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EXTRINSIC AND INTRINSIC MOTIVATION: BIBLIOMETRIC ANALYSIS-DERIVED INSIGHTS

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Abstract*: Numerous studies, such as sports, education, and business, conduct extensive research on motivation. Due to the importance of precise measurements for understanding extrinsic and intrinsic motivation, an evaluation of measuring instruments is essential. The objective of this study was to assess the publishing patterns of extrinsic and intrinsic motivation in the Scopus and Web of Science databases using ScientoPy and VOSviewer. This study indicated an upsurge in extrinsic and intrinsic motivation publications, with Web of Science publications outperforming Scopus after 2000. "Psychology" has been the subject of most interest in this research domain. The current study also found that "Frontiers in Psychology" and "Computers in Human Behaviour" have become the distinct foci of extrinsic and intrinsic research. This study found that content analysis based on the examination of authors' keywords focuses principally on "Extrinsic motivation", "Intrinsic motivation", and "Self-determination Theory". Notably, this review found that "Gamification", "Physical activity", and "Self-efficacy" emerged as hot keywords after 2017. This bibliometric research suggests that the publication of research on extrinsic and intrinsic motivation is substantial. In addition, it provides an overview of this research domain, which may be helpful to academics and those interested in gaining a deeper understanding of this topic. Also, researchers can monitor and review studies on extrinsic and intrinsic motivation for future reference as a road map for their work.*

Keywords*: Extrinsic Motivation, Intrinsic Motivation, Publication Trends, Scopus, Web of Science*

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Introduction

Many of us have goals and things to think about when considering what motivates us. Should a coach, for instance, be concerned that his athlete's incentive to prepare may decline if he receives a large bonus and becomes famous after winning a championship? Or, other versa, will a lack of accomplishments decrease an athlete's enthusiasm to practise? Should a supervisor be concerned that his employees' work motivation would decline if they are penalised for bad performance or receive less workplace appreciation? Or will students' incentive to study harder decrease if they have lower grades than their peers? Individual differences in motivation exist despite everyone having the criteria mentioned above, depending on the degree to which the environment supports those needs (Kanfer et al., 2017).

Over the past four decades, research on motivation has grown and gained the attention of academics (Lei, 2010). The terms "intrinsic" and "extrinsic" present several challenges and debates (Locke & Schattke, 2019). Ryan and Deci (2000) define and analyse intrinsic and extrinsic motivation that emerged twenty years ago. According to them, intrinsic motivation remains essential, expressing the inherent human desire to learn and assimilate. However, extrinsic motivation varies significantly in relative autonomy and can, therefore, either indicate external control or genuine self-regulation. The relationships between the two categories of motives and fundamental human needs for autonomy, competence, and relatedness are examined and have progressed rapidly. Much has been learned about these two main motivational styles, particularly in Self-determination Theory, a comprehensive theory of human development and well-being with significant educational implications (Ryan & Deci, 2020).

Two theories of motivation have been proposed by psychologists: dualism and multidimensional theory (Reiss, 2004). According to dualism, human motivation is divided into mind-body, approach-avoidance, or intrinsic versus extrinsic motivation. Instead, different views recognise a variety of motivations that are genetically unique, including sex, power, lust, curiosity, hunger, and so on (Reiss, 2012). Moreover, within motivation theory, the notion of a multi-directional motivational continuum is explored from the perspective of motivational connotations using models such as Self-determination Theory, Expectancy Theory, situational interest, achievement motivation, and other related theoretical models (Chen et al., 2022).

It is vital to analyse more deeply the various possible motivational factors, both intrinsic and extrinsic, of each individual in multiple aspects of life. A critical question is whether intrinsic and extrinsic motivation can or should be separated experimentally or theoretically. At the neural level, there is some evidence that they are inseparable constructs (Morris et al., 2022). The beneficial effect of intrinsic motivation on creativity and innovation has been highlighted over the last three decades, while extrinsic motivation has received less attention and is often viewed as controversial (Anderson et al., 2014). Little research has been conducted to determine whether intrinsic and extrinsic motives work better separately or together (Gerhart & Fang, 2014). Organisations must treat intrinsic and extrinsic motivation separately (Kuvaas et al., 2017). Extrinsic motivation, in contrast to intrinsic motivation, refers to motives for acting obtained from outside or society; this is extrinsic motivation while serving because of interest or pleasure is intrinsic motivation (Legault, 2020).

By offering a critical evaluation and bibliometric analysis of these metrics, as well as suggestions on how to utilise them based on specific research problems, this review aims to accomplish the gaps noted as aforementioned. The primary purpose of this study is to evaluate

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the characteristic of publications concerning extrinsic and intrinsic motivation in the Scopus and Web of Science (WoS) databases. By conducting this analysis, researchers will be significantly assisted in observing research trends and determining areas that need further study.

