



Conceptual framework in Chemistry and Biochemistry Research

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Background

A concept is an idea notion, thoughts, perception, or impression about something or anything. It may be about a question, problem, challenge, strength, success, or more. A framework is an outline, agenda, or background of anything (1). So, the concept or framework of Chemistry and Biochemistry research may be seen as the ideal notion, thoughts, perception, or impression of a

research or investigation whereas the framework of the Chemistry and Biochemistry research is the outline, agenda, or background of the research. (2)

Therefore, the conceptual framework of Chemistry and Biochemistry research is the outline or agenda of the researcher's idea, notions, perception about the research or investigation (3). In other words, the conceptual framework may be seen as the

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entire, reasonable direction and associations of research ideas that form the fundamental intellectual, structures, plans and practices and implementation of your whole research project. The conceptual framework defines the complete package made of the Chemistry and Biochemistry researcher's thoughts channeled towards the identification and mastery of the research: topic, problem, questions, literature, theories, methodology, the methods, procedures and instruments, the data analysis and interpretation of findings, recommendations and conclusions (4).

According to Miles and Huberman (5), a conceptual framework or concept map pulls together, and makes visible, what your implicit theory is, or clarifies an existing theory. This can allow you to see the implications of the theory, its limitations, and its relevance for your study. Again, it helps to develop theory and Like memos, concept maps are a way of "thinking on paper"; they can help you see unexpected connections, or to identify holes or contradictions in your theory and figure out ways to resolve these. Concept maps usually require considerable reworking to get them to the point where they are most helpful (6)

Concept map development

To develop a concept map, a set of concepts to work with is needed knowing that it is all about trying to represent already existent Chemistry and Biochemistry research theory about the phenomena being studied, not primarily to invent a new theory (7). On the other hand, topic keywords probably represent important concepts in the theory of Chemistry and Biochemistry research being implemented (8). Some of these concepts can be pulled directly from things already written

about a research topic under investigation. These may serve as a way of broadening the scope and spectrum of coverage of the Chemistry and Biochemistry research area

Existent Chemistry and Biochemistry research topic may be used as an example in which an already written topic may be used as a template to map out the theory that is implicit (or explicit) in this topic. One key concept, idea, or term may be taken and an effort made to brainstorm on all of the topics themes and subthemes that might be related to this (9). Thereafter, efforts are made to scale down, the Chemistry and Biochemistry research topics, and only those that seem most directly relevant to a study under investigation may be studied.

The selected topic is placed under scrutiny by asking someone to review the topic under investigation to help point out areas of bias about your topic, Concepts are not to be ignored based on personal experience rather than the literature as these can be central to a conceptual framework. Strauss (10) and Miles and Huberman (5) provided additional advice on how to develop concept maps for your study. Once some concepts to work with have been generated, how these are related and what connections exist among them are found out.

Rational

Many publishers and authors indeed have the right to present their Chemistry and Biochemistry research report in one way or the other, one thing stands out that in all researches a generally good paper include one that has a very clear concept map making it clear for readers to locate the point of argument and what authors have achieved or tried to achieve in the paper. The significance

of a conceptual map or framework cannot be overemphasized and this applies to all disciplines or events for which reliable answers are needed for critical questions.

Objective

In this study, efforts were made to review in retrospect activities and updates taking place in the Chemistry and Biochemistry research world over the past 3 decades with the ultimate goal of showing the significance of conceptual framework in Chemistry and Biochemistry research

Materials and Methods

In this retrospective cross-sectional study, we downloaded and perused 486 published full-length original papers, published addendum, corrections, editorials, abstracts of meetings, conference proceedings, and review articles, on the general concept of Conceptual framework. This searching and corresponding download of relevant papers were made from a globally recognized Chemistry and Biochemistry research-based data repository that included but was not limited to the Web of Science (WoS) (11 core collection database on the nineteenth of July 2020 at about 10.25 GMT+2). The database of PubMed, Research Gate, and Google scholars was perused to be sure no new documents relevant and necessary for this study were missed out. However, the web of science formed the major and reference database for this study because our software was more compatible with recovered data encoded in the web of science database while other databases consulted served to provide other relevant articles, we considered imported but probably missing in the web of science.

Boolean topic search approach

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The Boolean topic search approach (12) used included “(Conceptual * AND Framework\$) OR (Framework * AND Research concept\$) to encompass all relevant and available documents (13) on the subject of Conceptual framework between 1990 and 2019. At the time of this study, we judged that the Web of Science Core Collection database had enough user-friendly and accessible academic Chemistry and Biochemistry research database relatively covering enough journals, books, conferences as well as millions of records from clarivate.libguides.com (references). To ensure the inclusion of abbreviated or shorten words, the wildcard * and \$ were added to the end of the search algorithms. Thereafter, all documents that meet the eligibility criteria of conceptual framework were retrieved and exported into BibTex file format and the authors, titles, abstracts mined in PDF file format.

Data analysis

All the bibliometric variables were retrieved filtered and normalized for quality control. The results were analyzed in the bibliophagy plugin package of 3.5.1 version of R-studio software, while the codes and commands were adopted from <https://www.bibliometrics.org> to evaluate the bibliometrics indices. Tables and graph were made in Microsoft excel 16 version and network maps were visualized in 1,6 Vox-viewer software

Results

In this study, 409 papers written by 1425 authors for three decades were recovered, perused, and analyzed as shown in table 1. Ninety-nine (99) documents were written by 96 authors while 1329 authors wrote 1230, multi-author documents giving 3.62 collaborative indexes. Authors and co-authors per document indexes were 3.48 and

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3.62 respectively. Two hundred and eighteen (218) documents were full-length articles. Twenty-nine book chapters and 10 proceedings papers were originally presented as articles. Fifty-two (52) proceedings papers, 56 reviews, three of them were originally presented as journal articles while 18 were editorial materials and 18 articles were Editorial documents respectively.

