

CROWDSOURCING VS CITIZEN SCIENCE

CROWDSOURCING VS CITIZEN SCIENCE REPRESENTS TWO INNOVATIVE APPROACHES THAT LEVERAGE PUBLIC PARTICIPATION TO ACCOMPLISH TASKS TRADITIONALLY HANDLED BY EXPERTS OR ORGANIZATIONS. BOTH CONCEPTS HARNESS THE POWER OF COLLECTIVE INTELLIGENCE, YET THEY DIFFER SIGNIFICANTLY IN THEIR GOALS, METHODS, AND APPLICATIONS. UNDERSTANDING THE DISTINCTIONS AND OVERLAPS BETWEEN CROWDSOURCING AND CITIZEN SCIENCE IS CRUCIAL FOR ORGANIZATIONS, RESEARCHERS, AND COMMUNITIES AIMING TO ENGAGE THE PUBLIC EFFECTIVELY. THIS ARTICLE EXPLORES THE DEFINITIONS, PURPOSES, PROCESSES, BENEFITS, AND CHALLENGES OF CROWDSOURCING AND CITIZEN SCIENCE, PROVIDING A COMPREHENSIVE COMPARISON. ADDITIONALLY, IT HIGHLIGHTS EXAMPLES AND PRACTICAL APPLICATIONS TO ILLUSTRATE HOW THESE MODELS CONTRIBUTE TO VARIOUS FIELDS. THE FOLLOWING SECTIONS WILL DELVE INTO THESE ASPECTS IN DETAIL TO CLARIFY THE NUANCES OF CROWDSOURCING VS CITIZEN SCIENCE.

- DEFINITIONS AND CORE CONCEPTS
- PURPOSE AND OBJECTIVES
- PROCESSES AND METHODOLOGIES
- BENEFITS AND CHALLENGES
- APPLICATIONS AND EXAMPLES

DEFINITIONS AND CORE CONCEPTS

WHAT IS CROWDSOURCING?

CROWDSOURCING IS A METHOD THAT INVOLVES OUTSOURCING TASKS, PROBLEMS, OR PROJECTS TO A LARGE GROUP OF PEOPLE OR COMMUNITY, TYPICALLY VIA AN OPEN CALL ON THE INTERNET. THE TERM COMBINES “CROWD” AND “OUTSOURCING,” EMPHASIZING THE COLLECTIVE EFFORT OF MANY INDIVIDUALS CONTRIBUTING SMALL PARTS TO ACHIEVE A LARGER GOAL. CROWDSOURCING CAN BE USED FOR A WIDE RANGE OF ACTIVITIES, FROM DATA ENTRY AND IDEA GENERATION TO PROBLEM-SOLVING AND CONTENT CREATION. IT RELIES HEAVILY ON THE DIVERSITY AND SCALE OF THE CROWD TO PROVIDE INNOVATIVE SOLUTIONS, GATHER INFORMATION, OR PERFORM LABOR-INTENSIVE TASKS.

WHAT IS CITIZEN SCIENCE?

CITIZEN SCIENCE REFERS TO THE PROCESS WHERE MEMBERS OF THE GENERAL PUBLIC ACTIVELY PARTICIPATE IN SCIENTIFIC RESEARCH, OFTEN COLLABORATING WITH PROFESSIONAL SCIENTISTS. UNLIKE CROWDSOURCING, CITIZEN SCIENCE SPECIFICALLY FOCUSES ON CONTRIBUTING TO SCIENTIFIC KNOWLEDGE AND ADVANCING RESEARCH THROUGH DATA COLLECTION, ANALYSIS, OR OBSERVATION. THIS FORM OF PUBLIC ENGAGEMENT EMPOWERS NON-EXPERTS TO CONTRIBUTE VALUABLE DATA AND INSIGHTS IN FIELDS SUCH AS ECOLOGY, ASTRONOMY, ENVIRONMENTAL MONITORING, AND PUBLIC HEALTH. CITIZEN SCIENCE PROJECTS EMPHASIZE EDUCATION AND PUBLIC INVOLVEMENT ALONGSIDE DATA GATHERING.

