EPICUR EUROPEAN UNIVERSITY

Deliverable 2.2 EPIGame - Researchers Gamification Framework

European Partnership for an Innovative Campus Unifying Regions
EPICUR Research Agenda
Shaping European Society in Transition

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016926.

Deliverable number	D4
Relative number in WP	D2.2
Deliverable title	EPIGame - Researchers gamification framework
Work package	WP2 – EPICommunity as basis for strengthening human capital
Lead beneficiary	UvA
Dissemination Level	PU
Type	DEC
Due date (in months)	December 2021 (M12)
Submission date	June 2022 (M18)

Co-funded by the ERASMUS+ Programme of the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016926

Author(s)		
Name	Organisation	E-mail
Anouk Tso	UvA	A.N.Tso@uva.nl

Status of deliverable		
//	By	Date
Submitted (Author(s))	Anouk Tso	25.02.2022
Verified	PMT	03.03.2022 23.06.2022
Approved	PMT SC	23.06.2022 08.07.2022

Change of history		
Version	Date	Description of change
01	25.02.2022	
02	17.06.2022	Revised version (6.2 Entities, 6.3 Proposed gamification mechanics)

Description: A gamification framework on top of EPIQAssess that will be used for the implementation of EPICommunity gamification model.

Contents

List of Figures

List of Tables

1 Introduction

1.1 Context

This deliverable is part of Task 2.1 Action plan for the establishment of EPICommunity [(M01-M12) of Work package 2 "EPICommunity as basis for strengthening human capital"'. This work package aims to enhance sustainable research careers in the context of the European Research Area and is broken down in four tasks:

- **Task 2.1**. It elaborated EPICUR's researchers' framework (EPIQAssess) and will combine this with a gamification framework, namely incentives and rewards (EPIGame)
- **Task 2.2**. It will elaborate blended mobility formats (EPIMove) for researchers and will produce policy recommendations to the EC on the needs of early career researchers in the context of blended mobility, with a view to the new instruments in the next Erasmus+ programme
- **Tasks 3+4**. Tasks 2.3 and 2.4 will be devoted to design and implement the EPICommunity prototype by exploiting (a) EPIQAssess and (b) EPIGame (see Figure 1)

Figure 1: WP2 tasks interconnection

The main activities of Task 2.1 are:

- Activity 2.1.1: the definition of the researcher's assessment framework (EPIQAssess) and
- Activity 2.1.2: the definition of researcher's gamification framework (EPIGame).

The latter activity 2.1.2 is the output of activity 2.1.1 EPIQAssess, which was approved by the EPICUR Steering Committee on 18 October 2021. The following paragraphs are presenting these activities.

The EPICUR qualitative researchers' assessment framework aims to offer a practical tool for individual Early Career Researchers (ECRs), managers and supervisors of research units, researchers assessment committees, and university leaders to help develop and deploy qualitative ways in which staff performance is recognized and rewarded within the EPICUR alliance. A key feature of EPIQAssess is to focus on the actual deployment and practical implementation of the framework in real-life situation within EPICUR universities. The assessment framework takes into account the entire life cycle of researcher's career paths (stages R1-R4) based on 4 key dimensions of the EPICUR knowledge square: Learning & Teaching (LT), Research (R), Innovation (I) and Interaction with Society (S). The model framework is flexible and can be adapted to specific needs of individuals users from all scientific disciplines, while proposing both quantitative and qualitative assessment criteria (see appendices 1 to 4).

Gamification is the use of game elements in a non-game context in order to motivate and engage users (Deterding et al., 2011). In the EPICUR context, gamification will be adopted to actively recognize, reward and motivate researchers within the alliance.

2 Objective of the deliverable 2.2: EPIGame – Researcher's gamification framework

The main objective of this deliverable is to create a gamification framework aimed at lowering the threshold for participation amongst underrepresented groups (by offering incentives, such as rules and rewards, e.g., micro-credentials and badges) on top of EPIQAssess to promote EPIMove. These incentives are complementary to intrinsic motivation and will enhance inclusion of early career researchers from a diversity of cultural and socio-economic backgrounds in the European and global research community.
The main steps proposed for EPIGame are the following:

- **(a) State of the art of existing researcher's gamification frameworks:** This step will include (i) a mapping exercise within the EPICUR alliance about the ways of recognition, rewarding and motivation of their (early career) researchers, and (ii) a desk research of current gamification frameworks. EPICUR considers the Research Reward Cycle (figure 1) presented by the EC Working Group on Rewards under Open Science[1] to be a helpful starting point for this analysis.
- **(b) Definition of incentives and rewards (such as badges or microcredentials) for researchers**: A list of incentives and rewards will be elaborated in order to give input to the gamification framework based on the results of the mapping exercise and the desk research.
- **(c) EPIGame elaboration**: the gamification framework will be elaborated taking into account the criteria and the rewards defined in the previous steps. It will contain the rules, goals and means to support motivation (rewards). The framework will be developed from the perspective of the needs of ECRs but will also target stakeholders across the EPICUR member university and the alliance as a whole.

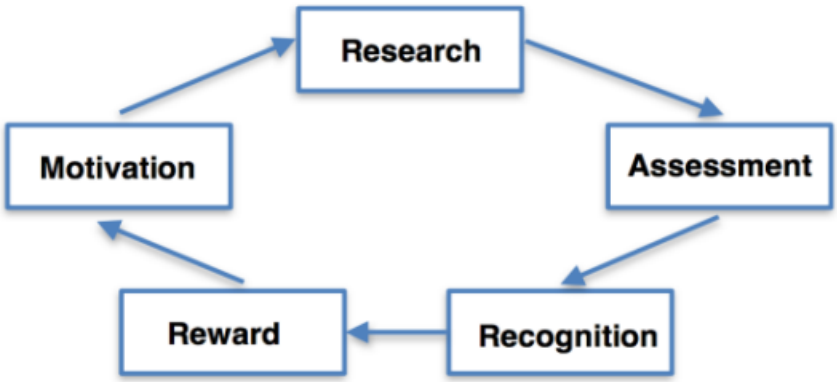


Figure 2: Research Reward Cycle

[1] European Commission, Directorate-General for Research and Innovation, Working Group on Rewards under Open Science (July – 2017) Evaluation of Research Careers fully acknowledging Open Science Practices Rewards, incentives and/or recognition for researchers practicing Open Science, available at https://ec.europa.eu/research/openscience/pdf/os_rewards_wgre-port_final.pdf

3 State of the art of current researchers' gamification frameworks

This section presents the results of (i) a mapping exercise conducted among EPICUR alliance members about the ways of recognition, rewarding and motivation of their (early career) researchers, and (ii) a desk research of current gamification frameworks.

3.1 EPICUR Mapping exercise about the ways of recognition, rewarding and motivation of their (early career) researchers

3.1.1 Introduction and methodology

Between September 2021 and February 2022, EPICUR Research carried out a concise mapping exercise amongst the EPICUR member universities for purposes of gaining insight into the current state-of-play of existing institutional practices of recognition and reward of researchers. To this end, requests were sent out by email to all alliance partners and several announcements were made during plenary meetings. Partners were requested to provide current institutional examples of mechanisms to issue rewards and incentives and submit these in written form, including available documentation and weblinks.
The majority of partners responded to this request and the initial findings were discussed during two working sessions of the Work Package 2 Research Working Group on 2 November and 6 December 2021. The paragraphs below include an overview of institutional examples, which helped inform the development of the EPIGame framework.

3.1.2 Aristotle University of Thessaloniki (AUTh)

3.1.2.1 Mission

The Aristotle University of Thessaloniki Excellence Awards Committee (EAC) has the task of highlighting in an organized and systematic way the outstanding actions in the field of research and innovation, as well as to promote the good practices and excellent performance of the members of the university community (academics, students, staff). The highlighting and promotion of these actions and good practices, which constitute an ethical recognition to the members of the university who perform this important work, takes place in a special annual Award Ceremony of Excellence.
The EAC defined areas of excellence and established awards, which cover the work produced at the Aristotle University of Thessaloniki by the teaching and research staff, students and administrative personnel. In order to carry out its work, EAC gathers candidacies from all members of the university while at the same time, utilizes the resources already available at the AUTh from ELKE (Special Research Account), the Library, the Information Technology Centre, etc.

3.1.2.2 Awards for Researchers

The following Awards of Excellence are usually given to researchers based at AUTh:

1. Award of Excellence in the recognition of research work
    a) in Sciences,
    b) in Health Sciences,
    c) in Physical Education and Sport Sciences, and
    d) in Humanities and Social Sciences
2. Award of Excellence in Arts
3. Award of Excellence in innovation and exploitation of research
4. Award of Excellence in attracting research programs

3.1.3 Adam Mickiewicz University, Poznań

3.1.3.1 Rector's awards:

Every year, the Rector awards academics at AMU for their outstanding organizational, research and teaching achievements that have resulted in a significant improvement in the conditions of research and teaching at the level of the university or its organizational units. The Rector annually award either individual or team achievements which includes a single discretionary bonus of which the amount is determined by multiplying the minimum basic salary of a full professor.
For individual awards: 1st degree award = 300% of such a salary; 2nd degree award = 200%; 3rd degree award = 100%.
For team awards: 1st degree award = up to 600%; 2nd degree award = up to 400%; 3rd degree award = 200%.
The deans submit applications for individual and team awards which should include the description of the achievement

3.1.3.2 National Initiative of Excellence - Research University:

A project granted by the Ministry of Higher Education to top universities in Poland. As part of the project, researchers may apply, for instance, for an extra bonus for publishing in top journals (as indicated by Scopus percentile). They can receive no more than 5 such awards per year, apply for conference funding schemes or for covering open access publications fees.