Description	Results
Documents	409
Sources (Journals, Books, etc.)	344
Keywords Plus (ID)	1288
Author's Keywords (DE)	1027
Period	1991 - 2019
Average citations per documents	34.27
Authors	1425
Author Appearances	1482
Authors of single-authored documents	96

Conceptual frame work in research

Authors of multi-authored documents	1329
Single-authored documents	99
Documents per Author	0.287
Authors per Document	3.48
Co-Authors per Documents	3.62
Collaboration Index	4.29
Document types	
ARTICLE	218
ARTICLE; BOOK CHAPTER	29
ARTICLE; PROCEEDINGS PAPER	10
BOOK	1
BOOK REVIEW	3
CORRECTION	2
EDITORIAL MATERIAL	18
MEETING ABSTRACT	17
NOTE	3
PROCEEDINGS PAPER	52
REVIEW	56

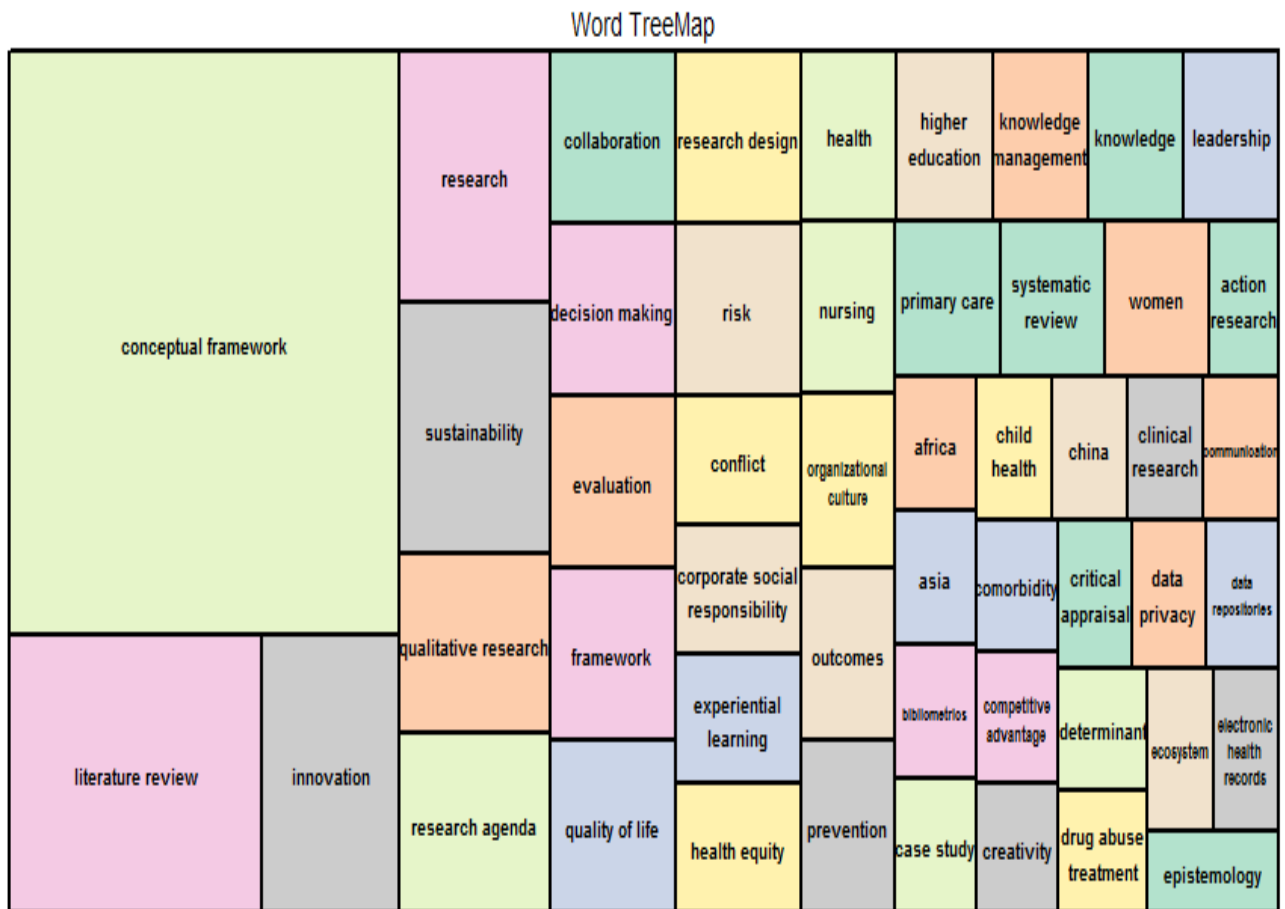


Figure 1: Word Tree-Map of with conceptual framework in Chemistry and Biochemistry Research

From figure1, the **conceptual framework** received the biggest category allotment followed by research agenda, health, nursing, case study, and determination. A **literature review** was the next biggest category allotment and the associated variables included research, decision making, framework, bibliometrics, and competitive advantage. The next category is **innovation** and associated variables included, including sustainability, prevention, creativity, clinical research, and electronic health records. The next category was **qualitative research** and the corresponding variables included evaluation, Africa, knowledge management, women, data privacy, and communication. **Collaboration** and **quality of life** had equal category size allotment with variables of collaboration including primary care, systematic review, critical appraisal, knowledge, action research, and epistemology whereas experiential learning, Asia, comorbidity, leadership, and data repositories as the associated variables. **Risk** is the next category and associated variables

included cooperate social responsibility, outcomes, higher education, China, and ecosystems respectively