PURPOSE AND OBJECTIVES

GOALS OF CROWDSOURCING

THE PRIMARY OBJECTIVE OF CROWDSOURCING IS TO LEVERAGE A LARGE, OFTEN DISTRIBUTED, WORKFORCE TO ACHIEVE TASKS MORE EFFICIENTLY OR CREATIVELY THAN TRADITIONAL METHODS ALLOW. ORGANIZATIONS USE CROWDSOURCING TO:

- ACCESS DIVERSE PERSPECTIVES AND SKILLS
- ACCELERATE PROBLEM-SOLVING AND INNOVATION
- REDUCE COSTS BY OUTSOURCING TO VOLUNTEERS OR LOW-COST CONTRIBUTORS
- GENERATE CONTENT, IDEAS, OR DATA AT SCALE

THESE GOALS MAKE CROWDSOURCING A VERSATILE TOOL FOR BUSINESS, TECHNOLOGY, MARKETING, AND SOCIAL INITIATIVES.

OBJECTIVES OF CITIZEN SCIENCE

CITIZEN SCIENCE PROJECTS PRIMARILY AIM TO ENGAGE THE PUBLIC IN SCIENTIFIC RESEARCH TO:

- COLLECT LARGE-SCALE OR GEOGRAPHICALLY DIVERSE DATA
- INCREASE SCIENTIFIC LITERACY AND EDUCATION AMONG PARTICIPANTS
- ENHANCE PUBLIC UNDERSTANDING AND SUPPORT FOR SCIENCE
- PROVIDE RESEARCHERS WITH DATA THAT WOULD BE DIFFICULT OR EXPENSIVE TO OBTAIN OTHERWISE

THESE OBJECTIVES HIGHLIGHT CITIZEN SCIENCE AS A COLLABORATIVE EFFORT TO DEMOCRATIZE RESEARCH AND EXPAND SCIENTIFIC INQUIRY.

PROCESSES AND METHODOLOGIES

How CROWDSOURCING WORKS

CROWDSOURCING PROJECTS TYPICALLY FOLLOW A STRUCTURED PROCESS THAT INCLUDES DEFINING A TASK, INVITING PARTICIPATION, GATHERING CONTRIBUTIONS, AND INTEGRATING THE RESULTS. KEY STEPS IN CROWDSOURCING INCLUDE:

1. IDENTIFYING THE PROBLEM OR TASK SUITABLE FOR CROWD INPUT
2. LAUNCHING AN OPEN CALL TO A BROAD AUDIENCE, OFTEN THROUGH ONLINE PLATFORMS
3. COLLECTING CONTRIBUTIONS, WHICH MAY BE IDEAS, DATA, OR COMPLETED TASKS
4. EVALUATING AND FILTERING SUBMISSIONS TO ENSURE QUALITY AND RELEVANCE
5. INCORPORATING THE CROWD'S INPUT INTO THE FINAL PRODUCT OR SOLUTION

PLATFORMS LIKE MECHANICAL TURK, IDEASCALE, AND OTHERS FACILITATE THESE PROCESSES BY CONNECTING ORGANIZATIONS WITH A GLOBAL CROWD.

How Citizen Science Operates

CITIZEN SCIENCE PROJECTS OFTEN INVOLVE VOLUNTEERS IN SCIENTIFIC ACTIVITIES SUCH AS MONITORING WILDLIFE, CLASSIFYING IMAGES, OR RECORDING ENVIRONMENTAL DATA. THE PROCESS TYPICALLY INCLUDES:

1. DESIGNING THE RESEARCH PROJECT WITH CLEAR SCIENTIFIC OBJECTIVES
2. RECRUITING AND TRAINING PARTICIPANTS TO ENSURE DATA QUALITY
3. DISTRIBUTING TOOLS OR PROTOCOLS FOR DATA COLLECTION OR ANALYSIS
4. GATHERING DATA FROM VOLUNTEERS ACROSS VARIED LOCATIONS OR TIMES
5. VALIDATING AND ANALYZING THE COLLECTED DATA IN COLLABORATION WITH SCIENTISTS

EXAMPLES OF CITIZEN SCIENCE PLATFORMS INCLUDE ZOOVERSE AND eBIRD, WHICH FACILITATE LARGE-SCALE PUBLIC PARTICIPATION IN RESEARCH.

BENEFITS AND CHALLENGES

ADVANTAGES OF CROWDSOURCING

CROWDSOURCING OFFERS NUMEROUS BENEFITS, INCLUDING:

- **COST-EFFECTIVENESS:** UTILIZING VOLUNTEER OR LOW-COST CONTRIBUTORS REDUCES EXPENSES.
- **SCALABILITY:** LARGE TASKS CAN BE DIVIDED AMONG MANY PARTICIPANTS.
- **INNOVATION:** DIVERSE CROWDS CAN GENERATE CREATIVE AND UNIQUE IDEAS.
- **SPEED:** PARALLEL CONTRIBUTIONS ACCELERATE PROJECT COMPLETION.