3.1.3.3 Incentive allowance:

This incentive is granted once year and includes a single discretionary bonus decided by Faculty Deans depending on employment type (e.g., an employee with a teaching position receives the allowance based on their teaching achievements; an employee with a research position receives the allowance based on their research achievements).

3.1.4 University of Freiburg (Uni-Freiburg)

Appointment bonuses over and above the basic W-level Professorships salary as per Section 38 of the State Employee Salaries Act may be granted for a limited or unlimited period. In the case of bonuses granted or announced for a limited period, a decision on whether to continue granting the bonus or begin granting the bonus should be made in good time following a corresponding evaluation. The rules of procedure governing this matter may also be found in the Guidelines for Procedure Governing Appointments to Professorships published by the Rectorate[2].

3.1.5 University of Amsterdam (UvA)

Universities in the Netherlands are actively discussing concrete ideas for making academics' careers more attractive and recognising and rewarding various achievements in five key areas: Education, Research, Social impact (valorisation), Leadership and Teamwork. At the UvA a committee headed by Rens Vliegenthart is investigating possibilities for improvement in the area of Recognition and Rewards[3]. The following is a selection of incentives and awards implemented at the UvA.

3.1.5.1 Lecturer of the Year:

since 2007 the UvA organises a 'Lecturer of the Year' election. This institution-wide 2-step election process is coordinated by the Teaching & Learning Centres in close collaboration with the ASVA Student Union, and the Central Student Council. Students are invited to cast their votes within their faculties, after which one of the seven faculty winners is elected UvA Lecturer of the Year by a judging panel. The award consists of a teaching slot for developing a new interdisciplinary course, with the support of the UvA Institute for Interdisciplinary Studies[4].

[2] https://intranet.uni-freiburg.de/public/downloads/saz/berufungsleitfaden-en.pdf?searchterm=

[3] https://www.uva.nl/en/about-the-uva/policy-and-regulations/policy/recognition-and-rewards/recognition-and-rewards.html

[4] https://www.uva.nl/en/education/quality-of-education/lecturer-of-the-year/lecturer-of-the-year.html

3.1.5.2 3MT© Competition for PhD students

The Three Minute Thesis competition or 3MT, is an annual competition held at over 900 universities across more than 85 countries worldwide. The Law Hub at the UvA was the initiator of the first ever UvA 3MT competition, supported by the Amsterdam University Fund and Innovation Exchange Amsterdam. Participants are challenged to present their PhD research in just three minutes to a non-specialist audience through a video recording. The 3MT is also a video competition: presentations are recorded on video and can be shared with others, even after the competition. All finalist videos will be showcased during the Grand Finale. Incentives and awards include:

- The opportunity to receive a video made with a professional videographer about your research;
- The opportunity to receive personal coaching and group pitch training to present your research;
- Prize funds worth of 1000 EUR and 500 EUR for the UvA top 3 PhD videos;
- Recognition and visibility of your research among academic and non-academic audiences[5].

3.1.5.3 Amsterdam Science & Innovation Awards (Innovation & Impact awards)

Innovation Award: is open to (teams of) researchers, staff and students from all Amsterdam universities and universities of applied sciences. It's an inclusive competition open to ideas from all research disciplines. The Jury will award a winner in each of the following categories Society, Health and Environment & Climate who will be awarded a prize of € 10.000, -. Payment of the prize money is preferably done to a department or research group. Or it can be wired to the spin off, start-up BV or Foundation, which will develop the idea. In case the winner is a person not affiliated with any of the above-mentioned entities the prize will be paid to the persons bank account.

Impact Award: This achievement award, is annually awarded to distinguished researchers or research groups who made meaningful contributions to society with their research and innovations. The award celebrates and acknowledges the importance of creating impact outside universities and in society. The Impact Award is an initiative of IXA (Innovation Exchange Amsterdam) that identifies and nominates researchers for the Impact Award with help of its extensive network in the universities[6].

3.1.6 Main finding and conclusions EPICUR Mapping Exercise

The main conclusions of the EPICUR mapping exercises on rewards and incentives are twofold:

- The submitted materials by partners and available information reveal that there are currently significant differences between institutional practices of rewards and recognition of academic achievements. While some EPICUR universities are in the process of developing institution-wide policies for recognition & reward and others run a wide range of university-wide reward schemes, some others did not implement any institutional schemes to date;
- The existing reward schemes submitted by partners reveal that most schemes reward academic achievements ('excellence') by offering forms or professional recognition often combined with monetary support (cash prizes and/or travel rewards). Also, the vast majority of rewards recognise academic performance in research, while fewer existing schemes rewarding achievements in innovation or societal impact were found.

An additional finding is that there seems to be room to develop more instruments specifically geared towards rewarding and motivating early career researchers, in particular in the period after receiving the PhD degree up to securing a permanent position. There seem to be manifold schemes in place to reward academic performance of senior researchers. Furthermore, over the past decade interesting new schemes to recognise and reward PhD research were initiated and rolled out across universities worldwide, such as the 3 MT© competition. However, similar instruments for Early Career Researchers from the post-doctoral phase onwards seem to be relatively scarce.

[5] https://grant-support.uva.nl/content/news/2021/04/uva-3mt.html

[6] https://www.amsia.nl/

The results of the EPICUR mapping exercise therefore underpin the need to provide the alliance partners with concrete instruments to deploy the core principles laid out in the EPICUR Model Framework for Researcher Assessment, especially in the areas of innovation and societal engagement. Over and above that, experimenting with the deployment of new instruments, provide an excellent opportunity to include more instruments catering for the needs of Early Career Researchers.

3.2 Desk research of current gamification frameworks

3.2.1 Introduction and methodology

Following the concise mapping exercise on institutional practices for rewards and incentives for researchers within the EPCIR-alliance, EPICUR decided to complement this analysis with desk research on existing rewards and recognition systems from beyond the alliance for purposes of contextualising the results of the findings from the internal mapping.

The specific purpose of this desk research is to identify and list reward systems and prizes for ECRs in the public domain and outside the EPICUR alliance and to analyse whether the types of practices are similar to or different from those identified in EPICUR partners' institutional contexts. The desk research is focused on existing information based on valid and credible sources with qualitative sound data. The external sources of research consist of:

- Published papers
- Online information posted by Higher Education Institutions (HEIs)
- Online information posted by established organizations and unions
- Public contests
- Government data
- Press releases

3.2.2 Results

The two tables below (Table 11 and Table 2) distinguishes rewards and incentives from universities and organizations based on analytical information of this desk research. The overview does not provide a comprehensive list of all existing schemes but serves to give an indication of the variety of existing types of rewards and incentives for early career researchers.

Table 1: ECR Rewards and incentives from Universities

Institution	Description	Types of incentives/rewards
Essex University (UK)[7]	The Celebrating Excellence in Research and Impact Awards include an award for the Best Research Impact by an Early Career Researcher and Outstanding Early Career Researchers in the faculties of: • Humanities • Science and Health • Social Sciences Award winners will be invited to give a short presentation at the celebration event. They will also receive an inscribed award and their research will be highlighted in internal and external communications, and in submissions for national awards.	Medal/inscribed award Invitation to give a short presentation Visibility
HHU Dusseldorf (Germany)[8]	Third-Party Funding Bonus for Young Researchers: The programme is intended as an incentive for young researchers to apply for third-party funding. It is	Prize money

[7] https://www.essex.ac.uk/research/celebrating-our-researchers/2021

[8] https://www.forschung.hhu.de/en/research-funding-and-services/advice-on-proposals/the-strategic-research-fund/third-party-funding-bonus-for-young-researchers