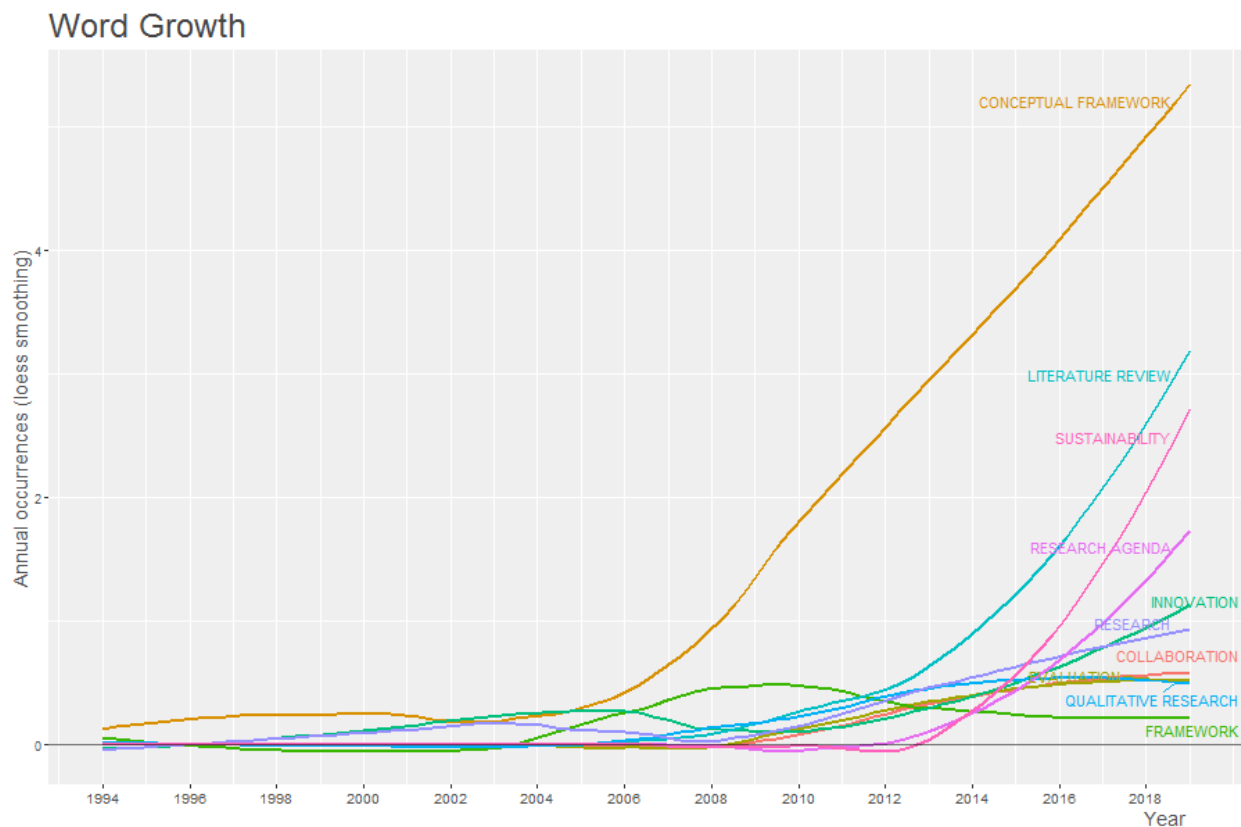


Figure 2: Word growth trend with a conceptual framework in Chemistry and Biochemistry research

Figure 2: The word growth graph shows word usage in the studied period as relates to conceptual framework and research. While the frequency of words used remained relatively stable from 1994 to 2004, the use of the conceptual framework experienced a hype as seen in a steep rise from 2008 till 2018. All other words used remained relatively stable and low in occurrence from 2004 till 2014, thereafter literature review, sustainability, research agenda, and innovation as shown in the fig above.

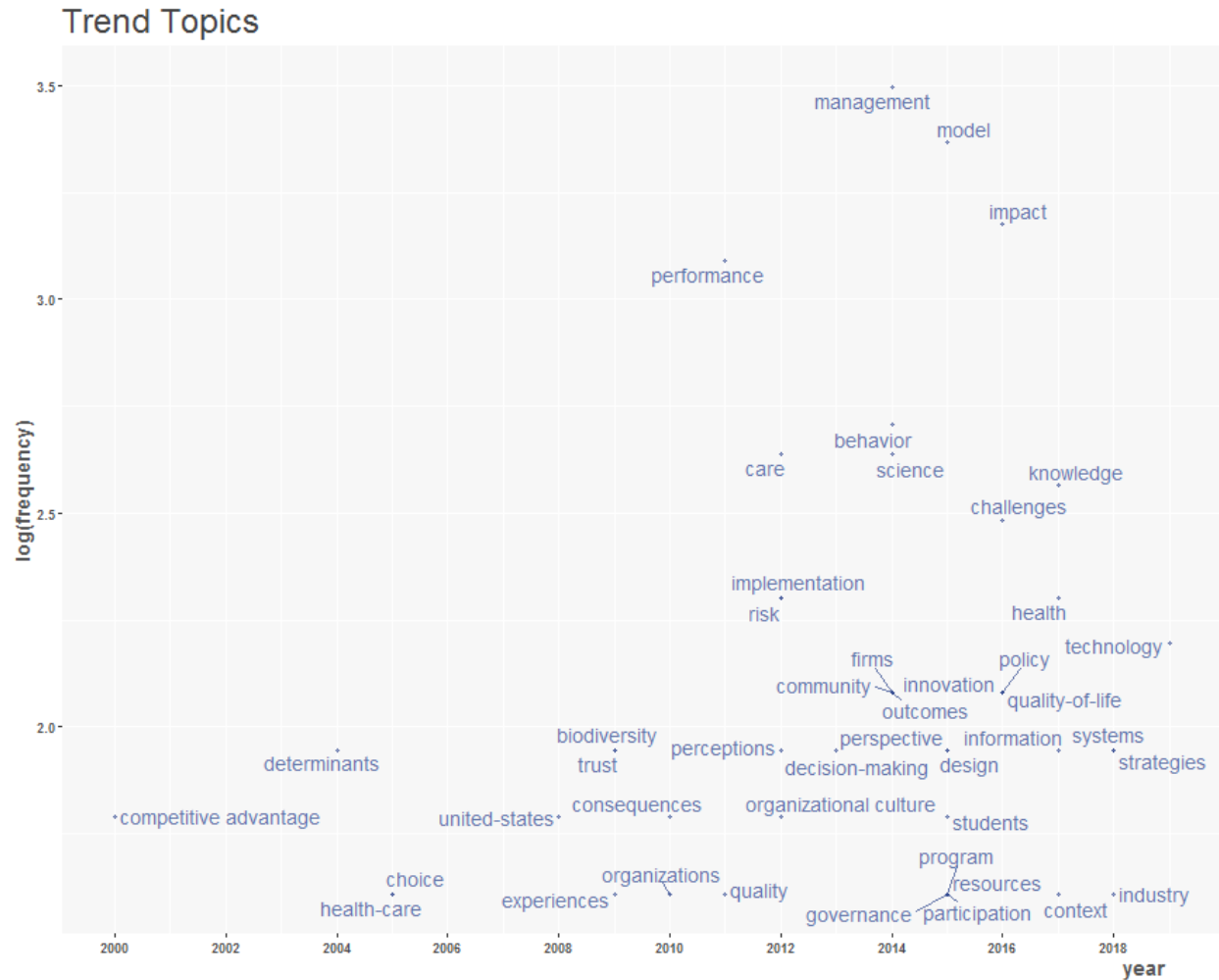


Figure 3: Topic trend with conceptual framework Chemistry and Biochemistry research