CHALLENGES OF CROWDSOURCING

DESPITE ITS ADVANTAGES, CROWDSOURCING FACES CHALLENGES SUCH AS:

- **QUALITY CONTROL:** ENSURING ACCURACY AND RELIABILITY OF CONTRIBUTIONS.
- **PARTICIPANT ENGAGEMENT:** MAINTAINING MOTIVATION AND COMMITMENT.
- **INTELLECTUAL PROPERTY CONCERNS:** MANAGING RIGHTS OVER CROWD-GENERATED CONTENT.
- **TASK COMPLEXITY:** SOME TASKS MAY BE UNSUITABLE FOR MASS PARTICIPATION.

BENEFITS OF CITIZEN SCIENCE

CITIZEN SCIENCE PROVIDES SIGNIFICANT BENEFITS TO BOTH RESEARCHERS AND PARTICIPANTS:

- **EXPANDED DATA COLLECTION:** ACCESS TO BROAD GEOGRAPHIC AND TEMPORAL DATA SETS.
- **PUBLIC ENGAGEMENT:** INCREASES AWARENESS AND INTEREST IN SCIENTIFIC TOPICS.
- **EDUCATIONAL VALUE:** ENHANCES SCIENTIFIC LITERACY AND SKILLS AMONG VOLUNTEERS.
- **COST SAVINGS:** REDUCES NEED FOR EXPENSIVE FIELDWORK OR LABOR.

CHALLENGES OF CITIZEN SCIENCE

SOME CHALLENGES ASSOCIATED WITH CITIZEN SCIENCE INCLUDE:

- **DATA QUALITY AND CONSISTENCY:** VARIABILITY IN VOLUNTEER TRAINING AND EXPERTISE.
- **VOLUNTEER RETENTION:** SUSTAINING LONG-TERM PARTICIPATION CAN BE DIFFICULT.
- **ETHICAL CONSIDERATIONS:** ENSURING PROPER CREDIT AND PRIVACY PROTECTIONS.
- **PROJECT DESIGN COMPLEXITY:** BALANCING SCIENTIFIC RIGOR WITH ACCESSIBILITY.

APPLICATIONS AND EXAMPLES

CROWDSOURCING IN PRACTICE

CROWDSOURCING HAS BEEN SUCCESSFULLY APPLIED ACROSS VARIOUS INDUSTRIES AND DOMAINS, INCLUDING:

- **TECHNOLOGY DEVELOPMENT:** PLATFORMS LIKE GITHUB HARNESS CROWDSOURCING FOR SOFTWARE DEVELOPMENT.
- **MARKETING AND DESIGN:** COMPANIES CROWDSOURCE LOGO DESIGNS AND ADVERTISING IDEAS.
- **PROBLEM-SOLVING CONTESTS:** CHALLENGES LIKE THE XPRIZE ENCOURAGE INNOVATIVE SOLUTIONS FROM THE PUBLIC.
- **DATA ANNOTATION:** CROWDSOURCING IS USED TO LABEL LARGE DATASETS FOR MACHINE LEARNING.

CITIZEN SCIENCE EXAMPLES

CITIZEN SCIENCE PROJECTS HAVE MADE CONSIDERABLE CONTRIBUTIONS TO SCIENTIFIC RESEARCH, SUCH AS:

- **eBIRD:** A GLOBAL BIRDWATCHING DATABASE COLLECTING OBSERVATIONS FROM ENTHUSIASTS.
- **GALAXY ZOO:** VOLUNTEERS CLASSIFY GALAXIES FROM TELESCOPE IMAGES TO ASSIST ASTROPHYSICS RESEARCH.
- **FOLDIT:** A GAME WHERE PARTICIPANTS FOLD PROTEIN STRUCTURES TO HELP UNDERSTAND MOLECULAR BIOLOGY.
- **CoCoRAHS:** A COMMUNITY WEATHER NETWORK COLLECTING PRECIPITATION DATA.

FREQUENTLY ASKED QUESTIONS

WHAT IS THE MAIN DIFFERENCE BETWEEN CROWDSOURCING AND CITIZEN SCIENCE?