Institution	Description	Types of incentives/rewards
	financed by the Strategic Research Fund (SFF) and applies to the non-medical faculties of HHU Dusseldorf. For each successfully acquired third-party-funded project of at least 100,000 € (single project, not cumulative), young scientists from non-medical faculties of HHU will receive a bonus of 5,000 € as freely available budget. Young scientists are defined as scientists who have obtained their PhD not more than 6 years ago and who have not yet held a W1 professorship with tenure, a W2 or W3 professorship.	
Ulm University, Medical Faculty (Germany)[9]	Support First-Time Research Grants/Junior Research Groups: In order to encourage young scientists (within 8 years after conferral of doctorate) to apply for their first research grant from the DFG (German Research Foundation), the Medical Faculty has decided to give the young scientist access to two thirds of the overheads. With this money the scientist can improve the infrastructure of his/her research group. In general, overheads are meant to cover necessary infrastructure like basic laboratory equipment, the renting of laboratory space, maintenance costs, software licenses, general administrative costs and other expenses that have an indirect relation to the research project. The overhead payments of the DFG (22% of the direct costs) are shared between the Medical Faculty (two thirds) and the department of the scientist attracting the grant (one third). Under this program, the share of the department is increased to two thirds and we ensure that the scientist has access to this money personally.	Funding to cover necessary infrastructure
University of Limerick (Ireland)[10]	This award rewards individuals in the early stages of their research career, defined as those who have held a post that includes responsibility for developing their own research agenda. Starter: applicants have between 2-7 years of experience since completion of their PhD as of the closing date for applications. Prize: President's Research Excellence and Impact medal and €5,000 research.	Medal/inscribed award Funding to cover research support costs
University of Manchester (UK)[11]	The Dean's Prize offers three years funding consisting of a start-up fund of £10,000 to cover research support costs and access to key technology platforms.	Funding to cover research support costs and access to key technology platforms

[9] https://www.uni-ulm.de/en/einrichtungen/resul/funding/early-career/incentives-program-for-dfg-grants-and-junior-groups-medicine/

[10] https://www.ul.ie/research/research-impact/president%E2%80%99s-research-excellence-and-impact-awards

[11] https://www.bmh.manchester.ac.uk/research/support/fellowships/deans-prize-awards/early-career/

Institution	Description	Types of incentives/rewards
University of Northampton (UK)[12] [13]	This Early Career Research Diamond Award is focused on excellence in research for researchers and/or Doctorate students with up to 5 years of post-Doctorate experience. Excellence is demonstrated through contributions to one's field of study, an ability to provide a stimulating and challenging research environment that incorporates students and teaching, and an ability to communicate research results effectively to relevant audiences.	Medal/inscribed award
University of Sheffield (UK)[14]	The remit of this prize is to reward excellence as an early career researcher in any of the four categories: Research, Teaching, Leadership and Wider Participation. Up to four £500 prizes will be awarded for excellence in any of the four categories below. Applicants should not be constrained by the examples listed nor will they be required to excel in all four categories.	Prize money
University of Wolverhampton (UK)[15]	There are two elements to the scheme: An individual research project that will yield outputs in terms of publications, further research and/or development of funding opportunities. A support programme to develop and enhance wider research-related skills through workshops, action learning, mentoring and progress reports. The competitors can apply for a budget of up to £5000 to support the completion of your project.	Support programme to develop and enhance wider research-related skills

Table 2: ECR Rewards and incentives from Organizations/Unions

Organisation	Description	Types of incentives/rewards
ACM – Association for Computing Machinery[16]	The ACM India Early Career Researcher (ECR) Award recognizes individuals in early stages of their careers, who have made fundamental, innovative, and impactful contributions to the computing field while primarily working in India. Prize approximately USD $20,000	Prize money
Biochemical Society[17]	These Biochemical Society awards recognize the impact of research carried out in the molecular biosciences by early career scientists, those who have no more than six years postdoctoral research experience. Each awardee is given:	Prize money Medal/inscribed award Invitation to give a short presentation Invitation to submit an article to a (prestigious) publication

[12] https://pure.northampton.ac.uk/en/prizes/early-career-research-diamond-award

[13] https://pure.northampton.ac.uk/ws/portalfiles/portal/4612129/52630324_2222708194651881_8872838860812320768_o.jpg

[14] https://sites.google.com/a/sheffield.ac.uk/mdhrsa/home/ecr-prize

[15] https://www.wlv.ac.uk/research/the-doctoral-college/early-researcher-award-scheme-eras/

[16] https://india.acm.org/awards/early-career-researcher-award

[17] https://www.biochemistry.org/grants-and-awards/awards/early-career-research-awards/

Organisation	Description	Types of incentives/rewards
	the opportunity to present a lecture at a Society conference £1000 prize money A medal the invitation to submit an article to a Society-owned publication	
The British Academy[18, 19, 20]	Newton International Fellowship: This scheme is aimed at researchers within seven years of the award of their doctorate and aims to attract the most promising early career researchers from overseas to work for two years at a UK institution with the aim of fostering long-term international collaborations Postdoctoral Fellowships: Scheme which offers a major career development opportunity for researchers who are within three years of the award of their doctorate and have not yet been appointed to a permanent academic post. The scheme is fully-funded for three years with the aim of improving researchers' chances of obtaining a permanent post by the end of the award The awards are very flexible, offering financial support for a wide range of travel and research expenses up to £10,000 towards a specific research project that can be carried out over anything from 1-24 months	Funding to cover research support costs Travel reimbursement
BERA - British Educational Research Association[21]	BERA is seeking applications for two awards, each worth £2,500, from early career researchers in education. The awards will assist those at a relatively early stage of their academic careers, who may not hold a full-time permanent academic post, to continue their research activity in their particular field of interest.	Funding to cover research support costs Specific career development opportunity
BSP - British Society for Parasitology - Cambridge University[22, 23]	Early Career Researcher award, and will be giving an annual prize of £1000 for the best paper by an early career researcher published in an issue of Parasitology during the previous year. Eligible ECRs with less than 7 years PhD.	Prize money
Elsevier[24]	The Scopus Early Career Researcher (ECR) Award recognizes six bright early career researchers across six different subject areas: Arts and Humanities; Biochemistry, Genetics and Molecular Biology,	Prize money

[18] https://www.thebritishacademy.ac.uk/funding/early-career-researchers/

[19] https://www.thebritishacademy.ac.uk/funding/postdoctoral-fellowships/

[20] https://www.thebritishacademy.ac.uk/funding/newton-international-fellowships/

[21] https://www.bera.ac.uk/award/the-review-of-education-early-career-researchers-award-2021

[22] https://bsp.uk.net/2020/12/17/parasitology-2021-ecr-prize-call-for-papers-published-in-2020/

[23] https://www.cambridge.org/core/journals/parasitology/early-career-researcher-awards

[24] https://www.elsevier.com/awards/early-career-researcher-uk-awards/scopus

Organisation	Description	Types of incentives/rewards
	Environmental Science, Medicine, Physical Sciences and Social Sciences. Each winner will receive a grant of £1,500.	
EFSA – European Food Safety Authority[25, 26]	Provide funding for early-career researchers from any discipline who are ready to develop their research identity. By the end of the award, they will be ready to lead their own independent research programme.	Funding to cover research support costs Specific career development opportunity Opportunity to lead own research programme
ESERA - European Science Education Research Association[27]	ESERA is offering travel awards of up to 1.000 euros each to enable ESERA members who are currently enrolled in doctoral studies or who were awarded their doctorate after 1st January 2019 to travel to research venues. For 2022 the total award fund is 10.000 euros.	Travel reimbursement
EuroScience[28]	The European Young Researchers' Award (EYRA), granted by EuroScience since 2010, aims to inspire early-stage researchers in all research areas to incorporate a European dimension and perspective into their research. Two awards are granted every two years to: a) a PhD candidate and b) a postdoctoral fellow. The Award consists of a certificate, waiving the participation fee to ESOF, a grant to cover travel and accommodation for the stay in the ESOF city and one year free EuroScience membership.	Prize money Travel reimbursement Medal/inscribed award Free access to conference Free membership to journal
KNAW- Royal Netherlands Academy of Arts and Sciences (The Netherlands)[29]	Each year, the KNAW awards a maximum of twelve Early Career Awards spread across four domains, including Natural and Engineering Sciences. Winners receive a monetary prize of 15,000 Euros and a work of art. The awards ceremony will take place in early 2020 at a festive event organised by the KNAW.	Prize money Visibility in internal and external communications Medal/inscribed award
UAI - Union Académique Internationale[30]	UAI established two prizes of 6,000 Euros each for a period of two years (2020-2021) for researchers in the humanities and social sciences in the early stage of their career. In 2021, candidates will hold a PhD in linguistics, philology, sociology, law or political science.	Prize money

[25] https://www.efsa.europa.eu/en/funding-calls/early-career-awards

[26] https://wellcome.org/grant-funding/schemes/early-career-awards

[27] https://www.esera.org/phd-research/travel-fellowship

[28] https://www.euroscience.org/news/10th-call-european-young-researchers-award-open/

[29] https://www.uu.nl/en/news/utrecht-researchers-win-first-knaw-early-career-awards

[30] http://www.uai-iua.org/en/uai/awards

Organisation	Description	Types of incentives/rewards
U21 – Universitas 21[31] [32]	Graduate Collaborative Research Awards: These annual awards enable doctoral candidates to develop and implement international research collaborations within the U21 network. Projects can be in any discipline or cross-disciplinary and should aid the development of transferable skills for doctoral candidates, allowing them to work independently, as well as in teams, on activities that benefit their doctoral research. Prospective applicants are invited to apply for up to US$5000 per project. Funding to be transferred to the lead institution's Graduate School. U21 Three Minute Thesis Competition: First developed by the University of Queensland in 2008, the Three Minute Thesis competition (3MT®) challenges research students to communicate the significance of their projects to a non-specialist audience in just three minutes. The U21 3MT pits leading presenters from U21 member universities against one another. Each participating member will hold their own internal 3MT competition to select a local winner who will then be put forward for the U21 final, to be judged by an international panel consisting of industry and academic professionals. Prizes: 1st Prize US$2,500 Highly Commended US$500 People's Choice Prize US$1000	Prize money Medal/inscribed award Visibility in internal and external communications

3.2.3 Main finding and conclusions

The desk research revealed that the rewards for ECRs mainly consist of ceremonial awards or medal and monetary support, namely cash prizes. In addition, there are monetary support rewards that aim to support the development of the researcher's identity, support research infrastructure and rewards that cover expenses for travels and hotel expenses.