Methodology

Research evaluation increasingly employs bibliometric analysis to comprehend publication trends' characteristics and classify potential research gaps (Abdullah, 2021). Besides, bibliometric analysis has become a tool used to quantify the influence of research quality by identifying, organising, and analysing the significant components within a specific study topic (Pabon et al., 2020).

The significance of bibliometric analysis is based on indicators highly dependent on methodology, and diverse data normalisation is an absolute necessity (Roslan et al., 2022). This study utilised a four-step method to conduct the current bibliometric analysis, as follows:

1. Identification of databases and specific keywords.
2. Performing the preliminary data analysis to eliminate duplicates.
3. Carrying out the bibliometric evaluation based on research questions.
4. Conducting the thematic assessment based on previously used keywords.

Identification of databases and specific keywords

In order to accomplish bibliometric analysis, this study used ScientoPy software. ScientoPy, a Python-based open-source analysis tool, is among previous researchers' most widely utilised bibliometric software programs (Abdullah & Sofyan, 2022). One of the unique features of this programme is its ability to eliminate potential bias in individual research resulting from the databases employed (Ruiz-Rosero et al., 2019).

WoS and Scopus, respectively, the world's largest abstract and citation database of peer-reviewed academic literature, were utilised to complete this bibliometric study (Sofyan et al., 2022). The selected time frame was from 1 January 1990 to 31 December 2021. A systematic search was undertaken using the search string "extrinsic motivation" AND "intrinsic motivation" in the title, abstract, and keywords to acquire possibly relevant publications for the study. In October 2022, search queries were conducted without language restrictions in both databases.

Performing the preliminary data analysis to eliminate duplicates

A preliminary data analysis was conducted to enhance the precision and dependability of the datasets from WoS and Scopus. Consequently, we must build the secondary dataset in ScientoPy's pre-processing mode. During the pre-processing phase, ScientoPy uses the following criteria to normalise the author's name: replacing it with a semicolon for metadata retrieved from the Scopus database, stripping it of dots, commas, and special characters for metadata retrieved from both databases, and removing duplicated samples with identical titles and authors (Pabon et al., 2020).

Figure 1 depicts the publication record of preliminary data analysis. The ScientoPy pre-processing analysis positioned WoS documents ahead of Scopus documents, as seen in Figure 1. This suggests that WoS databases contain more documents after duplicate removal than Scopus. This study's initial raw source dataset comprises 3,753 papers from the WoS and Scopus databases. However, ScientoPy's automatic classification only mandated publication types for conference papers, articles, reviews, proceedings papers, and press pieces. After that,

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the preliminary study assessed duplicate documents and eliminated around 1097 duplicates. Eventually, this study utilised 2553 entries from both databases, including 1843 publications from WoS and 710 papers from Scopus.

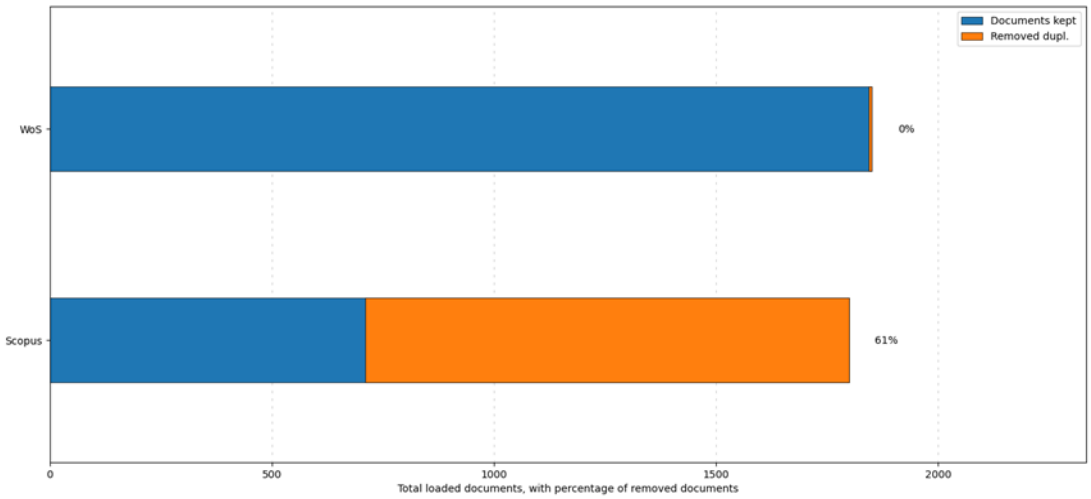


Figure 1: Publication Record of Preliminary Data Analysis

Carrying out the bibliometric evaluation based on research questions

The purpose of the present bibliometric study is to explore the publishing growth and trends of the worldwide research domain in extrinsic and intrinsic motivation by addressing the following research questions (RQs):

Research Question 1: What is the characteristic of publications' growth trend of the worldwide research domain in extrinsic and intrinsic motivation?