CROWDSOURCING INVOLVES OUTSOURCING TASKS TO A LARGE GROUP OF PEOPLE, OFTEN ONLINE, TO OBTAIN IDEAS, SERVICES, OR CONTENT, WHILE CITIZEN SCIENCE SPECIFICALLY ENGAGES NON-PROFESSIONAL SCIENTISTS IN COLLECTING OR ANALYZING SCIENTIFIC DATA FOR RESEARCH PURPOSES.

HOW DO CROWDSOURCING AND CITIZEN SCIENCE CONTRIBUTE TO RESEARCH?

CROWDSOURCING ACCELERATES DATA COLLECTION AND PROBLEM-SOLVING BY LEVERAGING DIVERSE PUBLIC INPUT, WHEREAS CITIZEN SCIENCE PROVIDES VALUABLE SCIENTIFIC DATA AND INSIGHTS THROUGH ACTIVE PARTICIPATION OF VOLUNTEERS IN SCIENTIFIC PROJECTS.

CAN CROWDSOURCING BE USED FOR SCIENTIFIC RESEARCH OUTSIDE OF CITIZEN SCIENCE?

YES, CROWDSOURCING CAN BE USED IN SCIENTIFIC RESEARCH FOR TASKS LIKE DATA ANNOTATION, HYPOTHESIS GENERATION, OR PROBLEM-SOLVING WITHOUT NECESSARILY INVOLVING VOLUNTEERS IN TRADITIONAL SCIENTIFIC ROLES, DISTINGUISHING IT FROM FORMAL CITIZEN SCIENCE PROJECTS.

WHAT ARE SOME EXAMPLES OF CITIZEN SCIENCE PROJECTS?

EXAMPLES INCLUDE PROJECTS LIKE GALAXY ZOO, WHERE VOLUNTEERS CLASSIFY GALAXIES, eBIRD FOR BIRD SIGHTINGS, AND FOLDIT, A PROTEIN FOLDING GAME THAT CONTRIBUTES TO BIOMEDICAL RESEARCH.

WHAT ARE THE CHALLENGES ASSOCIATED WITH CROWDSOURCING AND CITIZEN SCIENCE?

CHALLENGES INCLUDE ENSURING DATA QUALITY AND RELIABILITY, MAINTAINING PARTICIPANT ENGAGEMENT, ADDRESSING PRIVACY CONCERNS, AND MANAGING LARGE VOLUMES OF HETEROGENEOUS DATA.

HOW DOES TECHNOLOGY IMPACT CROWDSOURCING AND CITIZEN SCIENCE?

TECHNOLOGY, ESPECIALLY MOBILE APPS AND ONLINE PLATFORMS, FACILITATES EASY PARTICIPATION, DATA COLLECTION, REAL-TIME COMMUNICATION, AND LARGE-SCALE COLLABORATION, MAKING BOTH CROWDSOURCING AND CITIZEN SCIENCE MORE EFFICIENT AND ACCESSIBLE.

IS CITIZEN SCIENCE A SUBSET OF CROWDSOURCING?

YES, CITIZEN SCIENCE CAN BE CONSIDERED A SPECIALIZED SUBSET OF CROWDSOURCING FOCUSED ON SCIENTIFIC RESEARCH, WHERE VOLUNTEERS CONTRIBUTE TO GENERATING OR ANALYZING SCIENTIFIC DATA UNDER STRUCTURED PROJECT FRAMEWORKS.

ADDITIONAL RESOURCES

1. *CROWDSOURCING FOR SCIENCE: HARNESSING THE POWER OF THE CROWD*

THIS BOOK EXPLORES HOW CROWDSOURCING TECHNIQUES ARE REVOLUTIONIZING SCIENTIFIC RESEARCH BY ENGAGING LARGE GROUPS OF PEOPLE TO CONTRIBUTE DATA, IDEAS, AND SOLUTIONS. IT DISCUSSES THE BENEFITS AND CHALLENGES OF LEVERAGING PUBLIC PARTICIPATION, AS WELL AS THE TECHNOLOGICAL PLATFORMS THAT FACILITATE CROWD INVOLVEMENT. CASE STUDIES ILLUSTRATE HOW CROWDSOURCING ACCELERATES DATA COLLECTION AND PROBLEM-SOLVING IN VARIOUS SCIENTIFIC FIELDS.

