

Lesson 1: Impact – Why does research matter?

Keywords

- Academic impact
- Societal impact
- UN Sustainable Development Goals 2030
- 4 As of impact assessment
- Outcome vs. Impact
- Delivering impact
- Non-intended impacts
- RMAs as advocates for science

Learning Objectives

① ② ⑤
⑨ ⑩



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<https://learningapps.org/watch?v=pbima9dpn22>

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<https://www.youtube.com/watch?v=Nq8tA2NheKU&t=1s>

Research Impact

When the definition of **research impact** is sought in the literature, a clear distinction can be found between **academic impact**, defined as the intellectual contribution to a field of study within academia and **societal impact**, looking at effects going beyond academia.

This separation can be justified by the fact that academic assessment was often split from the research impact reaching outside academia. Nowadays, research impact is acknowledged as **all-encompassing** and tends to include all the changes brought about through research.

Depending on the goals and objectives at stake, different organizations and stakeholders have provided focused **definitions of research impact**, such as:

- the [European Commission's Better Regulation Guidelines and related toolbox](#) describes research impact as *all the changes which are expected to happen due to the implementation and application of a given policy option/intervention. Such impacts may occur over different timescales, affect different actors and be relevant at different scales (local, regional, national and EU). In an evaluation context, impact refers to the **changes associated with a particular intervention which occurs over the longer term.***

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- the [Research Excellence Framework REF UK](#) defines it as **an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia**.
- according to the [Australian Research Council's definition](#), *research impact is the **contribution** that research makes to the economy, society, environment or culture, beyond the contribution to academic research*.
- the [US National Science Foundation](#) defines it as *the **potential [of the research] to benefit society** and contribute to the achievement of desired society outcomes*.

Although most research impact definitions stress the positive effects of research, it has been argued that both positive and negative determination is subjective (what benefits one does not always benefit another). Albeit some **positive effects may turn out to have negative repercussions over time** (e.g.: long-term assessment of drugs may identify potentially negative effects for one's health).

Levels and scales of research impact

Research can have an impact at **different scales** (from individual research activities to institutional performance) and in **different areas**, such as:

- **Academic impact**
- **Cultural impact**
- **Economic impact** (contributing to cost savings, costs avoidance or increases in revenue, profits or funding)
- **Environmental impact**
- **Social impact**
- **Impact on health and wellbeing**
- **Policy influence and change**
- **Legal impact**
- **Technological developments**

Academic impact refers to the contribution that research makes in shifting the understanding and **advancing scientific knowledge**, method, theory and application across and within disciplines.

Impact reaching areas outside academia embraces all the diverse ways in which **research-related knowledge and skills benefit individuals, organisations and nations**.



Figure 43 - Types of research impact

(Source: <https://stories.nuigalway.ie/what-is-research-impact-/index.html>)

For all areas of research impact effects can be of different natures:

- **conceptual**: contributing to the improvement of **knowledge** (e.g., understanding of policy issues, reframing scientific debates, etc.)
- **instrumental**: contributing to **influencing the development/amendment of practices** (e.g., influencing the development of policy, shaping legislation, etc.)
- **capacity building**: contributing to the development of **individual or collective competencies** (e.g., technical and personal skill development of the research community, empowering research institutions with tools to improve research performance, etc.)

