Reframing the use of future in the educational contexts with Challenge Based Learning approach

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Workshop program

- Future Literacy involves Challenges…
- CBL and Futures Literacy: an educational alliance
- Examples of projects with CBL approach at Unitn
- Evaluation of learning and impact of the CBL activities
- Planning and realising a CBL course (**practical session**)

Future Literacy involves Challenges…

What are future studies?

The typical goal of futures studies consists in exploration of futures scenarios, using different methods and documentation from multiple scientific disciplines (economics, social sciences, ecological and systemic analysis, etc.). Scenarios are produced analysing from an **anticipation viewpoint** the main trends and social/economic/political events as well as physical phenomena (eg. acidification of seawaters) and investigating the associated social preferences (eg. technologies of communications) at a regional/global level.

In the last decade the prospective and methods of Future Studies have been implemented by a series of international organisations (Unesco, UN) and nations (Sweden, Finland, Singapore, Australia) to support sustainability plans and social change. In particular, the pedagogical approach of **future literacy** has been defined as **'an essential capability for the next millennium**' and introduced in schools' curricula and regional agencies agendas.

‘*Being futures literate empowers imagination* - quoting from Unesco declaration - e*nhances our ability to prepare, recover and invent as changes occur*’.

Futures Literacy

As Bourdieu suggested (2000) the future is an operational dimension incorporated in the deployment of the action and relates to the possibility to different ways of being and becoming. The future will be a different reality from the present and from the past, and will be characterized by different ways of acting, knowing, doing, thinking and experiencing..

Future Literacy is the ability to use the future actively in the present and to aspire to possibilities (Poli 2021). In few words, FL is the basic, non technical version of Future Studies, a competence that everybody should acquire.

According to FL perspective, the educators' task cannot be limited to preparing young people for a predetermined future (already imagined and known!), but to *create and explore new spaces for action in the present*.

CHANGES IN THE FUTURE OF LEARNING AND TEACHING - 1

Reports about educational futures highlight the prospective changes that educational systems will have in the future:

- Structural changes (economic, financial, political and social role of educational systems)
- Technological changes (media, tools and forms of knowing, AI)
- Social and pedagogical changes (learners/ teachers, ontology of learning)

CHANGES IN THE FUTURE OF LEARNING AND TEACHING - 2

Specifically, relevant changes will involve:

- Educational settings (composition of classes, use of technology, teaching methods, location)
- Learners and teachers (prospective who they will be, symmetric/power relations)
- Knowledge and innovation (creativity, resources, modes of knowledge diffusion and creation)
- Inclusivity and civic values (social participation)

CHANGES IN THE FUTURE OF LEARNING AND TEACHING - 3

Social sciences can have a role for promoting innovation in learning and teaching in higher education → **Innovative pedagogical methods**

Future Studies can stimulate reflexivity on prospective cognitive and relational / intercultural competences and solicit an anticipatory perspective of changes → **Futures Literacy**

An experience of collective reflexivity about the future of education and learning

MA Anticipation participants (not the typical graduate students!)

Large use of online and other multimedia learning tools

Class discussions in small group and online thematic group discussion.

 Confrontation between their imagined learning in the future and the ‘real’ experience of learning.

Results from the thematic class discussion

- Learning as an activity for all life (life-long), related to needs (re-employment, skills) but not necessarily
- Technology as an aid to save time, to expand references/knowledge and use new resources
- Learning can be planned and designed according to individual preferences
- Creativity raises from access to knowledge resources
- Social dimension of learning comes from different sources (online, F2F, peers, mentors…)
- Learning individually can be boring/ time demanding and risky…
- Need of social relations (teacher, peers) to connect knowledge, especially when new media resources are involved
- Transformative changes are difficult in online environments
- Imitation and copying are not too bad! Tutorial roles are essential…
- Time is always running out or… It takes too time to complete learning tasks..

Anticipating futures of education…

Social sciences can help in understanding why the confrontation between the imagined future (that will be our present) and the actual experience of it (its seeds) is frequently discouraging or confusing.

