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PHERECLOS: Boosting Science Capital and promoting STEAM Engagement with Open Schooling approaches

Phil Smith[1], Chris Gary[2], Cyril Dworsky[2], Florian Huber[3], Laura Cristea[4]

Teacher Scientist Network, UK[1] , Kinderbüro Universität Wien, Austria[2], SYNYO, Austria[3] , Asociatia Universitatea Copillor, Romania[4]

Abstract

PHERECLOS builds upon the theory of science capital [1] and the experience that Children's Universities [2] have made in the Third Mission of universities. They became intermediaries between various actors in the educational and social landscape – as incubators of change. Built around them, PHERECLOS develops innovative Open Schooling models of collaboration in six regional clusters (Local Educational Clusters, LECs), which serve as experimental testbeds for schools and affect the quality of STEAM engagement opportunities in general. Their regional effectiveness will lead to the development of implementation guidelines and policy briefs to enhance the sustainability of the overall approach, which is continuously informed by findings from academic implementation research and a Mentoring Programme for further 40 organisations (TEMPS, Transnational Education Mentoring Partnerships). These models of engagement which can be beneficial for educational establishments and for the social communities in a wider context, provided that the involved actors have the capacity and knowledge to approach them.
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Keywords: Science capital, Children's Universities, Open Schooling, STEAM, H2020

1. INTRODUCTION

The PHERECLOS project is approximately halfway along its journey, our goal being to develop and pilot innovative models of cooperation in micro-education ecosystems. The models involve various education providers at the overlapping edges of formal and non-formal education in order to respond to local demands and challenges in education.

The definitions of Open Schooling (OS) [3] speak of a collection of ideas from the 1970's around the idea of a school '*opening up its processes to become more permeable'* while Susan Phillips [4] takes the view that an Open School has one unique facet: the physical separation of the school-level learner from the teacher, and the use of alternative teaching methodologies (often ICT-based). This definition fits with some large-scale initiatives supported by the Commonwealth of Learning that have been in place since 1994, examples of which from Africa and India, dominate searches for the term 'Open Schooling' (eg.NIOS). More recently, Knudsen & Obro Skaarup [5], defined OS as the collaboration between schools and local institutions, businesses and organisations on teaching. They point out that under this definition it has been a mandatory part of the Danish public school system since 2014. There are clearly very many interpretations of how 'open' is an open school (involving any/all of open classrooms, open labs, open curriculum), all of which are 'open' to interpretation! For our purposes, we are using a relatively broad definition of 'operating a school in a way that reflects external ideas, topics and challenges and incorporates them in their teaching approaches and everyday school life, and in return, provides the creativity and potential as the assets of their pupils and teachers to the community around them.'

From this definition, we wish to explore how these structures are best developed to boost young people's Science Capital and promote STEAM engagement. Science Capital was defined. as a measure of science-related qualifications, interest, literacy and social contacts with science and scientists [1]. Those with high science capital being more likely to pursue a career in STEM related disciplines. The goal of implementing a STEAM curriculum (Science, technology, Engineering, Arts and Maths) is to provide a holistic education that engages both sides of the brain, develops students' functional literacy and promotes constructivism [6]

The project aims to develop innovative Open Schooling models of collaboration based around six regional clusters spread across Europe and beyond. PHERECLOS stands for Partnerships for Pathways to Higher Education and science engagement in REgional Clusters of Open Schooling.

Phereclos was also a Greek navigator and shipbuilder, explaining a number of the nautical references. All aboard!

2. METHODS

PHERECLOS is a three year, Horizon 2020 funded project of the European Commission under grant agreement *No 824630*. The project is being delivered by 15 Consortium partners from 10 countries.

KINDERBURO UNIVERSITAT WIEN GMBH (Lead), Austria
SYNYO GMBH, Austria
UNIVERSITAET INNSBRUCK, Austria
UNIVERSITAT WIEN, Austria
UNIWERSYTET SLASKI, Poland
POLITECHNIKA LODZKA, Poland
EUROPEAN SCHOOL HEADS ASSOCIATION, Austria
KOBENHAVNS UNIVERSITET, Denmark
STICHTING INTERNATIONAL PARENTS ALLIANCE, Netherlands
SNELLMAN-INSTITUUTTI RY, Finland
UNIVERSIDADE DO PORTO, Portugal
S.I.S.S.A. MEDIALAB SRL, Italy
UNIVERSIDAD EAFIT, Colombia
ASOCIATIA UNIVERSITATEA COPIILOR, Romania
TEACHER SCIENTIST NETWORK LBG, United Kingdom

2.1 Local Education Clusters (LECs)

Central to the PHERECLOS approach is the establishment of six Local Education Clusters which will see the interaction of stakeholders and key-actors including schools and businesses that is built upon the model of Children's Universities [2]. These models of science engagement have already proven their ability for creating new forms of awareness for research and STEAM, for having an impact in the regional educational landscape and for becoming agents of change –enhancing formal and non-formal education in their region.

Detailed workplans have been prepared by each LEC using tools developed by project partners with experience in implementation science and advocacy. This approach ensures that a common framework surrounds the diverse approaches being taken by the local LECs which are described in more detail below.

2.2 Implementation Science

A series of online workshops/webinars has introduced LEC participants to the principles of implementation research and to help to establish a common vision regarding the crucial steps in implementation processes and utilization of dedicated templates to assist the LECs in creating their workplans.