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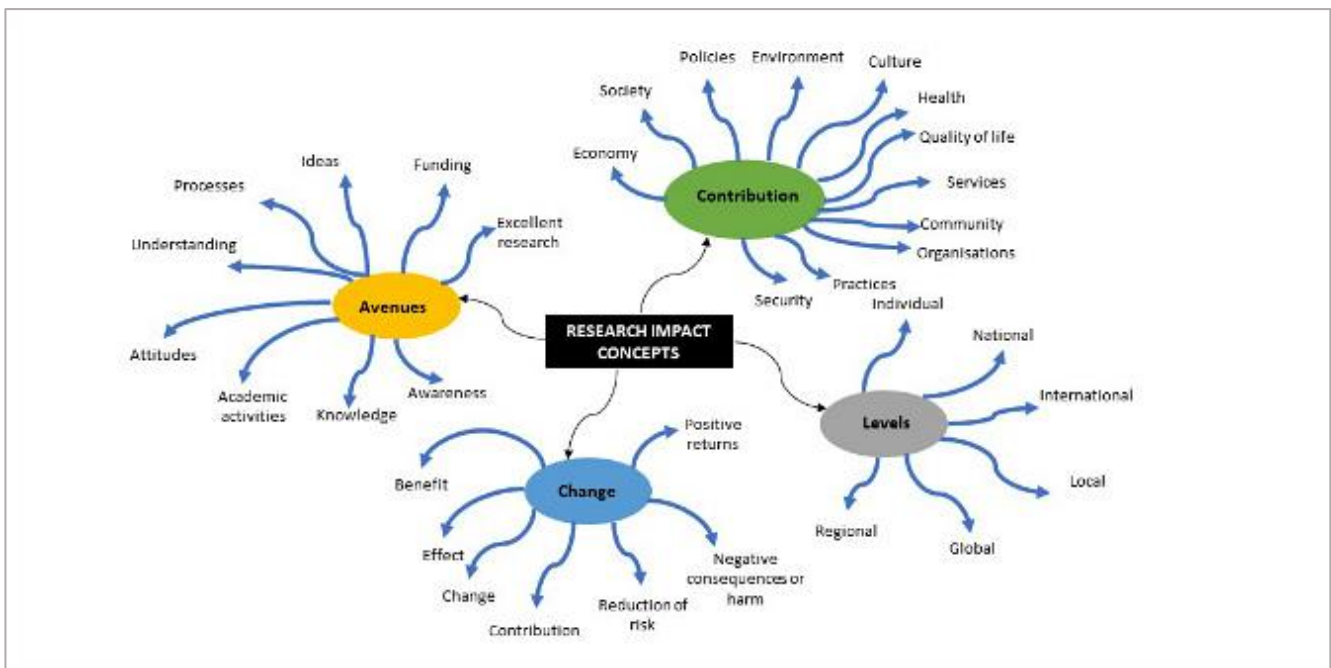


Figure 44 - What does research impact actually do?

(Source: <https://www.methodspace.com/blog/concept-research-impact-pervades-contemporary-academic-discourse-actually-mean>)

Major scientific achievements and impact case studies

Let's explore some **scientific achievements** revealing the different levels of research impact:

- Lists of major scientific achievements
 1. [The 50 Greatest Breakthroughs Since the Wheel](#)
 2. [Timeline of scientific discoveries](#)
- Several **science outreach** associations and magazines have selected the **major scientific achievements over the last 10 years**, such as [National Geographic's Top 20 scientific discoveries of the decade](#) or the [Smithsonian Magazine article The Top Ten Scientific Discoveries of the Decade](#).
- Below are selected **science communication articles** providing an overview of some of these major discoveries:
 1. [Astronomers Capture First-Ever Image of a Supermassive Black Hole](#).
 2. Editing genes: [CRISPR genome editing](#).
 3. CERN Detects the Higgs Boson: [The Higgs Boson](#).
 4. A vaccine and new treatments to fight Ebola: ['Make Ebola a thing of the past': first vaccine against deadly virus approved](#).

5. New human relatives: [A new species of Homo from the Late Pleistocene of the Philippines.](#)
6. Climate change: [The last five years were the hottest ever recorded](#)
7. New space missions: [Underground Lake of Liquid Water Detected on Mars.](#)
8. Fossilized pigments reveal the colours of dinosaurs: [The Colours of Dinosaurs Open a New Window to Study the Past.](#)
9. [40,000-year-old cave art may be the world's oldest animal drawing.](#)
10. [Lock the Planck: the kilogram has a new definition.](#)

On another level, **case studies of research projects' impacts** reveal significant and concrete influence on current research projects.