Nevertheless, no data or evidence emerged from ECRs regarding their opinion/propositions about reward systems or ways of recognition, and the fitness of such schemes for their specific needs in the context of career development. Also, it was hard to find any feedback from researchers and award recipients about the existing rewards and prizes. The latter is understandable, as the researchers are amongst the target group of future editions of these schemes and are therefore less likely to offer (critical) feedback in a public context.

Based on the desk research the following types of rewards and incentives can be distinguished:

1. Prize money
2. Funding to cover research support costs and access to key technology platforms
3. Funding to cover necessary infrastructure like basic laboratory equipment, the renting of laboratory space, maintenance costs, software licenses, general administrative costs and other expenses that have an indirect relation to the research project.
4. Medal/inscribed award

[31] https://universitas21.com/get-involved/researcher-opportunities/funding-awards

[32] https://universitas21.com/get-involved/three-minute-thesis-competition

5. Support programme to develop and enhance wider research-related skills through workshops, action learning, mentoring and progress reports
6. Invitation to give a short presentation/lecture at the celebration event
7. Visibility in internal and external communications, and in submissions for national awards
8. Opportunity lead own independent research programme.
9. Travel and hotel expenses reimbursement
10. Invitation to submit an article to a (prestigious) publication
11. Specific career development opportunity
12. Free membership to journal
13. Free access to conference

Interestingly, the analysis of the desk research overlaps with the main findings of the EPICUR internal mapping exercise on a key issue: the majority of award schemes featured in the research primarily reward academic achievements ('excellence') by offering monetary support (cash prizes and/or travel rewards) often combined with professional recognition (award ceremonies, medals, certificates etc.).
In addition, the finding from the internal mapping that there seems to be a 'gap' between the availability of rewards for senior researchers and the PhD candidates was confirmed. The analysis of instruments beyond the alliances also reveals a scarcity of rewards for the group or researchers who already completed a PhD but have not yet secured permanent positions.
Finally, similar to the institutional context, the majority of external schemes focus on awarding academic performance in research, as only few schemes awarding innovation and societal engagement were found.
In sum, the findings from both the internal mapping of rewards and incentives and the desk research on external reward instruments reveal that there is clearly merit for EPICUR Research to develop instruments targeting the group of Early Career Researchers with a view to providing incentives and motivation in all four key areas of the EPICUR Researcher Assessment Framework: Teaching & Learning, Research, Innovation and Societal Engagement. Building on the experiences gained in EPICUR's Erasmus+ project, a gamification approach could be a very effective way of developing tools to fill this gap and experiment with schemes catering for the needs of Early Career Researchers.
The most suitable gamification framework is summarised in Figure 2 and presented by the EC Working Group on Rewards under Open Science[33]. The proposed rewards are:

- Science Communication ("giving attention" is the most basic and cost-free type of reward, e.g., on university's website, in promotional events, etc.)
- Project proposal assessment
- PhD thesis examination
- Recruitment
- Promotion
- Funding allocation systems (e.g., REF, criteria in allocation models…)
- Research Evaluation Exercises (e.g., site visits for quality assurance)
- Research prizes

4 Introduction to gamification

4.1 Theoretical background

Games are designed in a way to provoke immersion and engagement in the player. That is the reason why a new concept named gamification was created. Gamification is the use of game elements in a non-game context in order to motivate and engage users (Deterding et al., 2011). This method has been implemented in education too. According to some literature reviews (Lister, 2015; Majuri et al., 2018; Manzano-León et al.,

[33] European Commission, Directorate-General for Research and Innovation, Working Group on Rewards under Open Science (July – 2017) Evaluation of Research Careers fully acknowledging Open Science Practices Rewards, incentives and/or recognition for researchers practicing Open Science, available at https://ec.europa.eu/research/openscience/pdf/os_rewards_wgre-port_final.pdf

2021; Zainuddin et al., 2020), most of the studies conclude that gamification affects motivation and engagement in a positive way. Both tutors and learners seem to be more active in courses (Mohammed & Ozdamli, 2021). The most common game elements employed are points, badges, leaderboards, and levels. These elements are categorized as achievement and progression-oriented elements. Only one of these game elements is not enough to motivate every user, so an environment with multiple game elements is suggested. However, to be more certain of the effectiveness of gamification, it is necessary in future research to consider more factors such as the individuality of each person, the effect of each element, etc.
In particular, surveys about implementation in universities show that learners are more active in courses and succeed to obtain knowledge. Thanks to gamification, they feel recognition of their efforts and the feeling of achievement. Moreover, according to Yıldırım & Şen (2019) the academic performance seems to be enhanced either to technological-based or non-technological-based courses.
Based on Werbach & Hunter (2012), who described the relationships between an organization and three gamification processes, the relationships between university and gamification categories are described and shown in *Figure 3*. The three gamification categories are internal, external and behavior-changer gamification:

- Internal gamification: University's rise of international recognition means supporting communication and collaboration between professors and covering the needs for accomplishing research.
- External gamification: Communication between students and professors. Professors support students' learning in order to motivate them to obtain and create new knowledge. They gamify their courses.
- Behavior-changer gamification: Education becomes an enjoyable way of better learning and teaching.

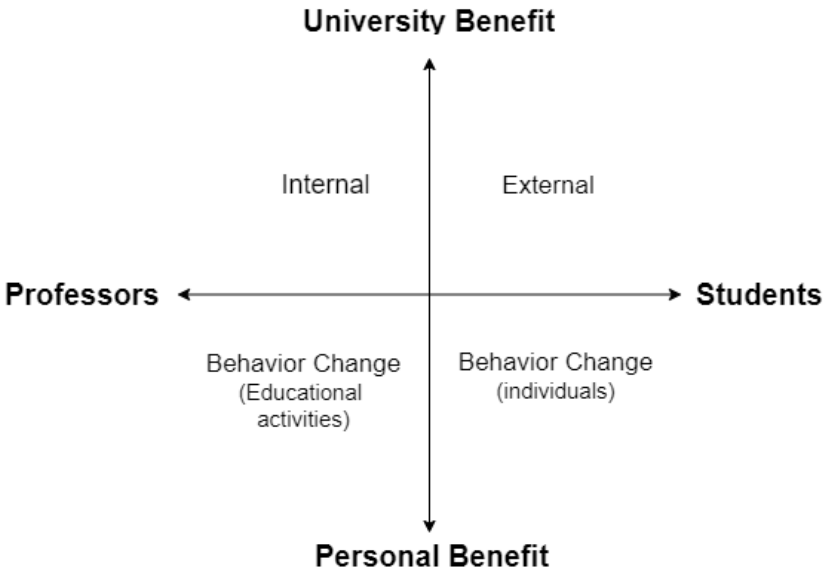


Figure 3 Relationships between university and gamification processes

It is important to create a well-designed gamification environment, considering the evoked emotions (e.g., success, failure) of the user in order to successfully motivate users. There is the need of carefully selecting the appropriate mechanics by taking into consideration the target group that they addressed, and the relevance for the users. A gamification environment aims to make user feels autonomous but also to be a guiding tool.
A properly designed gamification framework should rely on well-stablished theoretical models. Zainuddin et al. (2020) in their literature review state that in learning, most of the studies adopt the self-determination theory (SDT). In particular, 14 out of 29 studies that mention implicitly that they base their framework on a theoretical model utilise the SDT. Using the self-determination theory as a theoretical background, we can establish a relation between the system's gamification, the user's motivation and the learning outcomes.

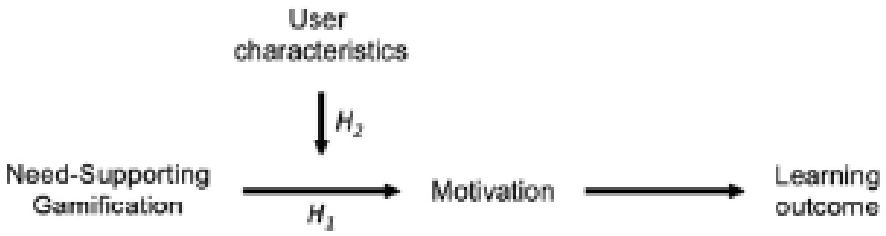


Figure 4 Theoretical model based on SDT (Roy & Zaman, 2018)

SDT's main idea is that a person's motivation should be evaluated by its quality apart from its quantity. In SDT there is an important distinction between autonomous and controlled motivation (Deci & Ryan, 2008). Autonomous motivation consists of intrinsic and extrinsic motivation. For an intrinsic motivated person, the activity resonates within the person resulting in integrating it into their sense of self. Extrinsic motivation is closely related to the feelings of satisfaction when performing an activity and identified regulations with the values and similar outcomes to intrinsic motivation. Autonomous motivation leads to greater psychological health and results of better quality that last longer.