Many aspects of the future are rooted (dependent) on the present (if not on the past) and changes in educational systems are not driven only by exogenous factors (technology, institutions, economic factors) but part of a transformation of all the society. *Q: Which forms of learning are institutionally 'recognisable'?* → criteria of social/accountability

In addition, some aspects of HE systems in the future question the existence of education systems in our societies (creation of 'educated' vs non educated citizens, social class) and a re-design of learning settings is not different from a re-design of social and organisational relations (different theories of learning). *Q: Which learning settings are prepared or willing to change?*

Drivers of changes in the learning experience

- Learning and teaching are social roles. Both activities involve a shared agreement on identities and their possibilities of action (*How shall I learn?*), as well as on the content of the exchange (*What shall I teach?)*→ **pedagogical relation**
- Social environments (and also individual learning tools) define the type of characteristics of knowledge (eg. they can nurture or prevent creative learning, re-inforce interpretative frameworks) → **organizational learning**
- Time in learning is a non-negotiable resource: it is mostly linked to neurophysiological processes and it cannot always be ‘molded’ according to individual/social needs (eg. back to school in the post-capitalistic system…) → **social organisation of society**

Education and Future Literacy

Social sciences should collaborate with Future Studies and develop Future Literacy in HE as a form of social reflexivity.

First, FL involves understanding the logic of anticipation. Building complex scenarios and explore them to anticipate connections and implications may provide learners a good opportunity both to expand specific knowledges (eg. multidisciplinarity) and to discuss them (eg. changing paradigm, new references).

Second, FL enables the capacity to analyse innovations in educational systems as part of a complex web of changes. Shared and global contexts are going to be the educational standard for future generations and the learning environment is to evolve as such, expanding the needs of confrontation and communication capabilities.

Challenge Based Approach and Futures Literacy: an educational alliance

Future Literacy involves Challenges…

The capability to reasoning about intersections among phenomena, to see relations and to envision solutions to problems, or in other words, to develop futures scenarios can be refined using different scientific and pedagogical instruments.

Futures scenarios can be build by means of articulate scientific projects and data monitoring (eg. surveys for financial scenarios) or by means of participatory methods, as the approach of Future Literacy suggests.

Imagining and developing scenarios can be stimulated and become part of curricular ('courses') and non curricular learning activities with the goal of improving the learners' confidence with anticipation logic and teach them how to approach challenges / innovations that could deeply transform our societies.

Innovative teaching methods and examples of CBL in HE

Challenge Based Learning is an innovative teaching methods that evolved from Project Based Learning and take inspiration from social learning theories (Social Constructivism and Situated Learning).

CBL has been adopted in all orders of education and also in research related training and has become one of the distinctive pedagogical methods that many international and European universities use. → **list of references**

Specifically, the implementation of CBL in partner universities of the **European Consortium of Innovative Universities (ECIU)** is part of a larger program to innovate higher education and promote a different approach in learning experiences and student-teacher relations.

«CBL is conceived as a learning framework that allows participants to navigate local and global ‘societal challenges’, identified autonomously or responding to a **challenge provider** while gaining **multi/inter disciplinary** awareness and cultivating disciplinary **knowledge** and **professional** and **social skills**. CBL allows to develop concrete and feasible socio-technical projects, based on a scientifically controlled research pattern and in **dialogue** with local and global stakeholders, that integrate a technological component and are likely to be communicated, implemented and disseminated, producing effects compatible with the **SDG agenda**».

De Stefani, P., & Han, L. (2022). “An inter-university CBL course and its reception by the student body: Reflections and lessons learned (in times of COVID-19)”. In Frontiers in Education, p. 321

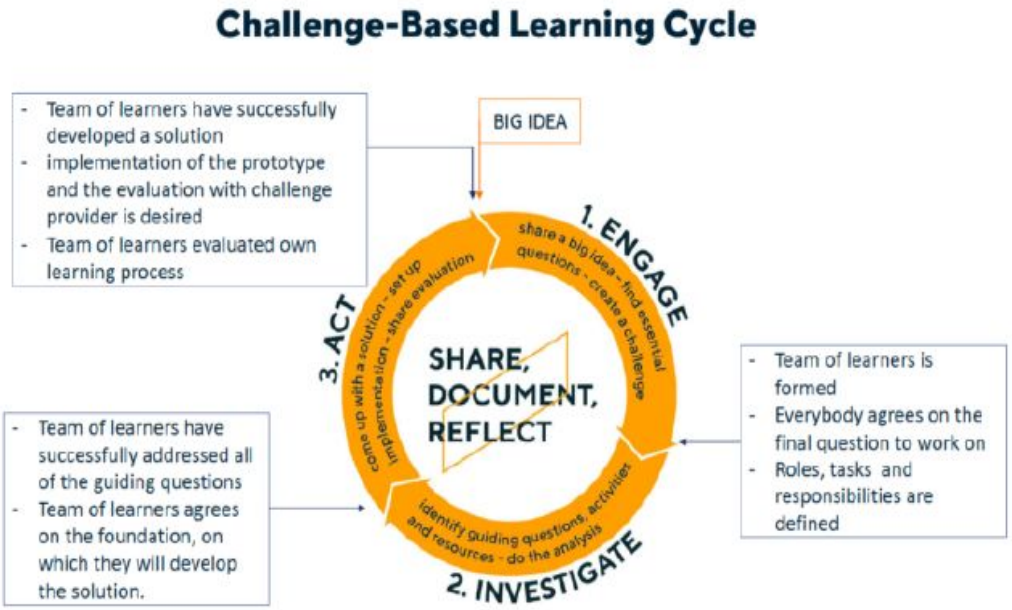
Frontiers

Nichols, M., Cator, K., Challenge Based Learning White Paper, Cupertino, California, Apple Inc., 2008