Figure 3: The trend of topics used in research involving conceptual framework are shown in the above figure. The use of words in research experienced the greatest 4-fold logarithmic growth between 2014 and 2018 with governance, participation, and context being at the base of the topic trend while management, model, and impact were on top of the topic trend. Terminologies that saw a two-fold rise included information, systems, outcomes, policy, innovations, community, firms among others. Between 2008 and 2010, biodiversity, consequences, experiences, United states, experienced less than 2-fold log rise in occurrence.

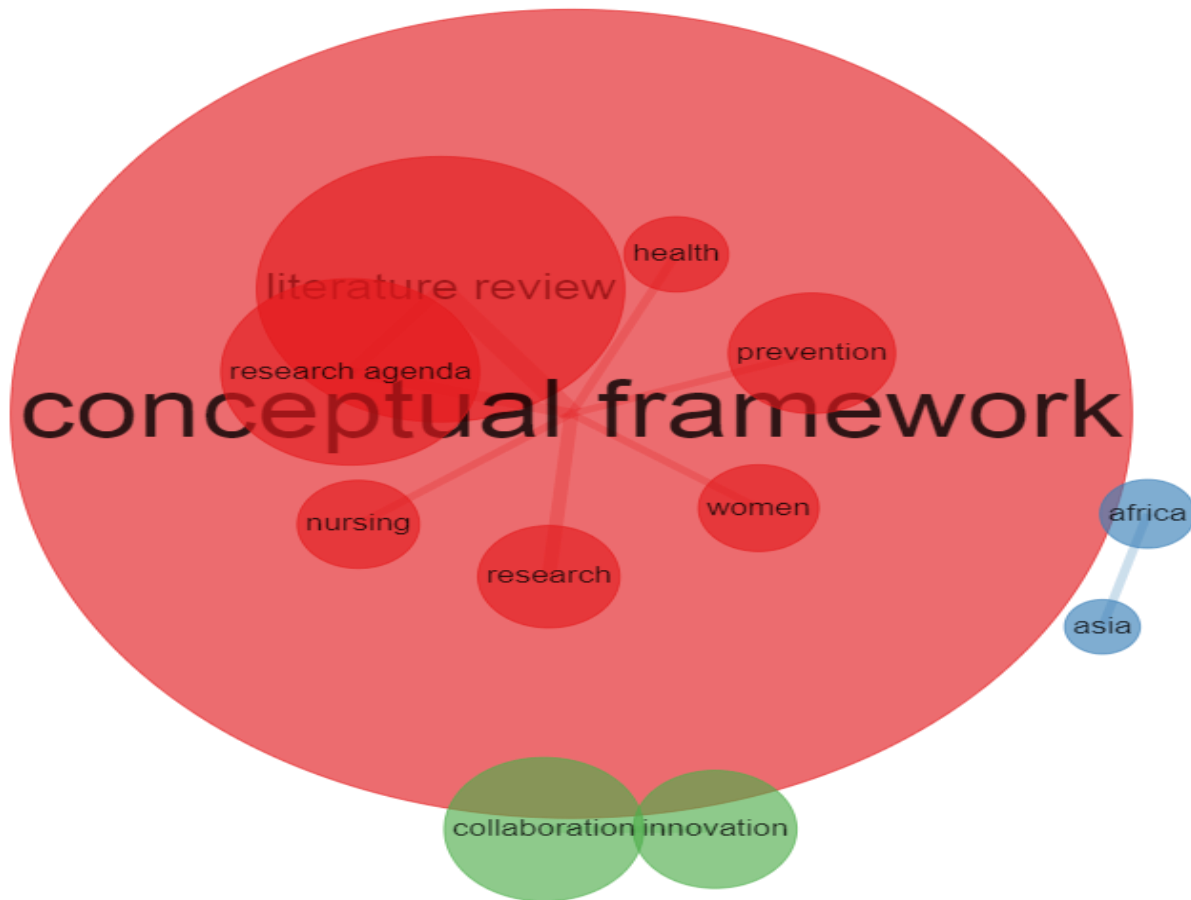


Figure 4. Co-occurrence of author keywords network with a conceptual framework in Chemistry and Biochemistry research

Conceptual framework cooccurred with literature review, research agenda, prevention, research, nursing, women, and health. Among the conceptual framework variables, the literature review had the strongest relationship with research while nursing, prevention, women, health, and research agenda had a similar relationship with the literature review.



Figure 5: Multiple comparison Analysis of the Conceptual structure map in Chemistry and Biochemistry Research

In figure 5 above, there are 3 main clusters, the blue, green, and red clusters. The green cluster located in the North-East quadrant of the multiple comparison analysis of the conceptual structure map MCA/CSM which represents a positive conceptual framework that is strongly related to the associated variables such as performance, competitive advantage, governance, perspective, context, management, and information technology, all clustered in a distance considered most discriminatory to the conceptual framework and research.

To further interpret the observed category and variable relationship nested within the northeast quadrant, the distance from the central category to the variables depicts the strength of relationships with the closest having a stronger relationship than the distant variables. Therefore, in the green words cluster: the conceptual framework map is strongly related to knowledge and weakly related to the resource-based view, networks, organizations, and technology

The green cluster in the southeastern quadrant depicts the presence of inclusion and diversity weekly related to perspective, identity, business, construction, and firm performance.

