

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navigate their environment, work well with others, perform well, and achieve their goals with complementing hard skills.