2. *CITIZEN SCIENCE: INNOVATION IN OPEN SCIENCE AND SOCIETY*

FOCUSING ON THE ROLE OF CITIZEN SCIENCE WITHIN THE BROADER OPEN SCIENCE MOVEMENT, THIS BOOK HIGHLIGHTS HOW NON-PROFESSIONAL SCIENTISTS CONTRIBUTE MEANINGFULLY TO RESEARCH PROJECTS. IT EXAMINES PARTICIPATORY METHODOLOGIES,

ETHICAL CONSIDERATIONS, AND THE SOCIETAL IMPACTS OF CITIZEN-LED INITIATIVES. READERS GAIN INSIGHT INTO THE COLLABORATIVE RELATIONSHIP BETWEEN PROFESSIONAL RESEARCHERS AND THE PUBLIC.

3. *CROWDSOURCING VS. CITIZEN SCIENCE: UNDERSTANDING TWO PARADIGMS OF PUBLIC ENGAGEMENT*

THIS COMPARATIVE ANALYSIS DELINEATES THE DIFFERENCES AND OVERLAPS BETWEEN CROWDSOURCING AND CITIZEN SCIENCE. THE BOOK ADDRESSES CONCEPTUAL FRAMEWORKS, MOTIVATIONS OF PARTICIPANTS, AND THE TYPES OF TASKS SUITED FOR EACH APPROACH. IT ALSO OFFERS GUIDANCE ON SELECTING THE APPROPRIATE METHOD FOR DIFFERENT RESEARCH GOALS.

4. *ENGAGING THE CROWD: THE SCIENCE BEHIND CITIZEN PARTICIPATION*

DELVING INTO THE PSYCHOLOGY AND SOCIOLOGY OF CROWD ENGAGEMENT, THIS BOOK EXPLAINS WHAT MOTIVATES INDIVIDUALS TO PARTICIPATE IN SCIENTIFIC PROJECTS. IT COVERS TECHNIQUES TO MAINTAIN PARTICIPANT INTEREST AND IMPROVE DATA QUALITY. PRACTICAL ADVICE IS PROVIDED FOR DESIGNING SUCCESSFUL CITIZEN SCIENCE AND CROWDSOURCING INITIATIVES.

5. *DATA QUALITY AND ETHICS IN CROWDSOURCED SCIENCE*

THIS BOOK CONFRONTS THE CRITICAL ISSUES OF DATA RELIABILITY, VALIDATION, AND ETHICAL CONSIDERATIONS IN CROWDSOURCED AND CITIZEN SCIENCE PROJECTS. IT DISCUSSES METHODS TO ENSURE SCIENTIFIC RIGOR WHILE RESPECTING PARTICIPANT PRIVACY AND CONSENT. THE TEXT SERVES AS A GUIDE FOR RESEARCHERS AIMING TO BALANCE OPENNESS WITH ACCOUNTABILITY.

6. *PLATFORMS AND TOOLS FOR CITIZEN SCIENCE AND CROWDSOURCING*

A COMPREHENSIVE OVERVIEW OF THE DIGITAL INFRASTRUCTURES THAT SUPPORT PUBLIC PARTICIPATION IN SCIENCE, THIS BOOK SURVEYS POPULAR PLATFORMS, APPS, AND SOFTWARE. IT EVALUATES THEIR FEATURES, USABILITY, AND SUITABILITY FOR DIFFERENT TYPES OF PROJECTS. READERS LEARN HOW TECHNOLOGY SHAPES AND ENABLES COLLABORATIVE SCIENTIFIC EFFORTS.

7. *FROM CROWDSOURCING TO CITIZEN SCIENCE: EVOLUTION OF PUBLIC INVOLVEMENT IN RESEARCH*

TRACING THE HISTORICAL DEVELOPMENT OF PUBLIC ENGAGEMENT IN SCIENCE, THIS BOOK CHRONICLES THE TRANSITION FROM SIMPLE CROWDSOURCING TASKS TO MORE COMPLEX CITIZEN SCIENCE ACTIVITIES. IT HIGHLIGHTS MILESTONES AND INFLUENTIAL PROJECTS THAT HAVE SHAPED CURRENT PRACTICES. THE NARRATIVE UNDERSCORES THE INCREASING DEMOCRATIZATION OF SCIENCE.

8. *THE IMPACT OF CITIZEN SCIENCE ON ENVIRONMENTAL RESEARCH*

FOCUSING ON ENVIRONMENTAL STUDIES, THIS BOOK SHOWCASES HOW CITIZEN SCIENCE PROJECTS CONTRIBUTE VALUABLE DATA FOR MONITORING ECOSYSTEMS, BIODIVERSITY, AND CLIMATE CHANGE. IT DISCUSSES THE INTEGRATION OF CROWDSOURCED DATA INTO POLICY-MAKING AND CONSERVATION EFFORTS. THE BOOK EMPHASIZES THE SYNERGY BETWEEN SCIENTIFIC RIGOR AND COMMUNITY INVOLVEMENT.