Research Question 2: What is extrinsic and intrinsic motivation's most prominent and significant research field?

Research Question 3: What is the most recognised source title for extrinsic and intrinsic motivation research publications?

Conducting the thematic assessment based on previously used keywords

A thematic analysis is undertaken based on previously employed keywords to find additional insights and themes within the papers. A thematic analysis aims to find themes, i.e., significant or intriguing patterns in the data, and use these themes to address the research or comment on a topic (Maguire & Delahunt, 2017). Thus, this method is aimed at answering the research question below:

Research Question 4: What is the most crucial keyword reported in prior publications that facilitates comprehension of the theme content of extrinsic and intrinsic motivation research?

Results and Discussion

Understanding the meaning of bibliometric characteristics facilitates the evaluation of researchers and journals, reduces the likelihood of their misuse, and enables them to serve as objective markers of academic productivity (Abd Aziz et al., 2022). The following research

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questions are the core ideas of results and discussion pertinent to extrinsic and intrinsic motivation bibliometric analysis.

Research Question 1: What is the characteristic of publications' growth trend of the worldwide research domain in extrinsic and intrinsic motivation?

Motivating yourself to complete a task because you genuinely look forward to it is an example of intrinsic motivation. When you're driven to achieve action by considerations other than your satisfaction, you're motivated by what psychologists call extrinsic motivation. Figure 2 depicts the development of publications on extrinsic and intrinsic motivation in both databases and the eccentric trajectory of research on the topic. Publishing contributions grew dramatically in 2000. The rapid development of motivation, specifically extrinsic and intrinsic components, indicates that publication growth is a prominent concern in motivation research. In education, for instance, we can include existing research and anticipated trends via bibliometric analysis. All of these works can assist us in comprehending the fundamental psychological needs, leadership styles, teacher support, and intrinsic and extrinsic motivations of students of all ages (Chen et al., 2022).

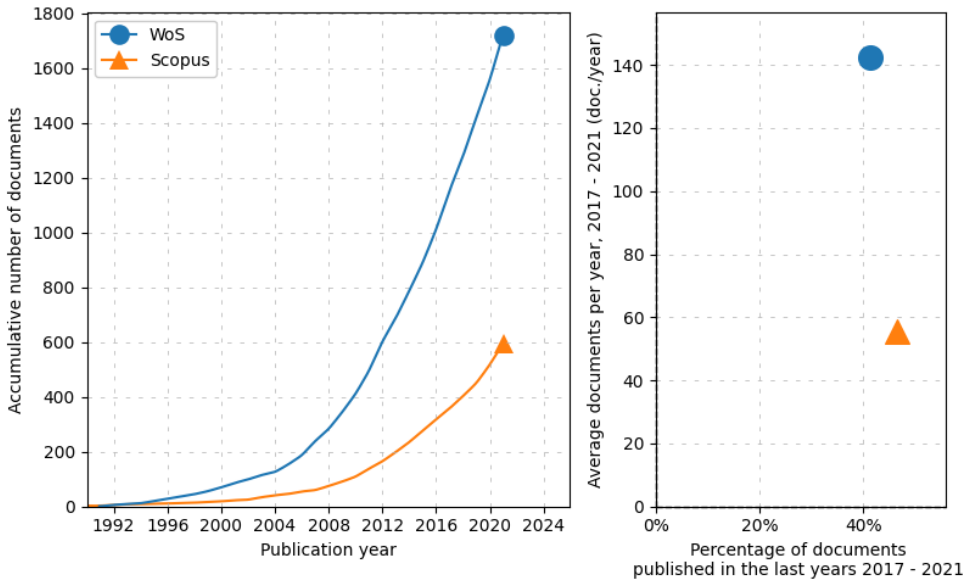


Figure 2: Publications' Growth

Research Question 2: What is extrinsic and intrinsic motivation's most prominent and significant research field?