One template covered the general description of the LEC (aims, organizations involved, planned activities etc.) and two other templates are based on a widely used aid in implementation science, the *Hexagon Tool* [7]. It allows a better understanding of how a new or existing program or practice fits into an implementing site's existing work context. It is also helpful to figure out strength and weakness of an innovation by considering several indicators of the innovation (usability, evidence, support) and the system (need, fit with current initiatives, capacity).

2.3 Advocacy – Policy Briefs

In order to incentivise a change of policy and practice for Open Schooling in the STEAM context, the project has developed a collection of 'policy briefs' which aim to ensure the long-term and widest possible impact of the project by advocating for upscaling and mainstreaming. From the advocacy perspective consideration was given to the specific needs of a diverse number of stakeholders including teachers, school heads, teacher training students, parents and pupils..

1. The Benefits of Open Schooling on STEAM learning
2. School Autonomy and Stakeholder Engagement in Open Schooling
3. School Leaders and Teachers in Open Schooling
4. Non-formal Education Providers in Open Schooling
5. Financial Aspects of Open Schooling
6. Physical and Legal Barriers to Student Participation in Open Schooling

3. RESULTS

3.1 The Mobilisation and Mutual Learning Platform (MML-P).

Evolving from a static information driven website (www.phereclos.eu), the PHERECLOS Mobilisation and Mutual Learning Platform (MML-P), serves as a central hub for dissemination, mobilization and community. It cleverly combines a public-facing project information element with a 'behind-the-scenes' partnering system to boost engagement and support the establishment of Open Schooling partnerships. The platform provides a variety of tools such as a filterable practices-database, information modules for LEC and TEMP activities as well as a dedicated partnering system for creating new education communities. The platform will help to ensure the sustainability of the project outputs as well as supporting interactions between the Open Schooling community.

3.2 Inspiring Cases

One of the first outputs from the project was a compilation of 63 inspiring cases or practices of Open Schooling in a STEM/STEAM context (https://www.phereclos.eu/practices). This collection will be used as inspiration for our own LEC and TEMP programmes but also serve as a repository for anyone interested in these topics such as teachers, school heads, decision makers, and other stakeholders who may wish to develop future OS projects. With the help of search terms, filters and tags the inspiring practices are easily detectable and the information accessible.

The cases also show the great variety of activities, which fit well with the broad definition of OS as part of the PHERECLOS approach. Most of the activities have a STEM-focus, but some include strong connections with humanities and the arts (STEAM). They cover a range from preschool up to upper-secondary level and are broad in terms of scale: small activities with a rather local focus, to large scale, nationwide activities.

3.3 LECs

The six LECs have been established and workplans prepared

- Austria: Vienna *Large scale approach in urban surrounding (capital city with diverse neighborhoods)– Network of Schools meet Network of Universities*
- Columbia: Medellin *Cross-sectoral design of teaching units to foster active citizenship for changing societies in post conflict areas*
- Finland: North Savo *Transfer of scientific knowledge from university to schools and households in rural remote areas*
- Italy: Trieste *Open Schooling in a City of Knowledge: Inclusive education to prevent school dropout*
- Poland: Lodz *Change of school program and teaching techniques to meet current and future labor market needs*
- Portugal: Porto *STEAM awareness, citizenship, and entrepreneurship skills development according to the 2030 SDG via a cross sectoral educational cluster*

3.4 Transnational Education Mentoring Partnerships (TEMPS)

Ten cross-sectoral Transnational Education Mentoring Partnerships (TEMPs) between differently experienced parties in innovative education development have recently been established. These include at least four partner organisations from two or more sectors in at least two different countries. These partnerships aim to create a STEAM-related mentoring programme between education providers from different countries, which have different levels of experience in the field.

The TEMPS are intended to amplify the individual and institutional learning generated about capabilities and effectiveness of Open Schooling models, notably from within the LECs and share it with a wider range of experts and practitioners. In return, it shall contribute to the accumulation of further insights about practical implementation of collaboration schemes in Open Schooling.

3.5 Open Badges

PHERECLOS is utilizing an empowering concept of digital badges as a future way to award and highlight organisations and individuals for their engagement related to the promotion of Open Schooling. The project has established five core badges, which emphasize different forms of engagement https://www.phereclos.eu/badge/). These badges will help to identify committed experts and practitioners in the field of Open Schooling making them more visible in their communities sharing their badges through various social media channels.

4. Next Steps and Concluding Remarks

Building upon experiences from the LECs, PHERECLOS will develop recommendations for new ecosystems in education, where schools become the central hub of a community to embark on new collaboration strategies. PHERECLOS will extend the incubatory role of Children's Universities for institutional and societal change to the school sector in a collaborative approach that is fostering the mutual understanding of formal and non-formal science education providers to become incubators of change.

Speaking about OS in times of school closures appears to be a contradiction – but PHERECLOS was conceived well before the pandemic and can now be realised as an opportunity, a boat of salvation to transport us all to other, not so distant shores, where we seek to understand how to rebuild our lives and hope that the 'new normal' can encompass an exciting blend of formal and non-formal learning geared towards contextualizing the curriculum for mutual benefit of schools and the wider society with PHERECLOS providing maps and charts to navigate our journey.

5. References

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