- **REF (Research Excellence Framework)** is the system for assessing the quality of research in **UK higher education institutions**; it provides a list of **2,200 impact case studies** that students can select according to their research subject area: <https://impact.ref.ac.uk/casestudies/Results.aspx?Type=S&Tag=770>
 - [Fast Track Impact R&I company](#) developed a study analysing 7 of these case studies and recognized **best practices and common errors**. Results and insights are available in the blog post [10 lessons from grant proposals that led to the most significant and far-reaching impacts](#) and in the *Nature* article [Writing impact case studies: a comparative study of high-scoring and low-scoring case studies from REF2014](#)

Societal impact: the case of the UN Sustainable Development Goals

Society faces tough challenges such as **global inequality** and **climate crisis**, and the research community is especially called upon to collaborate and take action to overcome these global challenges. The **social responsibility of research** is thus paramount, with R&I institutions regarding **societal impact** as the core goal of their action in 4 areas: research, teaching, outreach and operational level.

Adopted in 2015 as part of the **2030 agenda for sustainable development**, the United Nations defined **17 Sustainable Development Goals (SDGs)** and **169 associated targets** to identify areas considered of **critical importance for humanity** to achieve three very ambitious goals: end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030.

The UN Sustainable Development Goals 2030

- **Goal 1 - End poverty** in all its forms everywhere.
- **Goal 2** - End hunger, achieve **food security** and improved nutrition and promote **sustainable agriculture**.
- **Goal 3** - Ensure healthy lives and promote **well-being** for all at all ages.
- **Goal 4** - Ensure inclusive and equitable **quality education** and promote **lifelong learning** opportunities for all.
- **Goal 5** - Achieve **gender equality** and empower all women and girls.
- **Goal 6** - Ensure availability and sustainable management of **water** and sanitation for all.
- **Goal 7** - Ensure access to affordable, reliable, sustainable and modern **energy** for all
- **Goal 8** - Promote sustained, inclusive and **sustainable economic growth**, full and productive **employment** and decent work for all.
- **Goal 9** - Build resilient infrastructure, promote inclusive and sustainable industrialization and **foster innovation**.
- **Goal 10** - **Reduce inequality** within and among Countries.
- **Goal 11** - Make **cities** and human settlements inclusive, safe, resilient and sustainable.
- **Goal 12** - Ensure **sustainable consumption** and production patterns.
- **Goal 13** - Take urgent action to combat **climate change** and its impacts.
- **Goal 14** - Preserve oceans, seas and marine resources for sustainable development.
- **Goal 15** - Protect, restore and promote sustainable use of **terrestrial ecosystems** (manage forests, combat desertification, halt and reverse land degradation and stop biodiversity loss).
- **Goal 16** - Promote **peaceful and inclusive societies** for sustainable development, provide access to **justice for all** and build effective, accountable and inclusive institutions at all levels.
- **Goal 17** - Strengthen the means of implementation and **revitalize the global partnership** for sustainable development



Figure 15 - UN Sustainable Development Goals 2030

Academia is clearly mentioned in the list of stakeholders present in target 52:

*'We the peoples' are the celebrated opening words of the Charter of the United Nations. It is 'we the peoples' who are embarking today on the road to 2030. Our journey will involve Governments as well as Parliaments, the United Nations system and other international institutions, local authorities, indigenous peoples, civil society, business and the private sector, the **scientific and academic community** and all people. Millions have already engaged with and will own this Agenda. It is an Agenda of the people, by the people and for the people and this, we believe, will ensure its success.*

Following this clear **global call for action**, the **2030 UN Agenda** is currently an important **driver of public policy, including research policy**. As such, research funding at the national and international level has aligned with this agenda. In fact, the R&I framework programme **Horizon Europe** has the SDGs as the backdrop for its **funding mission** to address a set of global challenges.

Recognition to institutions/projects linking their achievements to the UN SDGs is provided. As such, several impact measurements were developed to **rank institutions** regarding their

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contribution to SDGs, such as the [Times Higher Education \(THE\) Impact Rankings](#) involving universities. Here, the **impact on society** is based on the institutions' success in **delivering the United Nations' Sustainable Development Goals**. While impact rankings can provide interesting insights, impact assessment results may also incur in bias. This aspect is tackled in the 2018 MIT Sloan article [The Right Way to Support the Sustainable Development Goals - A company's support of the SDGs is not necessarily a proxy for doing good](#), which acknowledges how challenges and concerns related to the use of SDGs by companies can easily apply to R&I institutions as well.