9. *DESIGNING EFFECTIVE CROWDSOURCING AND CITIZEN SCIENCE PROJECTS*

THIS PRACTICAL GUIDE OFFERS STRATEGIES FOR CREATING ENGAGING AND PRODUCTIVE PROJECTS THAT LEVERAGE PUBLIC PARTICIPATION. TOPICS INCLUDE PROJECT PLANNING, PARTICIPANT RECRUITMENT, DATA MANAGEMENT, AND COMMUNICATION. THE BOOK IS AIMED AT RESEARCHERS, EDUCATORS, AND ORGANIZATIONS SEEKING TO MAXIMIZE THE IMPACT OF THEIR CITIZEN-DRIVEN SCIENCE INITIATIVES.

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crowdsourcing vs citizen science: Citizen Science and Social Innovation: Mutual Relations, Barriers, Needs, and Development Factors Andrzej Klimczuk, 2022-03-21 Abstract: Social innovations are usually understood as new ideas, initiatives, or solutions that make it possible to meet the challenges of societies in fields such as social security, education, employment, culture, health, environment, housing, and economic development. On the one hand, many citizen science activities serve to achieve scientific as well as social and educational goals. Thus, these actions are opening an arena for introducing social innovations. On the other hand, some social innovations are further developed, adapted, or altered after the involvement of scientist-supervised citizens (laypeople or volunteers) in research and with the use of the citizen science tools and methods such as action research, crowdsourcing, and community-based participatory research. Such approaches are increasingly recognized as crucial for gathering data, addressing community needs, and creating engagement and cooperation between citizens and professional scientists. However, there are also vari

crowdsourcing vs citizen science: ECRM 2021 20th European Conference on Research Methods in Business and Management Dr Manuel Au-Yong-Oliveira, Prof Carlos Costa, 2021-06-07 Conference Proceedings of 20th European Conference on Research Methods in Business and Management

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crowdsourcing vs citizen science: Geoinformatics in Citizen Science Gloria Bordogna, 2019-07-01 The book features contributions that report original research in the theoretical, technological, and social aspects of geoinformation methods, as applied to supporting citizen science. Specifically, the book focuses on the technological aspects of the field and their application toward the recruitment of volunteers and the collection, management, and analysis of geotagged information to support volunteer involvement in scientific projects. Internationally renowned research groups share research in three areas: First, the key methods of geoinformatics within citizen science initiatives to support scientists in discovering new knowledge in specific application domains or in performing relevant activities, such as reliable geodata filtering, management, analysis, synthesis, sharing, and visualization; second, the critical aspects of citizen science initiatives that call for emerging or novel approaches of geoinformatics to acquire and handle geoinformation; and third, novel geoinformatics research that could serve in support of citizen science.

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most pressing environmental issues, their impact in countries around the world, and how—or if—they are being addressed. *Sustainable Planet: Issues and Solutions for Our Environment's Future* examines contemporary challenges to sustainability, including population, climate change, decreasing biodiversity, land degradation, and water quality. Each chapter analyzes one of these challenges by first providing an introduction to the topic as well as key concepts to provide readers with a basic understanding of the issue. Essays deepen comprehension by investigating different aspects of the challenge. Case studies written by experts in the field follow. Each case study considers how a specific country is affected by the particular issue as well as the measures the country is taking to find solutions that will provide for a more sustainable future. The final chapter of the book explores sustainability at a global level by examining, through annotated primary documents, a number of multinational initiatives and alliances intended to create a more sustainable planet.

crowdsourcing vs citizen science: Crowdfunding in the Public Sector Regina

Lenart-Gansiniec, Jin Chen, 2021-07-27 In recent years, crowdfunding has become important and it has been enthusiastically used not only by commercial organizations but also by the public sector. This alternative source of financing in times of constrained government budgets enables citizens to vote with their dollars online to bring ideas into reality. This book sheds light on the developing concept of crowdfunding in the public sector, with an overview of current academic discussions and best practices on crowdfunding in the public sector. The volume approaches crowdfunding in the public sector from an integrated perspective, addressing the dearth of publications on the subject. The book gathers a wealth of theoretical information, ideas, best practices and lessons learned in the context of executing concrete crowdfunding projects, and assess methodological approaches to integrating the topic of crowdfunding in public organizations curricula. The book provides definitions, insights and examples of this managerial perspective resulting in a theoretical framework of crowdfunding in the public sector. The contributors also explore different crowdfunding applications in public sectors such as local government, higher education, schools, arts & culture organizations, healthcare, energy sector, and police services, which are presented in several case studies. This is a unique book in the field that points the way forward both for policymakers and for the research community in terms of thinking about crowdfunding in the public sector and the complex issues surrounding its development.