Finally, the red cluster lies between the southwest and the northwest quadrant depicting no inclusion and diversity and the associated variables are relatively normally (neither strong nor weak) associated with the listed variables. However, within the red cluster, nestled within the southwest and northwest quadrant: faculty, women, medicine, care, cultural competence, improving diversity, African Americans, climate, workplace, and leadership are all distantly discriminated against inclusion and diversity compared to closely related experience education, science, gay, discrimination, schools, a minority in figure 5

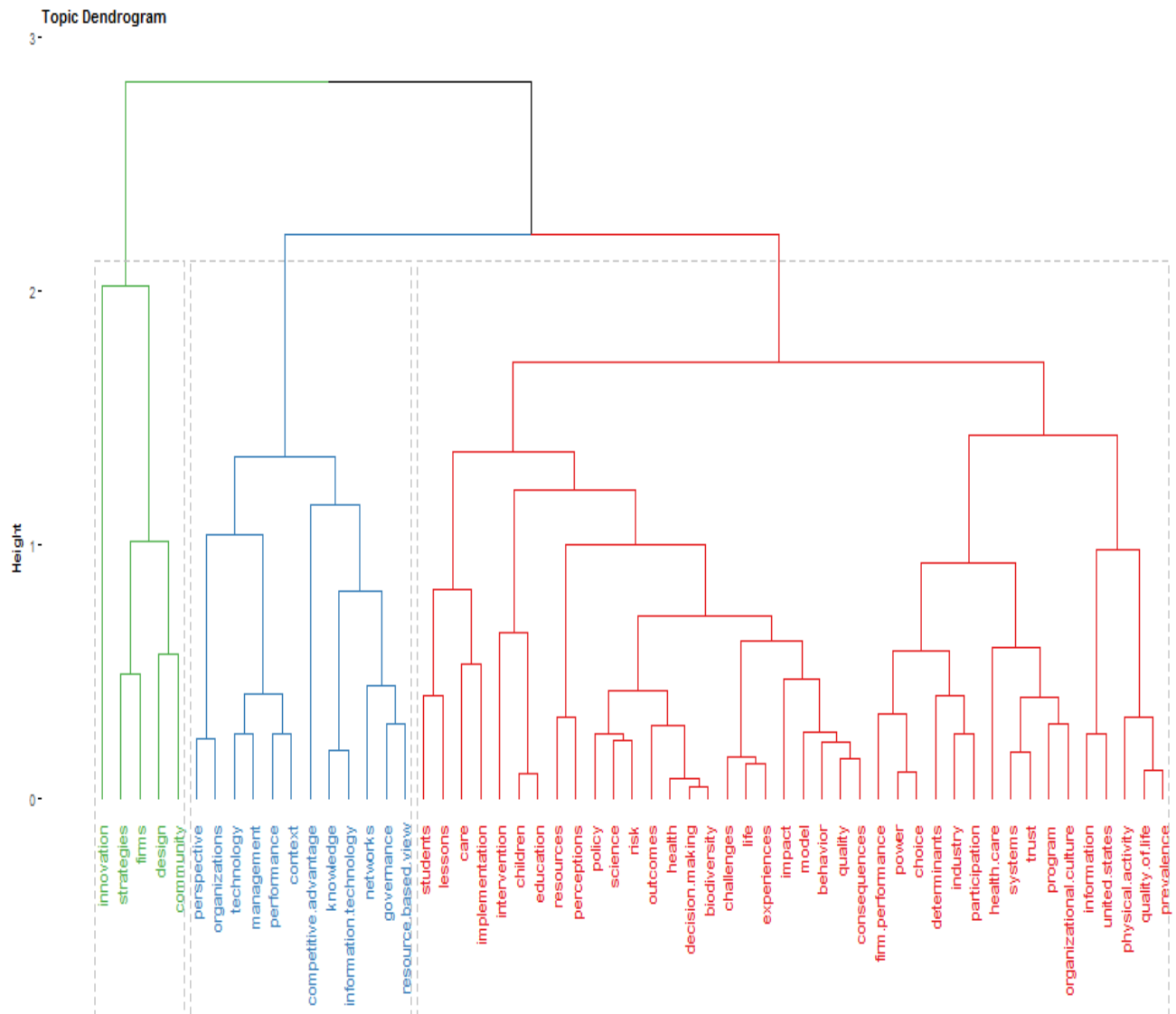


Figure 6: Topic dendrogram with a conceptual framework in Chemistry and Biochemistry Research

From figure 6 of the topic dendrogram above, community and design are related to each other while strategies and firms are related to each other. However, community/design is different from strategies/ firms. Information technology and knowledge are similar but not similar to complete advantage. Context and performance are a similar bit different from management and technology. On the other hand, risk and sciences are similar but different from policy. Consequences and quality are similar but different from behavior. Organizational culture and program are similar but different from trust and systems Experience are similar to life but different from challenges. And so on