Impact assessment

As impact implies change, to assess the impact we must be able to understand, identify and **assess the change** that has occurred. When we analyse a research activity, such as research project, we can identify changes occurring at different levels and stages. As such, it is important to distinguish what has changed within the project's timeframe (outputs) and the impact this change has generated.

LERU (League of European Research Universities) provided the following list of **impact-related concepts** in its [Impact and the next Framework Programme for Research and Innovation \(FP9\)](#) study:

- **Input:** the **resources** a researcher, a research funder or an institution spends in the research process (e.g.: people, infrastructure, money, etc.)
- **Research activities:** the research **work performed**, or the actions taken, as a result of research inputs (e.g., teams established, research undertaken, networking with stakeholders, etc.)
- **Output:** the **results of the research** activities (e.g., **publications**, conferences, new research lines, new interdisciplinary collaborations, new products to end-users, etc.)
- **Outcome:** the **changes that occur** as a result of a project/programme implementation, viewed in a more immediate term than the assessment of impact (e.g., contribution to **policy debates** or documents, strategy development, creation of **start-ups** and spinoffs).
- **Impact:** *Effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia* (HEFCE's definition used in REF).

Outcome vs. Impact

The LSE blog article [What is the difference between an impact and an outcome? Impact is the longer-term effect of an outcome](#), provides a concrete example of **the distinction between outcome and impact**. Below is an **output analysis** of an information and advice intervention programme on healthy eating, nutrition and weight loss.

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- **Example of outcome:** changes in body weight or body fat - *This is a direct, measurable, objective change brought about by engagements with nutritional information and advice.*
- **Example of impact:** increased sense of happiness and/or decreased sense of insecurity - *This is the effect nutritional information and advice had on the ability to make an informed choice, bringing empowerment or wider life experiences.*

In conclusion, to be able to achieve impact, **outputs must be converted into outcomes and, subsequently, into impact(s).**