crowdsourcing vs citizen science: Advanced Introduction to Environmental Compliance and Enforcement Paddock, Lee, 2021-09-21 This *Advanced Introduction* provides a clear and accessible guide to the essential elements of environmental compliance and enforcement programs. It examines compliance programs designed to assist regulated entities in meeting their obligations, as well as enforcement tools designed to address non-compliance - such as administrative, civil judicial, and criminal enforcement. Offering an insightful overview of this important area, LeRoy C. Paddock highlights recent developments that are changing the way compliance and enforcement work is practiced.

crowdsourcing vs citizen science: The Science of Citizen Science Katrin Vohland, Anne Land-zandstra, Luigi Ceccaroni, Rob Lemmens, Josep Perelló, Marisa Ponti, Roeland Samson, Katherin Wagenknecht, 2021-01-11 This open access book discusses how the involvement of citizens into scientific endeavors is expected to contribute to solve the big challenges of our time, such as climate change and the loss of biodiversity, growing inequalities within and between societies, and the sustainability turn. The field of citizen science has been growing in recent decades. Many different stakeholders from scientists to citizens and from policy makers to environmental organisations have been involved in its practice. In addition, many scientists also study citizen science as a research approach and as a way for science and society to interact and collaborate. This book provides a representation of the practices as well as scientific and societal outcomes in different disciplines. It reflects the contribution of citizen science to societal development, education, or innovation and provides an overview of the field of actors as well as on tools and guidelines. It serves as an introduction for anyone who wants to get involved in and learn more about

the science of citizen science.

crowdsourcing vs citizen science: Citizen Science Susanne Hecker, Muki Haklay, Anne Bowser, Zen Makuch, Johannes Vogel, Aletta Bonn, 2018-10-15 Citizen science, the active participation of the public in scientific research projects, is a rapidly expanding field in open science and open innovation. It provides an integrated model of public knowledge production and engagement with science. As a growing worldwide phenomenon, it is invigorated by evolving new technologies that connect people easily and effectively with the scientific community. Catalysed by citizens' wishes to be actively involved in scientific processes, as a result of recent societal trends, it also offers contributions to the rise in tertiary education. In addition, citizen science provides a valuable tool for citizens to play a more active role in sustainable development. This book identifies and explains the role of citizen science within innovation in science and society, and as a vibrant and productive science-policy interface. The scope of this volume is global, geared towards identifying solutions and lessons to be applied across science, practice and policy. The chapters consider the role of citizen science in the context of the wider agenda of open science and open innovation, and discuss progress towards responsible research and innovation, two of the most critical aspects of science today.

crowdsourcing vs citizen science: Collaboration and Technology Armanda Rodrigues, Benjamim Fonseca, Nuno Preguiça, 2018-08-27 This book constitutes the refereed proceedings of the 24th International Conference on Collaboration and Technology, CRIWG 2018, held in Costa de Caparica, Portugal, in September 2018. The 11 revised full papers presented together with 6 short papers were carefully reviewed and selected from 32 submissions. The papers published in the proceedings of this year span different areas of collaborative computing research, from collaborative learning to collaboration through social media and virtual communities.

crowdsourcing vs citizen science: Science for Environmental Protection National Research Council, Division on Earth and Life Studies, Board on Environmental Studies and Toxicology, Committee on Science for EPA's Future, 2012-12-21 In anticipation of future environmental science and engineering challenges and technologic advances, EPA asked the National Research Council (NRC) to assess the overall capabilities of the agency to develop, obtain, and use the best available scientific and technologic information and tools to meet persistent, emerging, and future mission challenges and opportunities. Although the committee cannot predict with certainty what new environmental problems EPA will face in the next 10 years or more, it worked to identify some of the common drivers and common characteristics of problems that are likely to occur. Tensions inherent to the structure of EPA's work contribute to the current and persistent challenges faced by the agency, and meeting those challenges will require development of leading-edge scientific methods, tools, and technologies, and a more deliberate approach to systems thinking and interdisciplinary science. *Science for Environmental Protection: The Road Ahead* outlines a framework for building science for environmental protection in the 21st century and identified key areas where enhanced leadership and capacity can strengthen the agency's abilities to address current and emerging environmental challenges as well as take advantage of new tools and technologies to address them. The foundation of EPA science is strong, but the agency needs to continue to address numerous present and future challenges if it is to maintain its science leadership and meet its expanding mandates.