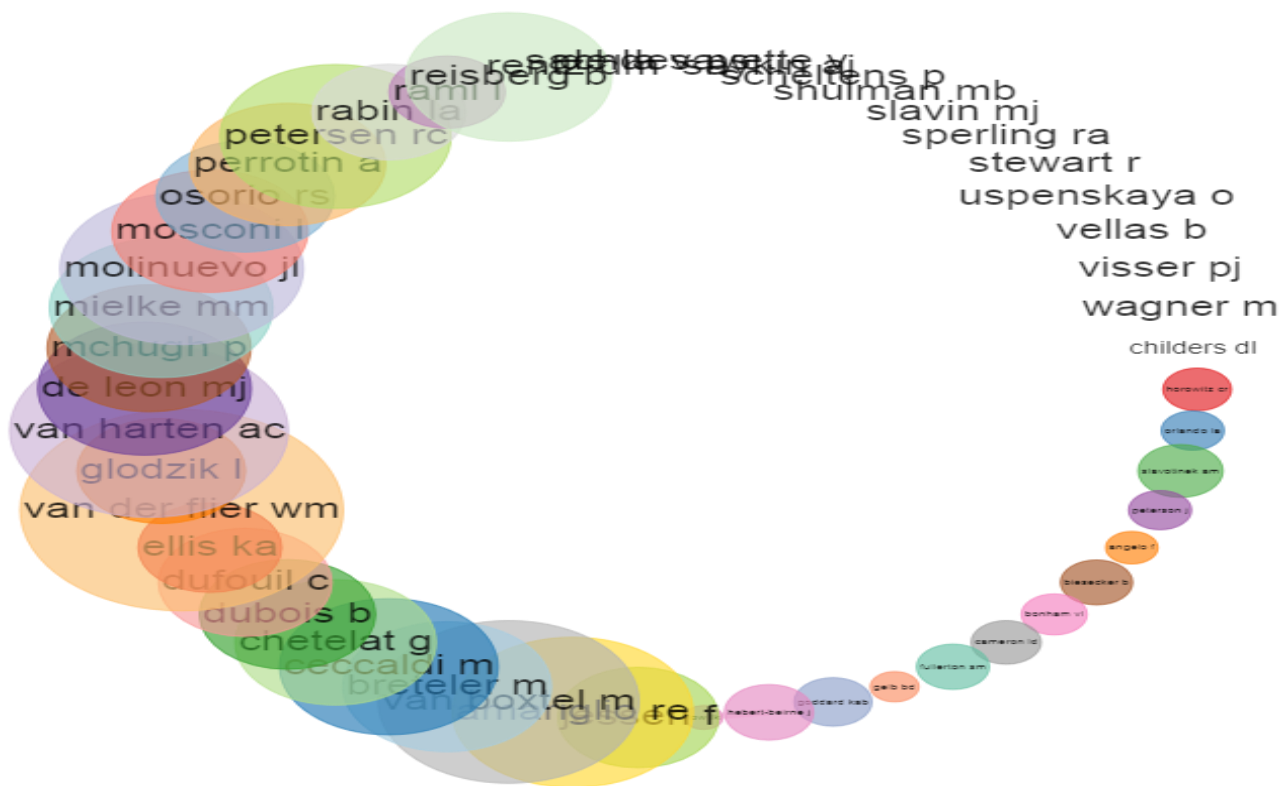


Figure 7: Author collaboration network with a conceptual framework in Chemistry and Biochemistry research

The bubbles represent authors, the size of the bubbles represents the magnitude or number of publications. The line between authors represents coauthorship links, the line between two authors or bubbles shows that those authors have coauthored one or more articles, authors that have coauthored articles tend to be located close to each other. Colors indicate clusters of authors that are connected by coauthorship. The figure above shows there was relatively no collaboration but This open access publication is Licensed under a creative common's attribution 4.0 international License

the bubbles overlap may indicate a coauthorship connection between authors. Authors on the left of the figure relatively low number of articles with no collaboration and no coauthorship.

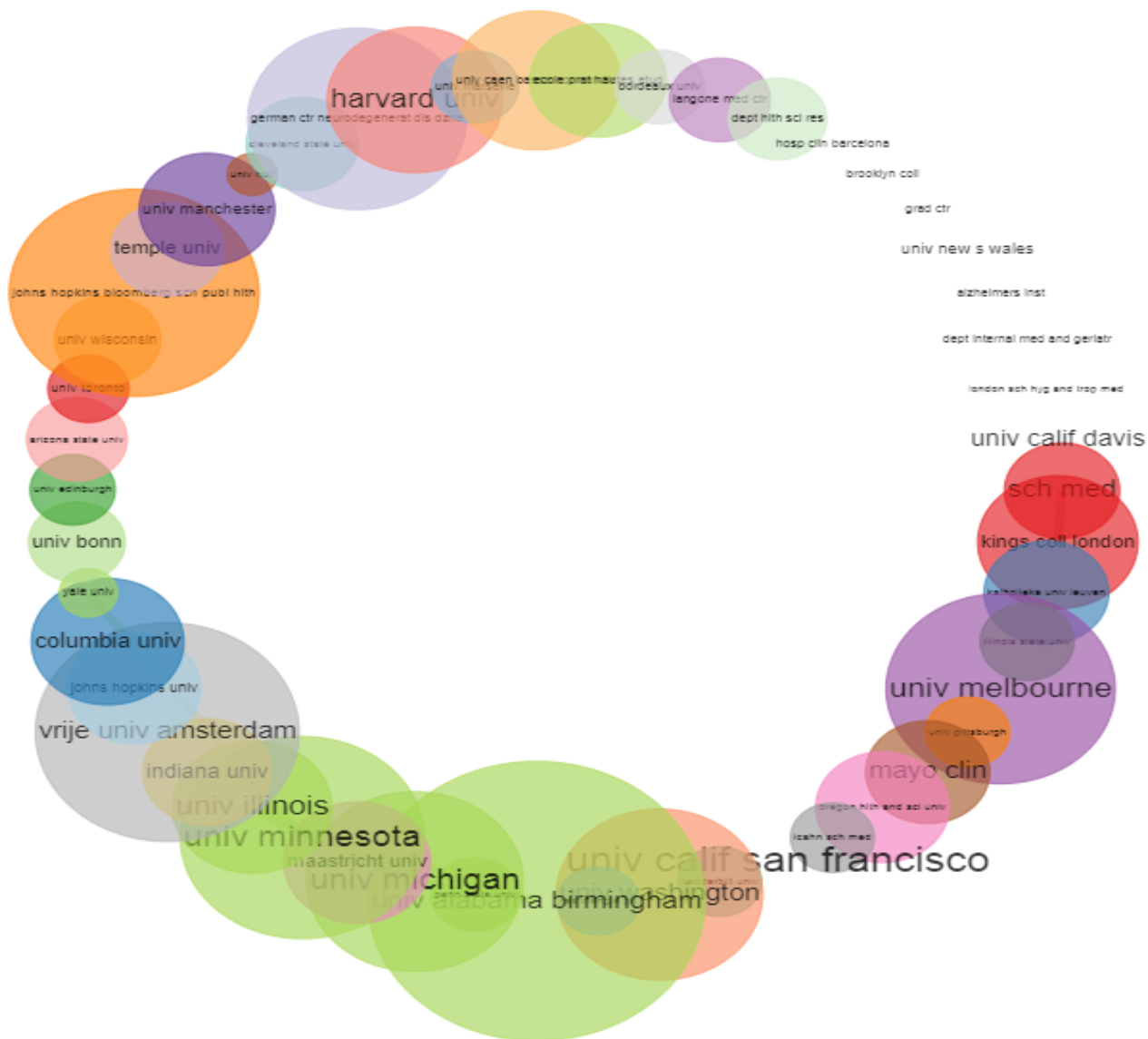


Figure 8: Institutional collaboration network with a conceptual framework in Chemistry and Biochemistry research

The figure above shows there was relatively no Institutional collaboration that is outside a given location since there is no line linkage. However, bubbles overlap shows size overlap and may not indicate any consortia of collaboration.