Controlled motivation describes two other types of extrinsic motivation which are the interojected and external regulations. Both types are regulations that either failed to be internalised or were partially internalised and still not considered to be a part of the person's self respectively. People with controlled motivation will not perform an activity because this will result into self-gratification, but with the anticipation of the outcome or the external reward in mind. Usually, people driven by controlled motivation are more prone to quit an activity when the external reward is removed (Roy & Zaman, 2018). However, both autonomous and controlled motivation, make the person be active in contrast to amotivation, which is the state of the person having no intention and no motivation.

In order for someone to internalise a regulation or to have intrinsic motivation, a set of needs should be satisfied at a certain degree. Deci & Ryan (2008) state that the needs for competence, autonomy and relatedness usually predict psychological well-being. All these needs can be easily linked to certain game design elements as described by Zainuddin et al. (2020) (*Figure 5*). Consequently, some gamification elements related to these needs may result in an effective gamification framework with the ability to be internalised by the users, leading them to have the best possible outcomes as they will be drive by autonomous motivation.

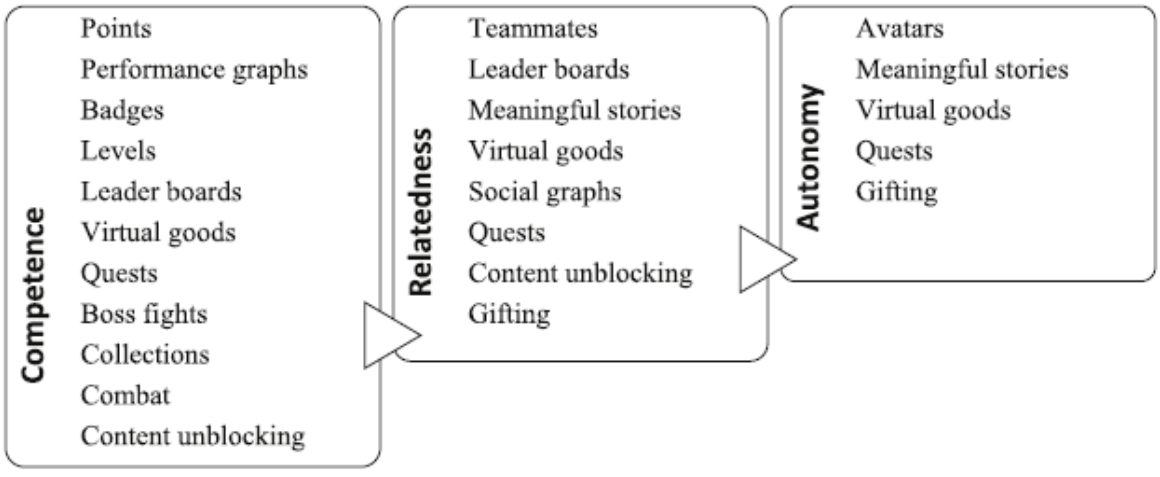


Figure 5 Psychological need of SDT related to game design elements (Zainuddin et al., 2020)

The Flow theory (Nakamura & Csikszentmihalyi, 2014) and the goal – setting theory are also used in a lesser degree as theoretical models used as basis for a gamification framework. Being "in flow" is the state where someone acts with certain characteristics, like focused concentration, loss of self-consciousness and the feeling that the activity is intrinsically rewarding among others. While "in flow", the person achieves peak

performance leading to effective learning and great, long-lasting outcomes. The goal – setting theory, being used with the same frequency is founded on the hypothesis that a difficult goal will result in be highly motivated users.

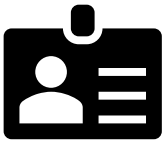
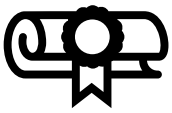
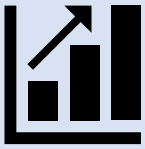
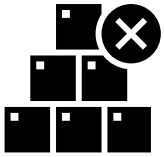
4.2 Useful gamification mechanics for EPICUR Research

This section is presenting useful gamification mechanics and game design elements described in the literature (Zainuddin, Chu, Shujahat, Perera, 2020) or elsewhere[34], which could be considered for the EPICUR gamification framework.

Table 3: Useful Gamification Mechanics for EPICUR Research

No	Sample Representation	Type	Meaning	SDT need
1		Loss Aversion	Loss of something (status, points, progress)	Competence
2		Gain enjoyment	Enjoyment of gaining something (status, points, progress)	Competence
3		Progress	Measurement of the progress towards the achievement of a goal	Competence
4		Random Reward	Give unexpected rewards to people	Competence
5		Fixed rewards	Give rewards to people based on defined actions, milestones and events. These rewards could be time depended as well.	Competence
7		Social status	Greater visibility for people/entities, creating opportunities to create new relationships. It can be supported by leader boards/certificates	Relatedness

[34] https://www.gamified.uk/user-types/gamification-mechanics-elements/

No	Sample Representation	Type	Meaning	SDT need
8		Unlockable content	Free content accessible by everyone	Relatedness
9		Customization	Customization of the user experience	Autonomy
10		Challenges	Specific challenges for keeping people interested and helping them to test their knowledge.	Competence
11		Certificates / Micro credentials	Different from general rewards and trophies, certificates are a physical symbol of mastery and achievement. They carry meaning, status and are useful.	Competence
12		Badges for skills	Badges for learning new skills	Competence
13		Badges for achievements	Badges for achievements is a form of feedback.	Competence
15		Levels	Levels and goals help to map a user's progression through a system. It can be as important to see where you can go next as it is to see where you have been.	Competence
16		Collections	Let people collect things to remember their journey in EPICUR	Relatedness
17		Sharing knowledge	Create communities of students for supporting each other	Relatedness

No	Sample Representation	Type	Meaning	SDT need
18		Points/Score	Points and Experience Points (XP) are feedback mechanics. Can track progress, as well as be used as a way to unlock new things. Award based on achievement or desired behaviour.	Competence
19		Physical Rewards / Prizes	Physical rewards and prizes can promote lots of activity and when used well, can create engagement. Be careful of promoting quantity over quality.	Competence
20		Leader boards	Leader boards come in different flavours, most commonly relative or absolute. Commonly used to show people how they compare to others and so others can see them. Not for everyone.	Relatedness

5 Definition of incentives and rewards for researchers

5.1 Consultation with ECR Board

EPICUR acknowledges the importance of considering the needs and wishes of early career researchers within the alliance, in order to ensure the relevance and usefulness of the gamification framework. Therefore, the newly established EPICUR ECR board consisting of early career researchers representing their wider communities based at EPICUR member universities, has been actively involved in developing the framework, and was consulted during working sessions held on 6 December 2021 and 11 February 2022. The main approach of the framework was discussed in details and the ECR board supported the key principles of the proposed EPICUR gamification framework.

The ECR Board members agreed to start implementing an EPICUR pilot gamification model and supported the exploitation of relevant European tools, such as Europass, European CV and EU-funded mobility programmes and other related project (e.g., SciLink and ShapeID). The board members also encouraged the creation of EPICUR profiles for ECRs based on the Europass profile and developing gamification mechanics which would allow more exposure and visibility for the recognition and reward of researcher's output. Monetary support and visibility remain important, but are not always decisive to motivate and encourage ECRs. Other possibilities and incentives could be very attractive which will allow researchers to expand personal networks, to participate in research activities/workshops (e.g. EPICluster/Camps), to travel to colleagues based in other countries as part of a mobility scheme, and to develop a new course based own research.

Over and above that the ECRs expressed a strong wish to lower participation threshold for EPICUR research activities and to ensure that gamification would stimulate more collaboration and less competition among EPICUR researchers. The importance of creating more opportunities for EPICUR researchers to connect, interact and network was strongly emphasized by the ECR board members and the development of an online EPICUR community (EPICommunity) for ECRs was strongly supported to facilitate more mobility and collaboration in the field of research. The ECR board members preferred peer to peer-based assessments and rewards which could be implemented by each member of the EPICommunity, instead of competition-based judging panels.