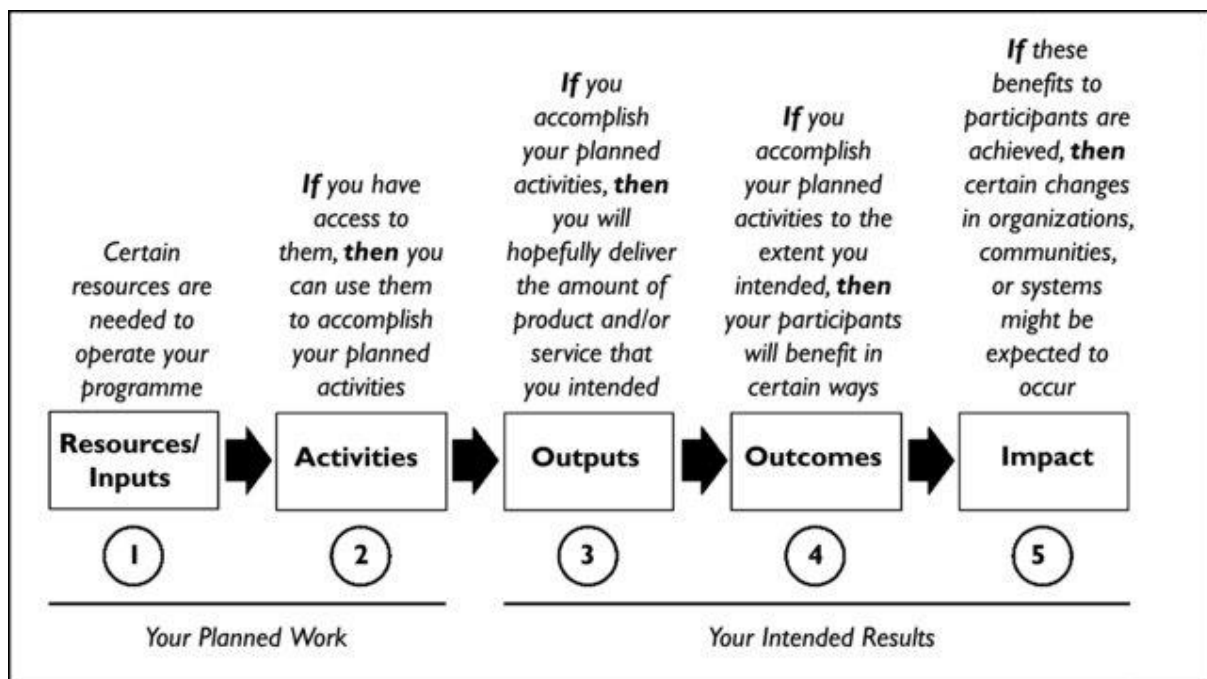


Figure 46 - A simple logic model ((W. K. Kellogg Foundation, 2004)

When to assess impact (and why)

Planning and assessing research impact is therefore a complex and multi-faceted phenomenon that requires a non-linear understanding and network-oriented processes of engagement with stakeholders beyond the academic community. Although researchers are requested to **plan and maximize their projects' impact**, doing this at the proposal stage is a very difficult task due to the level of **uncertainty and risk** which is inherent to research and its interaction with target audiences and stakeholders. At the same time, as **impact represents a long-term effect**, assessing it shortly after the research project's conclusion is an impossible task since only outputs and outcomes are available for assessment at that time.

Looking at the implementation phase, **delivering impact** is also not an easy task. For this reason, tasks involved in this process are often planned in a very linear way, using **default activities (workshops, seminars)** and assuming **dissemination/communication leads to**

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impact; although, when foreseen impacts are too broad, these are not easily transferable to the realities of implementation.

Why, then, do we evaluate research impact? Impact assessment is a useful exercise since it helps researchers and institutions achieve (and learn to achieve) different goals. In [Assessment, evaluations, and definitions of research impact: A review](#), Teresa Penfield et.al summarize the usefulness of such an evaluation into four main concepts:

1. **overview performance,**
2. **inform funding decisions,**
3. understand the **pathways to maximize research impact,**
4. demonstrate to governments, stakeholders, and the wider public the **value of research.**

Another way to look at the topic is proposed by Paula Adam et al. in [ISRIA statement: Ten-point guidelines for an effective process of research impact assessment](#), where the authors propose **'Four As' of research impact assessment** as the main reasons to assess impact:

- **analysis,**
- **allocation,**
- **advocacy,**
- **accountability.**



Figure 47 - The 4 A's of research impact assessment

(Source: https://www.researchgate.net/figure/The-Four-As-of-research-impact-assessment-advocacy-analysis-accountability-and_fig2_323024747)

The role of RMAs in promoting research impact

RMAs play an important role in all of these 'reasons' behind the usefulness of impact assessment. For example:

- RMAs working in pre-award stages encourage researchers to think about and **identify potential areas of impact** and which **stakeholders to engage**, as well as providing support in the articulation of such elements in the writing of the research proposal.
- RMAs also act as **facilitators** and are involved in many **public engagement activities** (the focus of the next lesson).
- RMAs working in post-award stages also play an important role in monitoring and reporting the **Key Performance Indicators (KPIs)** of research impact.
- RMAs working in research strategy and policy provide important inputs to support the definition, monitorization and assessment of impact at the institution and policy level, supporting the development of **strategic impact plans**.
- Transversely, as part of the research community, RMAs are big players in **advocating and lobbying for science**.

This lesson looks closely at the **RMAs' role in supporting researchers during the design of pathways/routes for impact**. For example, in the early stages, an RMA can help the researcher brainstorm and identify possible impacts (at varied levels and of different nature) and also map the activities required to achieve those impacts. Researchers often do not reflect on the **non-intended impacts** of their research activity/project, so it is important to promote the identification of possible negative impacts but also of those non-intended.