What is Challenge Based Approach ? *An Introduction*

Challenge:

- “A broad statement or task as a means of encouraging students to address educational criteria, fulfil competencies and complete learning objectives” (Gibson, Irving, and Scott 2019)
- Innovative education: students that think ahead



«Challenge Based Learning is an engaging **multidisciplinary** approach to teaching and learning that encourages students to leverage the technology they use daily to solve **real-world problems**. Challenge Based Learning is **collaborative** and hands-on, asking students to work with peers, teachers, and experts in their communities and worldwide to ask good questions, develop deeper subject area knowledge, accept and solve challenges, take action, and **share** their **experience**»

Nichols, M., Cator, K., Challenge Based Learning White Paper, Cupertino, California, Apple Inc., 2008

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How is Challenge Based Approach applied?

Most of the experiences of CBL are related to concrete, real world problems (such as the design of products/processes), or to the development of specific capabilities and sensibility (awareness of AI applications, diversity management,..).

Here is a selected list of cases to illustrate the diversity of topics and organisations involved in the implementation of CBL.

Two aspects that links these experiences are a) they put the **learning experience** at the center of attention and b) they highlight how changes (technological, processual, economic…) are **not necessarily generated by exogenous factors**. On the contrary, innovations are essential for understanding and transform reality, and their potentialities should be explored in all type of educational settings and in particular in universities (class, labs, debates).

Challenge Based Approach and Futures Literacy

Evaluation of learning and impact of the CBL activities

Futures Literacy and CBL

Advantages in implementing CBL approach in Future Literacy programs

- develop interest for problems transformation → proactive approach to innovation
- nurture a different attitude to change (vs instability) → navigate the possibilities of the futures
- use group dynamics as leverage for individual progressing → learning a new way of thinking
- produce intermediate and final results that are visible and evaluable from public point of view → accountability

Why are scenarios used in CBL?

Developing futures scenarios in CBL is important as a starting point for performing a broad array of capabilities related to Future Literacy such as

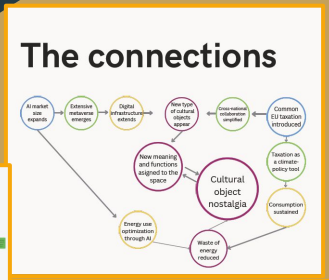
- reasoning about complexity
- attention for different points of view and multiple demands from society
- capacity to find leverages for innovation and change
- observe path dependencies and evaluate their prospective incidence in the future
- formulate solutions that are open to revision
- understand and integrate knowledge from different disciplines
- include multiple stakeholders and future generations

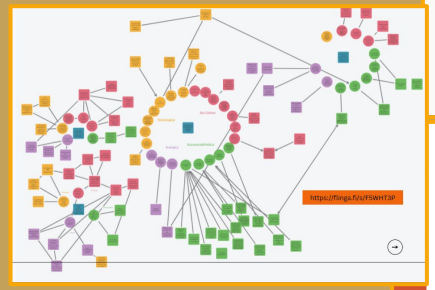
Types of Scenarios		
Time	Synchronic (Snapshot)	Diachronic (Future history, evolution)
Modality	Exploratory (Mapping possibilities)	Normative (Desirable, undesirable)
Description	Abstract (List of scenario elements)	Narrative (With storyline)

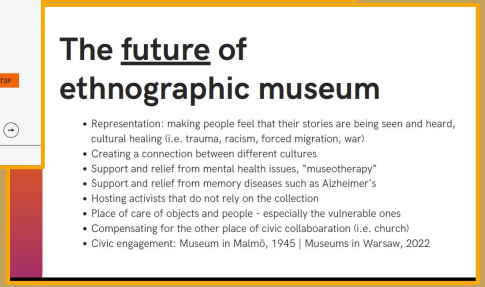
Explorative scenarios are useful for planning ahead investments, for setting guidelines and anticipating future opportunities (cooperation across disciplines, policy reforms etc.).