crowdsourcing vs citizen science: Nursing Informatics Ursula H. Hübner, Gabriela Mustata Wilson, Toria Shaw Morawski, Marion J. Ball, 2022-07-25 This new edition of the classic textbook on health informatics provides readers in healthcare practice and educational settings with an unparalleled depth of information on using informatics methods and tools. However, this new text speaks to nurses and — in a departure from earlier editions of this title — to all health professionals in direct patient care, regardless of their specialty, extending its usefulness as a textbook. This includes physicians, therapists, pharmacists, dieticians and many others. In recognition of the evolving digital environments in all healthcare settings and of interprofessional teams, the book is designed for a wide spectrum of healthcare professions including quality officers, health information

managers, administrators and executives, as well as health information technology professionals such as engineers and computer scientists in health care. The book is of special interest to those who bridge the technical and caring domain, particularly nurse and medical informaticians and other informaticians working in the health sciences. *Nursing Informatics: An Interprofessional and Global Perspective* contains real-life case studies and other didactic features to illustrate the theories and principles discussed, making it an ideal resource for use within health and nursing informatics curricula at both undergraduate and graduate level, as well as for workforce development. It honors the format established by the previous editions by including a content array and questions to guide the reader. Readers are invited to look out of the box through a dedicated global perspective covering health informatics applications in different regions, countries and continents.

crowdsourcing vs citizen science: Academic Libraries and Public Engagement With Science and Technology Eileen Harrington, 2019-03-28 Libraries have historically played a role as a community builder, providing resources and spaces where knowledge can be archived, shared and created. They can also play a pivotal role in fostering the public's understanding of science and scientific processes. From makerspaces to data visualization labs to exhibits, many libraries already delve into scientific explorations and many more could join them. Scientists often need to include broader impacts goals in grant proposals, but they might not know where to begin or feel that they do not have the time to devote to public engagement. This is where libraries and librarians can help. Research in science communication also supports tapping into libraries for public engagement with science. Studies show that it is important for scientists to present findings in an apolitical way-not aligning with one solution or one way of thinking and not being seen as an activist (Druckman, 2015; Jamieson & Hardy, 2014). One of the core tenets of librarians and libraries is to present information in a neutral way. Research also shows that Informal conversations about science can have a greater effect on people than reading about it online or hearing about it on the news (Eveland & Cooper, 2013). Again, libraries can play a role in fostering these types of conversations. Given this landscape, this book will demonstrate concrete ways that libraries and librarians can play a role in fostering public engagement with science. In addition to background information on the current landscape of public knowledge and understanding of science, it will also include best practices and case studies of different types of programming and services that libraries can offer. Often libraries do not jump to mind when people think about science education or science literacy, and many librarians do not come from a science background. Literature on science programming and sharing science is largely absent from the library field. This book will help give confidence to librarians that they can participate in engaging the public with science. At the same time, it will provide a conduit to bring informal science educators, communication officers from universities or research organizations who share scientific discoveries with the public, and librarians together to explore ways to align their work to promote scientific literacy for all.

crowdsourcing vs citizen science: The Handbook of Science and Technology Studies, fourth edition Ulrike Felt, Rayvon Fouche, Clark A. Miller, Laurel Smith-Doerr, 2016-12-16 The fourth edition of an authoritative overview, with all new chapters that capture the state of the art in a rapidly growing field. Science and Technology Studies (STS) is a flourishing interdisciplinary field that examines the transformative power of science and technology to arrange and rearrange contemporary societies. The Handbook of Science and Technology Studies provides a comprehensive and authoritative overview of the field, reviewing current research and major theoretical and methodological approaches in a way that is accessible to both new and established scholars from a range of disciplines. This new edition, sponsored by the Society for Social Studies of Science, is the fourth in a series of volumes that have defined the field of STS. It features 36 chapters, each written for the fourth edition, that capture the state of the art in a rich and rapidly growing field. One especially notable development is the increasing integration of feminist, gender, and postcolonial studies into the body of STS knowledge. The book covers methods and participatory practices in STS research; mechanisms by which knowledge, people, and societies are coproduced; the design,

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