A useful tool to map this potential impact, but also to explain how research plans will enable the anticipated impacts, is the **Theory of Change (TOC)**. TOC is a comprehensive description and illustration of how and why a certain change is expected to happen in a particular context. It starts by identifying the desired long-term goals and then looks back to select the activities that must be put in place for those long-term goals to be achieved. By identifying the link between activities and the major goal, this **mapping strategy** leads to a better overview of how change happens and, in turn, to better planning. It is important to stress the need to **think beyond the activities themselves**, to capture what those activities achieved: what difference they made for those participating and what did they provoke within their areas of operation.

Bibliographic references

- *40,000-year-old cave art may be world's oldest animal drawing*. (2018, November 7). Science. <https://www.nationalgeographic.com/science/2018/11/news-oldest-animal-drawing-borneo-cave-art-human-origins/>

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- Adam, P., Ovseiko, P. V., Grant, J., Graham, K. E. A., Boukhris, O. F., Dowd, A.-M., Balling, G. V., Christensen, R. N., Pollitt, A., Taylor, M., Sued, O., Hinrichs-Krapels, S., Solans-Domènech, M., Chorzempa, H., & for the International School on Research Impact Assessment (ISRIA). (2018). ISRIA statement: ten-point guidelines for an effective process of research impact assessment. *Health Research Policy and Systems*, 16(1), 8. <https://doi.org/10.1186/s12961-018-0281-5>
- Australian Research Council. (n.d.). *Research Impact Principles and Framework*. Research Impact Principles and Framework. <https://www.arc.gov.au/policies-strategies/strategy/research-impact-principles-framework>
- Bennett, J. (n.d.-a). *Astronomers Capture First-Ever Image of a Supermassive Black Hole*. Smithsonian Magazine. Retrieved 15 January 2021, from <https://www.smithsonianmag.com/science-nature/astronomers-capture-first-images-supermassive-black-hole-180971927/>
- Bennett, J. (n.d.-b). *The Top Ten Scientific Discoveries of the Decade*. Smithsonian Magazine. Retrieved 15 January 2021, from <https://www.smithsonianmag.com/science-nature/top-ten-scientific-discoveries-decade-180973873/>
- Bennett, J. (2018, July 25). *Underground Lake of Liquid Water Detected on Mars*. Popular Mechanics. <https://www.popularmechanics.com/space/moon-mars/a22541370/underground-lake-liquid-water-mars/>
- Black, R. (n.d.). *The Colors of Dinosaurs Open a New Window to Study the Past*. Smithsonian Magazine. Retrieved 15 January 2021, from <https://www.smithsonianmag.com/science-nature/colors-dinosaurs-open-new-window-study-past-180972070/>
- Callaway, E. (2019). 'Make Ebola a thing of the past': first vaccine against deadly virus approved. *Nature*, 575(7783), 425–426. <https://doi.org/10.1038/d41586-019-03490-8>
- Détroit, F., Mijares, A. S., Corny, J., Daver, G., Zanolli, C., Dizon, E., Robles, E., Grün, R., & Piper, P. J. (2019). A new species of Homo from the Late Pleistocene of the Philippines. *Nature*, 568(7751), 181–186. <https://doi.org/10.1038/s41586-019-1067-9>
- England, H. F. C. of. (n.d.). *Guidance on submissions (2019/01) - REF 2021*. Higher Education Funding Council for England. Retrieved 15 January 2021, from <https://www.ref.ac.uk/publications/guidance-on-submissions-201901/>
- European Commission. (n.d.). *Better regulation toolbox* [Text]. European Commission - European Commission. Retrieved 15 January 2021, from https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox/better-regulation-toolbox_en