5.2 Main findings

Based on the feedback and suggestions from the ECR board, it can be concluded that ECRs based in EPICUR member universities belief strongly in connecting researchers to allow better collaboration and networking. Incentives and rewards are essential as long they are relevant and attractive for young researchers.
In addition to current reward schemes focusing on monetary support and increasing the visibility of individual researchers and teachers, more EPICUR-wide schemes could be developed to reward ECRs working towards different pathways in an entrepreneurial and societal role. Possible incentives and rewards for EPICUR researchers should inspire and motivate ECRs to connect and collaborate more. The schemes should not only be competition-based, but also adopt assessment and reviews of ECRs by their own peers in an online environment which will be provided by a user-friendly and interactive EPICommunity. Individual profiles should be based on existing EU-formats to allow compatibility and convenience to participate in future EU-programmes and projects.
Possible rewards and incentive schemes for the EPICUR alliance could include (see Figure 5):
Free course for personal skill development (leading to microcredentials):

- SciLink Foundation (e.g. Open science course, skills courses for early career researchers)
- EU-funded ShapeID toolkit (e.g. the Pathway to develop a career in Inter- and Transdisciplinary research)

Mobility:

- EPIMove (internal EPICUR mobility, to be developed in EPICUR-Research)
- Bilateral mobility schemes between EPICUR member universities
- Erasmus+ schemes, including the new instruments for blended mobility
- Future inter-alliance mobility schemes

Visibility:

- Based on EPICommunity Gamification mechanics on entities like publications, project, profile, etc.

Networking:

- EPICluster (to be developed in EPICUR-Research)
- Fee waivers for participation in European and global conferences (EPICUR partners)

New research-based courses

- Receive free slots to develop new research-based courses

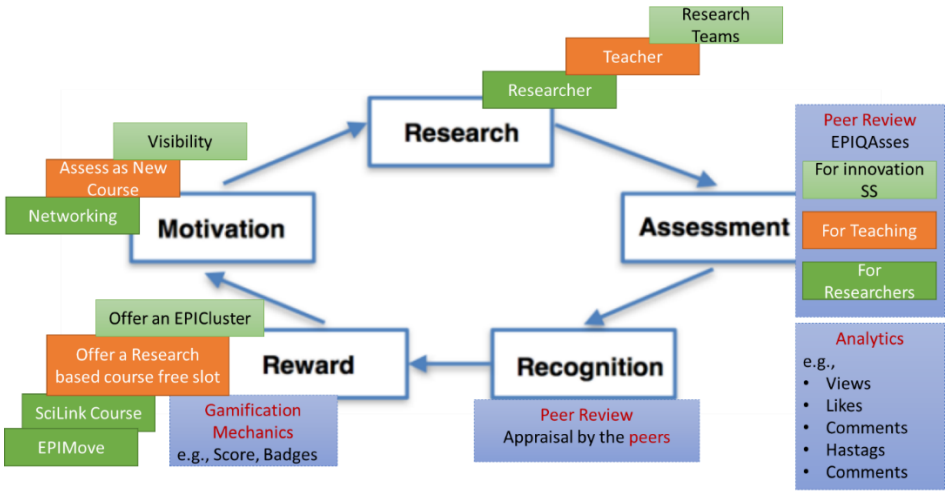


Figure 6: EPICUR Research Reward Cycle

6 EPIGame elaboration

6.1 Introduction

Based on the conceptual approaches from self-determination theory (SDT) and autonomous motivation theory, the exploitation of the gamification techniques and mechanics aims to support the ultimate goal which is to enhance the exposure of the Early Career Researchers and also to promote motivation and engagement in self-completion. Through gamification and analytics, ECRs will be able to monitor their own progress, identify their personal strengths and weaknesses, as well as acquiring the acknowledgement they desire.

The EPICommunity profile creation, can be done through two ways. The first way is for the user to manually fill in his/her information to the platform. The second option is to import his/her data from a Europass CV directly. This way is more convenient, less time consuming and you can update your profile only in one place. The EPICommunity model schemes is in line with the Europass data model. The following paragraph is presenting data for the description of an EPICommunity profile, concerning every aspect gamification as well as proposed analytics.

6.2 Entities

6.2.1 User

6.2.1.1 Data

- First name
- Last name
- Date of birth
- Gender
- Place of birth
- University Name
- University Faculty/Department
- Skills
  - Communication/Interpersonal
  - Organizational
  - Digital
  - Language
- Profile description/annotation (form of hashtags)
- Publications
- Projects
- Work experience[35]
- Courses[36]

6.2.1.2 Analytics

- Number of skills
- Number of publications
- Number of Projects
- Number of jobs
- Number of courses
- Number of assessments done by other ECRs

[35] Example: An instance in the work experience might contain and describe university functions as well. Every job instance has a description section, for the user to write down his/her responsibilities/tasks.

[36] It refers to the offered courses by the user. Please note that a course, might or might not be available for attending in the present.

- Number of my assessments
- Number of profile views
- Number of likes
- Number of comments
- Aggregation of annotations (hashtags)
- EPIQAssess Score[37]

6.2.2 Project

6.2.2.1 Data

- {in line with EUROPASS[38] data model}

6.2.2.2 Analytics

- Number of views
- Number of likes
- Number of comments
- Aggregation of annotations (hashtags)

6.2.3 Course

6.2.3.1 Data

- {in line with EUROPASS[39] data model}

6.2.3.2 Analytics

- Number of views
- Number of likes
- Number of comments
- Aggregation of annotations (hashtags)

6.2.4 Group

6.2.4.1 Data

- Group name
- Group description
- Group annotations
- Number of members
- Group type (closed/open)

6.2.4.2 Analytics

- Number of views
- Number of likes
- Number of comments
- Aggregation of annotations (hashtags)

6.2.5 Publication

6.2.5.1 Data

- {in line with EUROPASS[40] data model}

[37] The final scoring methodology will be documented in deliverable EPICommunity design (D2.5) based on the EPIQAssess criteria

[38] https://europa.eu/europass/en/europass-interoperability#2703

[39] https://europa.eu/europass/en/europass-interoperability#2703

[40] https://europa.eu/europass/en/europass-interoperability#2703

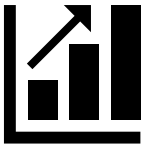
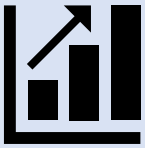
6.2.5.2 *Analytics*

- Number of views
- Number of likes
- Number of comments
- Aggregation of annotations (hashtags)

6.3 Proposed Gamification Mechanics

Table 4 presents a proposed list of gamification mechanics is proposed for EPIGame describing types of awards and incentives based on different measurable achievements as well as how they could satisfy the SDT basic psychological needs[41].

Table 4: Proposed Gamification Mechanics

No	Sample Representation	Type	Title	Description	SDT[42] needs
1		Progress	Users Profile Completion	Having filled out all the required profile entities (projects, publications, jobs, courses)	Autonomy
2		Levels	User Top Categories	The top categories in profile level based on annotations (hashtags)	Competence
3		Levels	Community Top Categories	The top categories based on annotations (hashtags) on community level	Competence
4		Score	User Profile Score	An aggregation of comments, likes and profile views	Competence

[41] Competence – The need to experience our behaviors as effectively enacted (to feel like we've done a good job) (Niemiec & Ryan, 2009).

Autonomy – The need to experience behavior as voluntary and "…reflectively self-endorsed" (Niemiec & Ryan, 2009) (to feel like we have control over what we do).

Relatedness – The need to "…interact, be connected to, and experience caring for others" (Baumeister & Leary, 1995) (to have meaningful relationships and interactions with other people).

[42] Competence – The need to experience our behaviors as effectively enacted (to feel like we've done a good job) (Niemiec & Ryan, 2009).

Autonomy – The need to experience behavior as voluntary and "…reflectively self-endorsed" (Niemiec & Ryan, 2009) (to feel like we have control over what we do).

Relatedness – The need to "…interact, be connected to, and experience caring for others" (Baumeister & Leary, 1995) (to have meaningful relationships and interactions with other people).

No	Sample Representation	Type	Title	Description	SDT[42] needs
5		Score	User Score in [Category]	An aggregation of comments and likes on a specific category	Competence
6		Score	User Impact in [Category]	A percentage that represents how a profile category score impacts the total category score in the community [=Category Score/population]	Competence
7		Badge for achievements	Opinion maker of the month [in Category]	The user with the higher impact in the [category] per [month]	Competence
8		Badge for achievements	Peer reviewer	A badge given to a user for a given number (tbd) of assessments done by him/her	Autonomy
9		Fixed reward	Profile caretaker	Update the profile once per month for at least 6 consecutive months	Autonomy
10		Badges for achievements	Most liked publication	A badge given to the users, who have a publication in the top 10% of the most liked publications	Relatedness
11		Badges for achievements	Most liked course	A badge given to the users, who have a course in the top 10% of the most liked courses	Relatedness
12		Badges for achievements	Most active group	A badge given to the group members for the most active group, when the aggregation of comments, likes and views is the higher in the EPICommunity	Relatedness
13		Badges for achievements	Most liked project	A badge given to the users, who have a project in the top 10% of the most liked projects	Relatedness