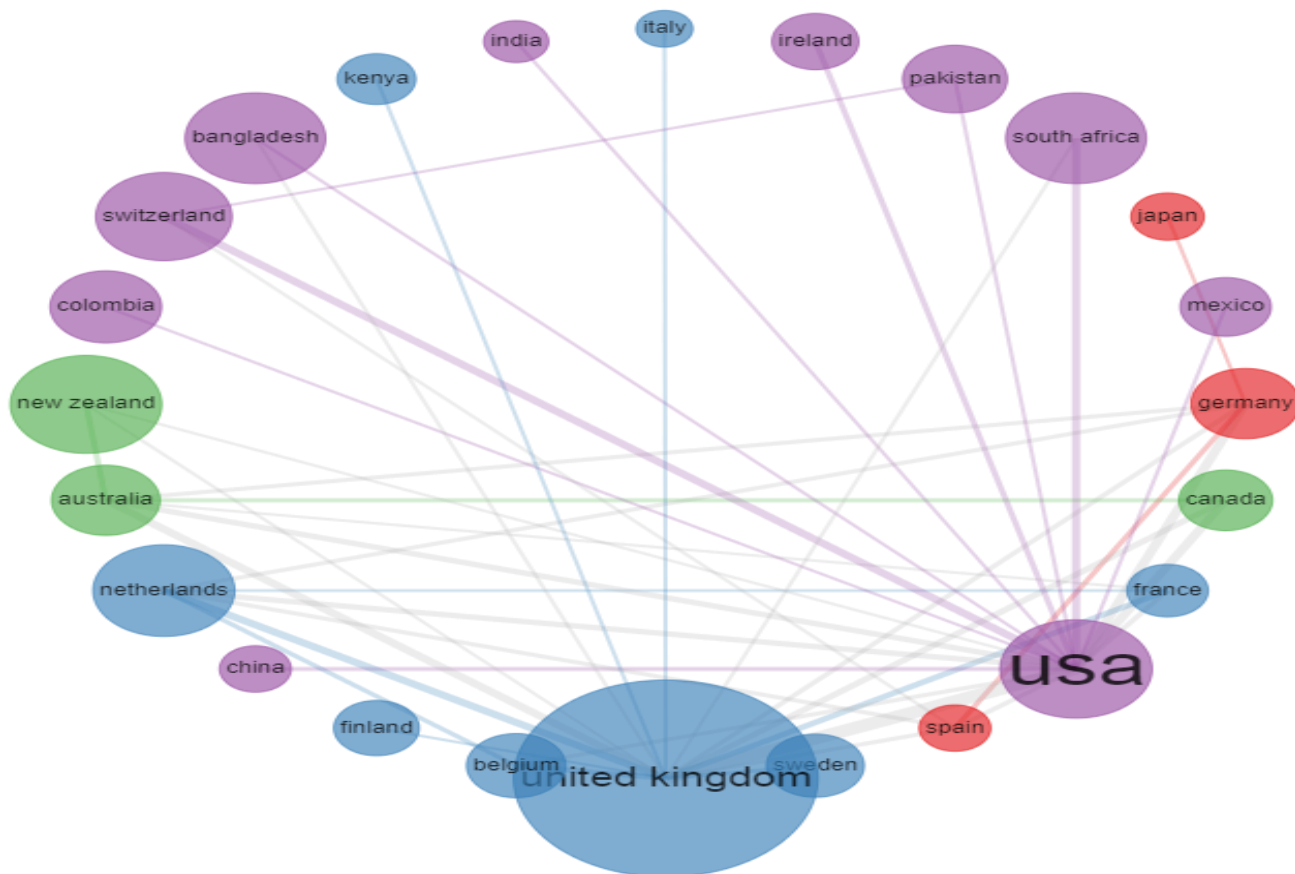


Figure 9, Country collaboration network with a conceptual framework in Chemistry and Biochemistry research

The figure above shows there was a collaboration between countries. United Kingdom collaborated more with other countries followed by the USA. Other countries were all connected to either USA or UK but rarely to each other. Three main clusters can be seen the blue, purple, and red. The United Kingdom worked more with Netherlands, and France, then followed by Kenya and Italy, and Belgium, Sweden, and Finland. The USA worked more with Switzerland, Ireland, and South Africa followed by Bangladesh, Pakistan, Columbia Mexico, India, and China. The red cluster is between Germany Japan and Spain. And the green cluster is between New Zealand Australia and Canada

Discussion

The emergence of complex health epidemics and pandemics (14) continue to emphasize

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the need for Chemistry and Biochemistry research alertness if humans are to continue living on the planet earth (15). Treatment failure poses great a challenge to successful disease interventions, especially during

epidemics. There are ample literature widely confirming that resistance to treatment agent, compliance to treatment directives and prescription, holds the key to effective intervention (16). Treatment failures and management complications (17) continue to stress the need for advanced treatment competencies (18) and thereby underscoring the need for advances in Chemistry and Biochemistry research (19) that helps define the chemistry of drug reactions in drug discovery science. The need for a good conceptual framework that will help a carefully designed Chemistry and Biochemistry researched to achieve its set objective cannot be overemphasized. Therefore, a description of a good concept is necessary.

Application of Chemistry and Biochemistry knowledge in health and wellness issues

To improve treatment outcome, Chemistry and Biochemistry have a part to play because a good concept impacts on many aspects of Chemistry and Biochemistry research competencies concerning health and wellness issues so that incidences of treatment failure is reduced to a minimum. A good concept can impact the many Chemistry and Biochemistry research areas including but not limited to how best to develop, produce, and market drugs licensed for use as medications for humans or animals (20). Emphasis is placed on brand-name (trade name and can be produced and sold only by the company holding the patent) and/or generic (i.e., chemically equivalent, lower-cost version of a brand-name drug) medications and medical devices (agents that act on diseases without chemical interaction with the body) (21).