Module 4 - Research Impact and Public Engagement

- Fallows, J. (2013, October 23). *The 50 Greatest Breakthroughs Since the Wheel*. The Atlantic. <https://www.theatlantic.com/magazine/archive/2013/11/innovations-list/309536/>
- Karbassi, R. G. E. and L. (n.d.). *The Right Way to Support the Sustainable Development Goals*. MIT Sloan Management Review. Retrieved 15 January 2021, from <https://sloanreview.mit.edu/article/the-right-way-to-support-the-unsustainable-development-goals/>
- LERU - League of European Research Universities. (2018). *Impact and the next Framework Programme for Research and Innovation (FP9)* (p. 16). <https://www.leru.org/files/Publications/Impact-and-the-next-Framework-Programme-for-Research-and-Innovation.pdf>
- *Lock the Planck: the kilogram has a new definition*. (n.d.). CERN. Retrieved 15 January 2021, from <https://home.cern/news/news/engineering/lock-planck-kilogram-has-new-definition>
- Penfield, T., Baker, M. J., Scoble, R., & Wykes, M. C. (2014). Assessment, evaluations, and definitions of research impact: A review. *Research Evaluation*, 23(1), 21–32. <https://doi.org/10.1093/reseval/rvt021>
- Reed, S. B. and P. M. (2016, February 14). *10 lessons from grant proposals that led to the most significant and far-reaching impacts*. Fast Track Impact. <https://www.fasttrackimpact.com/post/2016/02/14/pathways-to-topscoring-impacts-an-analysis-of-pathways-to-impact-in-grant-applications>
- *REF impact - Research England*. (n.d.). Retrieved 15 January 2021, from <https://re.ukri.org/research/ref-impact/>
- Reichard, B., Reed, M. S., Chubb, J., Hall, G., Jowett, L., Peart, A., & Whittle, A. (2020). Writing impact case studies: a comparative study of high-scoring and low-scoring case studies from REF2014. *Palgrave Communications*, 6(1), 1–17. <https://doi.org/10.1057/s41599-020-0394-7>
- Says, E. (2014, October 27). What is the difference between an impact and an outcome? Impact is the longer term effect of an outcome. *Impact of Social Sciences*. <https://blogs.lse.ac.uk/impactofsocialsciences/2014/10/27/impact-vs-outcome-hardening/>
- Staff, S. (n.d.). *What Is CRISPR Gene Editing?* ScienceAlert. Retrieved 15 January 2021, from <https://www.sciencealert.com/crispr-gene-editing>
- *The Higgs boson | CERN*. (n.d.). Retrieved 15 January 2021, from <https://home.cern/science/physics/higgs-boson>
- *The last five years were the hottest ever recorded*. (2019, February 6). Environment. <https://www.nationalgeographic.com/environment/2019/02/2018-fourth-warmest-year-ever-noaa-nasa-reports/>

Module 4 - Research Impact and Public Engagement

- *These are the top 20 scientific discoveries of the decade.* (2019, December 5). Science. <https://www.nationalgeographic.com/science/2019/12/top-20-scientific-discoveries-of-decade-2010s/>
- Times Higher Education (THE). (2020, March 4). *Impact Ranking.* Times Higher Education (THE). <https://www.timeshighereducation.com/impactrankings>
- *Transforming our world: the 2030 Agenda for Sustainable Development.* Sustainable Development Knowledge Platform. (n.d.). Retrieved 15 January 2021, from <https://sustainabledevelopment.un.org/post2015/transformingourworld>
- US National Science Foundation. (n.d.). *GPG Chapter III.* Retrieved 15 January 2021, from https://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_3.jsp
- What is Theory of Change? (n.d.). *Theory of Change Community.* Retrieved 15 January 2021, from <https://www.theoryofchange.org/what-is-theory-of-change/>
- W.K. Kellogg Foundation. (2004). *Logic Model Development Guide* (p. 72). W.K. Kellogg Foundation. <https://ag.purdue.edu/extension/pdehs/Documents/Pub3669.pdf>
- Wooding, S., Nason, E., Klautzer, L., Rubin, J., Hanney, S., & Grant, J. (2007). *Policy and practice impacts of research funded by the Economic and Social Research Council: A case study of the Future of Work programme, approach and analysis.* https://www.rand.org/pubs/technical_reports/TR435.html
- World Heritage Encyclopedia. (n.d.). Timeline of scientific discoveries. In *World Heritage Encyclopedia.* http://self.gutenberg.org/articles/eng/Timeline_of_scientific_discoveries