No	Sample Representation	Type	Title	Description	SDT[42] needs
14		Badges for achievements	Excellent researcher	EPIQAssess Score >85% of the total score in the research aspect	Competence
15		Badges for achievements	Excellent teacher	EPIQAssess Score >85% of the total score in the teacher aspect	Competence
16		Badges for achievements	Excellence in service role	EPIQAssess Score >85% of the total score in the society aspect	Competence
17		Badges for achievements	Excellent entrepreneur	EPIQAssess Score >85% of the total score in the innovation aspect	Competence
18		Progress	Reputation as Researcher in the Community	EPIQAssess Score based on peer assessment in the Researcher Role aspect	Relatedness
19		Progress	Reputation as Teacher in the Community	EPIQAssess Score based on peer assessment in the Teacher Role aspect	Relatedness
20		Progress	Reputation about Service Role in the Community	EPIQAssess Score based on peer assessment in the Service Role aspect	Relatedness
21		Progress	Reputation as Entrepreneur in the Community	EPIQAssess Score based on peer assessment in the Innovation Role aspect	Relatedness
22		Physical Rewards / Prizes	Nomination for EPICluster	Most active group	Competence

No	Sample Representation	Type	Title	Description	SDT[42] needs
23		Physical Rewards / Prizes	Nomination to offer a Research based course free slot	Most liked course	Competence
24		Physical Rewards / Prizes	Nomination for EPIMove	Most active user in a group	Competence
25		Physical Rewards / Prizes	Nomination for SciLink Course	User with the smaller EPIQAssess score	Relatedness

7 References

EPICUR-Research D2.1.1: EPIQAssess - EPICUR qualitative researchers' assessment framework (October 2021). A list of criteria for the qualitative assessment of the researchers and piloting of alternative reward systems at EPICUR partner universities.

Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. Educational Research Review, 30, 100326.

Sebastian Deterding, Dan Dixon, Rilla Khaled, and Lennart Nacke. 2011. From game design elements to gamefulness: defining "gamification". In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments (MindTrek '11). Association for Computing Machinery, New York, NY, USA, 9–15. DOI:https://doi.org/10.1145/2181037.2181040

Lister, Meaghan. (2015). Gamification: The effect on student motivation and performance at the post-secondary level. Issues and Trends in Educational Technology. 3. 10.2458/azu_itet_v3i2_Lister.

Manzano-León A, Camacho-Lazarraga P, Guerrero MA, Guerrero-Puerta L, Aguilar-Parra JM, Trigueros R, Alias A. Between Level Up and Game Over: A Systematic Literature Review of Gamification in Education. Sustainability. 2021; 13(4):2247. https://doi.org/10.3390/su13042247

Majuri, J., Koivisto, J., & Hamari, J. (2018). Gamification of education and learning: A review of empirical literature. In Proceedings of the 2nd international GamiFIN conference, GamiFIN 2018. CEUR-WS.

Yıldırım, İ., & Şen, S. (2019). The effects of gamification on students' academic achievement: A meta-analysis study. Interactive Learning Environments, 1-18.

Mohammed, Y. B., & Ozdamli, F. . (2021). Motivational Effects of Gamification Apps in Education: A Systematic Literature Review . BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 12(2), 122-138. https://doi.org/10.18662/brain/12.2/196

Werbach, K., & Hunter, D. (2012). For the Win: How Game Thinking Can Revolutionize Your Business.

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. Canadian psychology/Psychologie canadienne, 49(3), 182.

Van Roy, R., & Zaman, B. (2018). Need-supporting gamification in education: An assessment of motivational effects over time. Computers & Education, 127, 283-297.

Nakamura, J., & Csikszentmihalyi, M. (2014). The concept of flow. In Flow and the foundations of positive psychology (pp. 239-263). Springer, Dordrecht.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. Theory and Research in Education, 7, 133-144.

Baumeister, R.; Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. Psychological Bulletin. 117: 497–529. doi:10.1037/0033-2909.117.3.497. PMID 7777651.

8 Appendix 1: EPIQAssess Criteria for Researcher Role (Research)

No	Criteria	Description	PhD (R1)	Early Career (R2)	Mid-Career (R3)	Late Career R4)	Remarks
A. Core criteria							
A.1	**Carry out research**	Ability for critical analysis, evaluation and synthesis of new and complex ideas; to conducts research under supervision or independently to advances a research agenda and to take the lead in executing collaborative research projects. Development of a strategic vision on the future of the research field and contribute through original research by developing a substantial body of work, innovation or application.	1	2	3	2	Number indicates level of relevance (1: least relevant, 3 most relevant)
A.2	**Subject matter and expertise**	Understanding of a field of study and subject area and the ability to conceive, design, implement and adapt a substantial programme of research with integrity in the subject area using the appropriate research methodologies and approaches	1	2	3	3	
A.3	**Value team science**	Contribute and engage in collaborative, team-based reserach and share tasks and responsibilities equally among all team members and empower and support young researchers	2	2	3	3	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016926

A.4	**Supervision of research and mentorship**	Supervise less experienced students and researchers to conduct research and finalize their study programme and successfully implement their research project. Mentor and help Early Stage Researchers, to become more effective and successful in their research career. Shares external networks with less experienced researchers/students.	1	1	3	2	
A.5	**Open Science skills**	Skills and expertise support to apply open science research routines and practices, and Skills and expertise necessary for open access publishing	1	1	2	3	
A.6	**Scientific publications and impact**	The level of contribution to scientific papers, journals, reviews, editorials, as co- and/or lead author, and to the initiation and organization of workshop or conference sessions. The level of contribution (breakthroughs) to own research field or spanning multiple areas	1	2	3	2	
B. Specific criteria							
B.1	**Inter- and transdisciplinary research**	Participation and contribution in inter & transdisciplinary research and/or research review involving two or more disciplines and/or and non-academic/business partners and actors in applying and integrating research approaches from other disciplines	1	1	2	3	
B.2	**Academic collaboration**	Makes a positive contribution to the development of knowledge, research and development through (international) co-operations and collaborations	1	2	3	3	
B.3	**Acquisition of funding**	Identifies and secure research funding / budgets / resources from research funding bodies, government or industry in partnership with research consortia members	1	1	3	2	
B.4	**Research-based teaching**	Influence and impact on the learning outcomes and experiences of student through teaching based on research content and results.	1	1	3	2	

B.5	**International portfolio**	Create and participate in international engagement in research exchange, mobility and collaboration with international counterparts	1	1	3	3	
B.6	**Digital skills**	Ability to use specialized digital tools and programmes for conducting and sharing research, and building digital resilience and protect from cyber threats	1	2	3	2	

C. Personal qualities							
C.1	**Academic leadership and management**	Ability to manage a research team independently and linfluence and support others to innovate and improve their practice in the area of research. H and help create the institutional conditions and policies to improve the research culture and working environment	1	1	2	3	
C.2	**Professional role model for others**	Prioritise professional and career development in the role of supervisor or research manager for less experienced researchers/PhD-students and pay more attention to qualitative assessment criteria	1	1	2	3	
C.3	**Intercultural awareness and competences**	Show behaviour and communication that are both effective and appropriate in intercultural interactions with(international) students, peers and wider society by improving awareness through cross-cultural competence assessment and training	1	2	3	2	
C.4	**Communication**	Effective communication with peers and the academic community and wider society to explain the outcome and value of teaching and research results. Knowledge of language(s) required for research, including technical language	1	2	3	3	
C.4	**Professional development**	Ability to manage own career progression, set realistic and achievable career goals, develops ways to improve employability, and acts as mentor for others.	1	2	3	1	

D. Emerging criteria

D.1	**Please add if necessary**	Please add if necessary					

9 Appendix 2: EPIQAssess Criteria for Teacher Role (Teaching and Learning)

No	*Criteria*	*Description*	*PhD (R1)*	*Early Career (R2)*	*Mid-Career (R3)*	*Late Career R4)*	*Remarks*
A. Core criteria							
A.1	**Research-based teaching**	Understanding of a field of study and subject area and the ability to influence and impact on the learning outcomes and experiences of student through teaching based on research content and results.	1	1	3	2	Number indicates level of relevance (1: least relevant, 3 most relevant)
A.2	**Curriculum revisions/ educational design**	Contribution to new and innovative educational design and development of the curriculum and to learning activities and resources as a part of the curriculum.	1	1	2	3	
A.3	**Supervision and mentorship**	Supervise and mentor Earlier Stage Researchers, to become more effective and successful in their teaching career	1	1	3	2	
B. Specific criteria							
B.1	**Collaboration and networking**	Contribution as well as the ability to involve and create the necessary networks for guest lecturers and exchange, including research networks	1	1	2	3	

B.2	**International portfolio**	Create and participate in international engagement in teaching exchange and collaboration with international counterparts	1	1	2	1	
B.3	**Interdisciplinarity**	Participation and contribution in interdisciplinary teaching and/or education review involving two or more disciplines in applying and integrating teaching approaches from other disciplines	1	1	1	2	
B.4	**Digital skills**	Ability to use specialized digital tools and programmes for conducting and sharing teaching, and building digital resilience and protect from cyber threats	1	1	3	2	