Outline of the best ways to develop, produce, and market drugs licensed for use as medications for humans or animals (22). This

includes brand-name (trade name and can be produced and sold only by the company holding the patent) and/or generic (i.e., chemically equivalent, lower-cost version of a brand-name drug) medications and medical devices (agents that act on diseases without chemical interaction with the body). (23)

Chemistry and Biochemistry research on the Safety of drug delivery to anticipated targets

Medical applications of polymer chemistry such as latex gloves, bandages, and tubing, to applications as advanced as self-tying sutures, implantable medical devices, and artificial joints (24). Drug delivery allows for targeted delivery of therapeutics directly to tumor tissue using specially designed polymeric nanomaterials (25). Advancements in biodegradable polymers have created products for use in biomedical engineering applications as scaffolds that support tissue growth, then degrade slowly once implanted in the body (26). They're also a need to look at green polymer chemistry involving the development of green (environmentally-friendly) polymers. Emphasis is placed on more environmentally friendly packaging—incorporating biodegradable materials, edible food wrappings, bio-based/renewable monomers, and processes that minimize the amount of packaging material used (27).

Biochemistry of cell regulation and integrity research

Complete life cycle analysis that considers everything from starting materials through final disposal, including impact on the environment and health (28). How best to start a company production line using starting materials, i.e., monomers, derived from bio-based, renewable resources, such as plants, or

replicating polymers already present in nature (29). Attention are also is placed on; Chromoproteins and Gene Expression Control (30), Intracellular Signaling and Cancer and Mitochondria in Ageing and Disease (31), Cell Regulation and Cell Death and Proteases, Serpins, and Cytolysins in Cell Development and Death (32), and Protein Folding, Misfolding, and Disease and Protein Interaction and Cancer Res Lab (33)

Elements of the concept map

Chemistry and Biochemistry Conceptual map (34) has 4 unique elements, namely: concept, lines/arrows, linking words, and proposals. A concept is a word that is used to identify facts, processes, objects, or situations that share the same characteristics, and differentiate them from those that are different from them (35). Lines and arrows are used, within a conceptual map, to represent the connection between one concept and another (36). Linking words are short descriptions that are located between one concept and another, next to the lines that connect them, with which how concepts are related. Concept maps are time schemes containing preselection, presentation of information in segments that are later integrated. Concept maps answer questions that help build knowledge (37). When new knowledge is gained, stakeholders appreciate elaborate approaches to things and strive to implement them, leading to the negotiation of meaning and self-esteem

There are so many ideas that come in and goes out in researchers mind but it should be noted that not all these ideas are researchable. The decision on which thoughts or ideas should be studied are based on many premises but the most outstanding are challenges too: advancement, wellbeing, existence, supremacy, and more.

Advancement is a broad term that may include but is not limited to knowledge, technology, economy, and many other interests. Wellbeing covers health, social, economic, and environmental. Existence challenge deals with survival from extinction while supremacy challenge deals with fame, power, respect, and more. Care and caution are needed when sieving through information to know what to study or investigate to confirm a concept.

Information quality for concept map development

Quality of information considered when designing a good concept include, relevance, faithful representation, Neutral, comparable, verifiable, concise, timely, Relevant ideas keep the research in focus to the objective and prevent frivolities and waste of resources and increase the feasibility of the study. Correct representation gives the true picture of the idea in real terms with no fabrication, falsification, or extrapolation. The neutral idea is not swayed to the left or right and mostly remains in the center but subsequently impacts both left, right, and center. Nature and quality of ideas are defined by their comparable, verifiable, concise, and timely characteristics. These are the basis for which a good concept map or framework is made.

Figure 1, shows a word treemap of certain terminologies used to show the relevance of this study to Chemistry and Biochemistry research. Such terminologies include but are not limited to: health, health equity, drug abuse treatment, qualitative research, primary care, action research, collaboration, quality of life, Africa and Asia, China, and others. These are terms that can come to mind when conceptualizing a research study in Chemistry and Biochemistry. In Figure 2, management, model and impact were on top of the most trending topics. Many of the

Chemistry and Biochemistry research is tested on experimental models, and the outcome of the experiments has impacts on disease management in the long or short term.

In decreasing order of magnitude, conceptual framework cooccurred with literature review, research agenda, prevention, research, and more fig 4. In Chemistry and Biochemistry research, the first step is to conceptualize the research, look for literature to determine its relevance in the research world stage, develop an agenda of the research and implement the research in such a way as to achieve the ultimate goal of disease prevention. Among the conceptual framework variables, the literature review had the strongest relationship with research depicting the strength and influence of literature review in Chemistry and Biochemistry research both of which remain strong variables to the conceptual framework.

There were little or no authors and institutional collaboration figures 7 and 8. Probably depicting the challenges and roadblocks militating against Chemistry and Biochemistry research. However, collaboration was noticed at the country level with the United Kingdom and the United States playing a major role in synchronizing the global research agenda especially in the context of Chemistry and Biochemistry research.

As a master plan, which a conceptual framework is, some questions are necessary for the context of Chemistry and Biochemistry research and need answers for a good concept to be produced. The questions include but not limited to the following: what the researcher wants to do in the context of Chemistry and Biochemistry research? (38) Why does he or

she want to do it concerning importance, target, objective, and spectrum of coverage in Chemistry and Biochemistry research? How does the researcher want to achieve its objective concerning methods, participants, sampling and data analysis, interpretation of data, the worldview of data concerning positive or interpretative, critical or pragmatic paradigm in the context of Chemistry and Biochemistry research? How will the report or publication of the findings be concerning: a research paper, seminar paper, a conference paper, a book chapter, a book or thesis in the context of Chemistry and Biochemistry research?

Conclusion

The Conceptual framework is important in research, provision of the fundamental principle for setting up a standard for Chemistry and Biochemistry research, enhancement of consistency and comparability, generally accepted criteria and principles governing science disciplines are ascertained. such as Chemistry and Biochemistry research. The objective identifies the goals and purpose while the fundamental provides the how to achieve the objectives of the Chemistry and Biochemistry research.

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