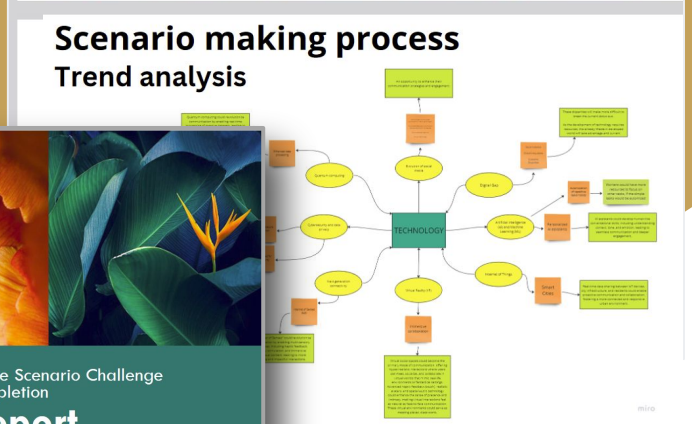
Narrative scenarios have the great advantage of including the background of a possible future world, the setting of everyday life in an imagined future.

Types of scenarios in future studies









A project may develop into different types of futures scenario..

Dear diary,

Today I am turning 40. As I reached the age of my mother, I decided to celebrate my birthday with my grandmother. It was such a nice day… We were sitting in the forest and talking about things now and then. I discovered so many things I was not aware of! Granny said she used to go to the Udzungwa Mountains forest and collect the wood from there for building

The experience at Unitn with CBL

Trento university has developed interesting applications of the CBL approach in research related areas (IPSP, HIT) and as member of the European Consortium of Innovative Universities (CIU), Trento has adopted the ECIU framework for implementing CBL in curricular and extracurricular courses.

In the last years the Trento MA program in Social Foresight and the School of Innovation have also launched an innovative learning experience for BA students adopting CBL to improve Futures Literacy. Challenges have been organized both for technology oriented issues (biotechnologies) and cultural and social issues.

Future Literacy is introduced to CBL participants and future scenario building is used as a method of approaching societal problems from a multidisciplinary perspective.

Examples of CBL activities with FL approach

Product/Technology oriented CBL

https://www.soi.unitn.it/courses/back-to-the-future/

- Climate change influences the possibility of application of the specific product/ technology.
- Students are encouraged to imagine and develop innovation paths/ scenarios that imply use of the product/technology (3 Horizons).
- Future Literacy is merged with other knowledge and skills (ex. evaluation of technology returns).

Social issues oriented CBL

https://www.soi.unitn.it/courses/engaging-with-the-future/

- Social, economic and environmental changes are interrelated.
- Students are encouraged to imagine and develop scenarios that (may) involve the stakeholder and use a global perspective (Future Wheels).
- Future Literacy is the main competence that is developed in the CBL experience.

Evaluation of CBL assessment programs

It is important to define learning goals and evaluation rubrics at the beginning of the CBL both for individual and group (social) dimensions. The use of different evaluative tools is also recommended, as well as the involvement of the stakeholder(s) in providing a feedback to participants.

Evaluative assessments could be planned at the **individual level** either with qualitative (interviews) or quantitative methods (surveys) with the aim of defining learning expectations/goals of the participants. A learning diary may also provide indicators of students' involvement in the CBL and interests in the topics related to it.

Assessments at the **group level** may involve: evaluation of the group contributions during intermediate mentoring session, evaluation of the final reports and of the final presentation of the groups' projects. P2P methods such as focus groups are also useful to have feedback about learning outcomes and eventual criticalities in group dynamics.

Finally, having a **panel committee** with teachers and external representatives (eg. CBL stakeholders, community leaders) may also be a good idea to introduce students to public engagement and pre-figurate the possible impacts of their projects (eg. relevance of future scenarios for policies' design).

An example of a CBL assessment program

	CBL#3 (resilient communities)
individual level	• "letter to yourself" (to stimulate personal reflexivity and motivation) • learning diary - completeness, depth and quality of reflections • seminar attendance • contribution to and facilitation of team meetings (limited to the tutoring sessions) • two questionnaires (to explore study background and expectations of participants)
group level	• group contributions during intermediate tutoring sessions • final presentation (open format) • final report and evaluation of the presentations by the challenge provider (with standardised format)
Challenge evaluation	• P2P interviews of a sample of participants • comments expressed in learning diaries, during the tutoring sessions and in the open questions (questionnaires)

Workshop Group Activity

Design of a CBL activity with FL perspective

Thanks for your attention and keep in touch!

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