C. Personal qualities							
C.1	**Educational leadership and management**	Ability to manage a teaching team independently and influence and support others to innovate and improve their practice in the area of teaching. Help create the institutional conditions and policies to improve the learning environment and development of teaching practice	1	1	2	3	
C.2	**Professional role model for others**	Prioritise professional and career development in the role of supervisor or teaching manager for less experienced lecturers/students and pay more attention to qualitative assessment criteria.	1	1	2	3	
C.3	**Intercultural awareness and competences**	Show behaviour and communication that are both effective and appropriate in intercultural interactions with(international) students, peers and wider society by improving awareness through cross-cultural competence assessment and training	1	2	3	2	
C.4	**Communication**	Effective communication with peers and the academic community and wider society to explain the outcome and value of teaching and research results. Knowledge of language(s) required for teaching, including technical language	1	2	3	3	
C.5	**Professional development**	Ability to manage own career progression, set realistic and achievable career goals, develops ways to improve employability, and acts as mentor for others.	1	2	3	1	

D. Emergent criteria							
D.1	**Please add if necessary**	Please add if necessary					

10 Appendix 3: EPIQAssess Criteria for Entrepreneurial Role (Innovation)

No	*Criteria*	*Description*	*PhD (R1)*	*Early Career (R2)*	*Mid-Career (R3)*	*Late Career R4)*	*Remarks*
A. Core criteria							
A.1	**Carry out research**	Ability for critical analysis, evaluation and synthesis of new and complex ideas; to conducts research under supervision or independently to advances a research agenda and to take the lead in executing collaborative research projects. Development of a strategic vision on the future of the research field and contribute through original research by developing a substantial body of work, innovation or application.	1	1	2	1	Number indicates level of relevance (1: least relevant, 3 most relevant)
A.2	**Subject knowledge and expertise**	Understanding of a field of study and subject area and the ability to conceive, design, implement and adapt a substantial programme of research with integrity in the subject area using the appropriate research methodologies and approaches	1	2	3	3	
A.3	**Business development and Intellectual property (IPR)**	Find and create business opportunities to respond to challenges, generate value for others and address business and industry needs that have not been met. Leads networks with relevant network connections with academic and business/industry bodies and	1	1	2	3	

		organisations, in public and private research area. Understanding of IPR, licensing to contribute to and manage the development and creation of patents, licensing, spinoff/spinouts, and participation in competitions.					
A.4	**Collaboration with business and industry**	Establishes collaborative relationships with relevant industry research or business partners. Contribution to develop knowledge of research methodologies and results for business and industry, and contribution and influence on the agenda of business and industry through (international) co-operations and collaborations	1	1	2	3	
A.5	**Supervision and mentorship**	Supervise less experienced students and researchers to conduct research, start their own business and successfully implement their research project and business plans. Shares external networks with less experienced researchers/students and mentors Earlier Stage Researchers to become more effective and successful in their research career	1	1	2	3	

B. Specific criteria							
B.1	**Inter- and transdisciplinary research**	Participation and contribution in inter & transdisciplinary research and/or research review involving two or more disciplines and/or and non-academic/business partners and actors in applying and integrating research approaches from other disciplines	1	1	2	2	
B.2	**Scientific publications and impact**	The level of contribution to scientific papers, journals, reviews, editorials, as co- and/or lead author, and to the initiation and organization of workshop or conference sessions. The level of contribution (breakthroughs) to own research field or spanning multiple areas	1	1	2	1	
B.3	**International portfolio**	Create and participate in international engagement in innovation exchange, mobility and collaboration with international counterparts	1	1	2	3	

B.4	**Acquisition of funding**	Identifies and secure research funding / budgets / resources from research funding bodies, government or industry in partnership with research consortia members	1	1	3	2	
B.5	**Research-based teaching**	Influence and impact on the learning outcomes and experiences of student through teaching based on research content and results.	1	1	2	1	
B.6	**Value team science**	Contribute and engage in collaborative, team-based and share tasks and responsibilities equally among all team members and empower and support young researchers	1	1	2	2	
B.7	**Digital skills**	Ability to use specialized digital tools and programmes for conducting and sharing research, and building digital resilience and protect from cyber threats	1	2	3	2	

C. Personal qualities							
C.1	**Leadership and management**	Ability to manage a team independently and influence and support others to innovate and improve their practice in the area of innovation and business. Help create the institutional conditions and policies to improve the innovation and business culture and working environment	1	1	2	3	
C.2	**Coping with uncertainty, ambiguity and risk**	Exploring new things and coping with the fear of failing, and evaluate the benefits and risks of alternative options to make decisions despite uncertainty and ambiguity	1	1	2	3	
C.3	**Professional role model for others**	Prioritise professional and career development in the role of supervisor or research manager for less experienced researchers/students and pay more attention to qualitative assessment criteria.	1	1	2	3	
C.4	**Intercultural awareness and competences**	Show behaviour and communication that are both effective and appropriate in intercultural interactions with(international) students and peers and wider society by improving awareness through cross-cultural competence assessment and training	1	2	3	2	

C.5	**Communication**	Effective communication with peers and the academic community and wider society to explain the outcome and value of teaching and research results. Knowledge of language(s) required for research, including technical language	1	2	3	3	
C.6	**Professional development**	Ability to manage own career progression, set realistic and achievable career goals, develops ways to improve employability, and acts as mentor for others.	1	2	3	1	

D. Emerging criteria							
D.1	**Please add if necessary**	Please add if necessary					

11 Appendix 4: EPIQAssess Criteria for Service Role (Interaction with Society)

No	***Criteria***	***Description***	***PhD (R1)***	***Early Career (R2)***	***Mid-Career (R3)***	***Late Career R4)***	***Remarks***
A. Core criteria							
A.1	**Carry out research**	Ability for critical analysis, evaluation and synthesis of new and complex ideas; to conducts research under supervision or independently to advances a research agenda and to take the lead in executing collaborative research projects. Development of a strategic vision on the future of the research field and contribute through original research by developing a substantial body of work, innovation or application.	1	1	2	1	Number indicates level of relevance (1: least relevant, 3 most relevant)

A.2	**Societal impact, incl. citizen science and science popularisation projects**	Development and creation of value of own research work in the context of products and services from governmental and societal organisations.The level of research results being used and by societal groups and being acknowledged and shared by societal groups and participation of stakeholders in peer review processes. Expected to promote, within professional contexts, technological, social or cultural advancement in society.	1	2	3	3	
A.3	**Collaboration with government and society**	Understanding and development of knowledge of research methodologies and results for government and society, and contribution to and influence on the agenda's of governmental and societal organisations. Makes a positive contribution to the development of knowledge, research and development through (international) co-operations and collaborations	1	2	3	3	
A.4	**Subject knowledge and expertise**	Understanding of a field of study and subject area and the ability to conceive, design, implement and adapt a substantial programme of research with integrity in the subject area using the appropriate research methodologies and approaches	1	2	3	3	
A.5	**Supervision and mentorship**	Supervise less experienced students and researchers to conduct research, engage with societal partners, successfully implement their societal project and plans. Shares external networks with less experienced researchers/students and mentors Earlier Stage Researchers to become more effective and successful in their research career	1	1	2	3	

B. Specific criteria							
B.1	**Scientific publications and impact**	Contribution to scientific papers, journals, reviews, editorials, as co- and/or lead author, and to the initiation and organization of workshop or conference sessions. The level of contribution (breakthroughs) to own research field or spanning multiple areas	1	1	2	2	

B.2	**Acquisition of funding**	Identifies and secure research funding / budgets / resources from research funding bodies, government or industry in partnership with research consortia members	1	1	2	2	
B.3	**International portfolio**	Create and participate in international engagement in research exchange, mobility and collaboration with societal counterparts	1	1	2	2	
B.4	**Green transition skills**	Knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society	1	1	2	3	
B.5	**Value team science**	Contribute and engage in collaborative, team-based and share tasks and responsibilities equally among all team members and empower and support young researchers	1	1	2	2	
B.6	**Research-based teaching**	Influence and impact on the learning outcomes and experiences of student through teaching based on research content and results.	1	1	2	2	
B.7	**Digital skills**	Ability to use specialized digital tools and programmes for conducting and sharing research, and building digital resilience and protect from cyber threats	1	2	3	2	

C. Personal qualities							
C.1	**Leadership and management**	Ability to manage a team independently and influence and support others to innovate and improve their practice in the area of research. Help create the institutional conditions and policies to improve the institutional culture and working environment	1	1	2	3	
C.2	**Professional role model for others**	Prioritise professional and career development in the role of supervisor or research manager for less experienced researchers/students and pay more attention to qualitative assessment criteria.	1	1	2	3	
C.3	**Intercultural awareness and competences**	Show behaviour and communication that are both effective and appropriate in intercultural interactions with(international) students and peers and wider society by improving awareness through cross-cultural competence assessment and training	1	2	3	2	

C.4	**Communication**	Effective communication with peers and the academic community and wider society to explain the outcome and value of teaching and research results. Knowledge of language(s) required for research, including technical language	1	2	3	3	
C.4	**Professional development**	Ability to manage own career progression, set realistic and achievable career goals, develops ways to improve employability, and acts as mentor for others.	1	2	3	1	

D. Emerging criteria							
D.1	**Please add if necessary**	Please add if necessary					