This analysis found that "psychology" was the most prominent research area in researching extrinsic and intrinsic motivation (see Figure 3). Another interest in this domain was the "Education & Educational Research" field. This finding demonstrates a relationship between extrinsic and intrinsic motivation, psychological domains, and academic performance. Since the 1950s, research in organisational psychology on work-related motivation has changed from a static content model to a dynamic process model, according to Segal et al. (2005). The study of motivation within the context of psychology thus attracts considerable attention. In addition, the effect of motivation on academic achievement has been carefully investigated in previous studies. Motivation has been proven to positively affect students' study strategies, academic performance, adjustment, and well-being in educational fields other than medical education

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(Vansteenkiste et al., 2005). In addition, throughout childhood and adolescence, motivation is a crucial component of academic learning and accomplishment (Elliot & Dweck, 2005). According to Ayub (2010), motivation enhances pupils' academic performance. These findings imply that when teachers are compassionate and supportive, emphasise the teaching-learning process over performance outcomes, and provide feedback, students are motivated to achieve and anticipate success.



Figure 3: Most Prominent and Significant Research Field

Research Question 3: What is the most recognised source title for extrinsic and intrinsic motivation research publications?

In this study, the source titles parameter refers to the journal title. This investigation identified the top ten source titles, as shown in Figure 4. Figure 4 is a word cloud depicting the most well-known source title. The graphic illustrated that the font size corresponded to the frequency of its appearance. The leading publication was recognised as Frontiers in Psychology, followed by Computers in Human Behaviour and Psychology of Sport Behaviour. The findings indicate that these sources have provided helpful material that will be utilised by future researchers in their work in this research domain. Moreover, this shows that the source titles facilitate users' access to and manipulation of the required data.

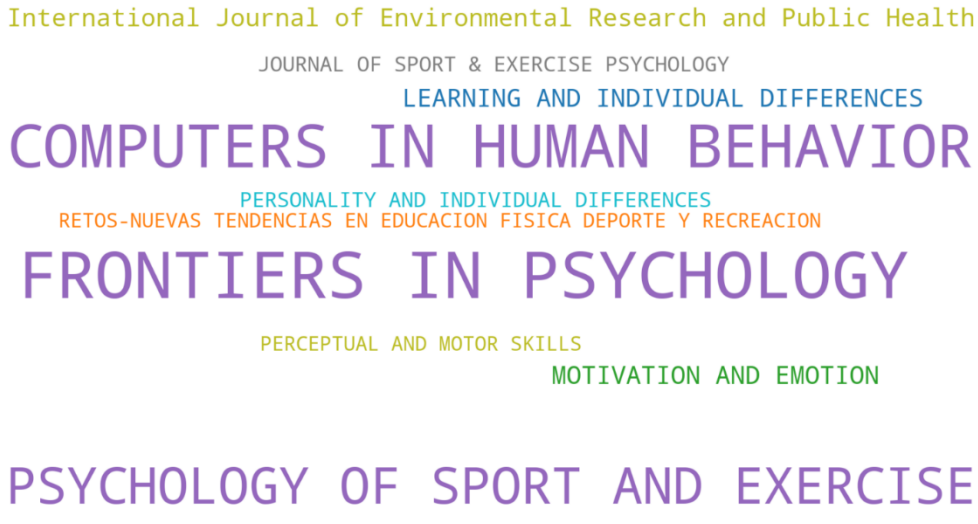


Figure 4: Most Recognised Source Title

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Research Question 4: What is the most crucial keyword reported in prior publications that facilitates comprehension of the theme content of extrinsic and intrinsic motivation research?

In this study, the keyword analysis mainly intends to analyse the author's keywords used in prior studies. This step is essential to identify the authors' keywords that vividly represent the document's core ideas. In addition, the authors' keywords aided readers and future researchers in classifying critical concepts and themes in the publications. Electronic search engines, databases, and journal websites rely on author keywords to locate relevant articles; so potential readers can access the information they need. ScientoPy could examine the evolution of a study topic or search argument in this context based on the authors' keywords. This section explores the keywords defined by the authors in the prior research on extrinsic and intrinsic motivation. It has been suggested that equivalent terms in American and British spelling be merged to eliminate term duplication.

Figure 5 depicts the top 20 keywords utilised in the preceding study on extrinsic and intrinsic motivation. As shown in Figure 5, the most commonly used keyword is determined by the thickness of the terms. Intrinsic motivation is the most frequently used keyword, followed by extrinsic motivation, motivation, and Self-determination Theory. In prior publications, these keywords have garnered the most attention, indicating that studies on crucial aspects of motivation have received more focus over the years. Extrinsic influences might be considered synergistic outside drivers. Fischer et al. (2019) stated that extrinsic motivation combines relational and transactional rewards. In a broad sense, it refers to external factors that inspire an individual to perform. In contrast, intrinsic motivation is a vital evaluation of an individual's personal qualities or characteristics (Ryan and Deci, 2017). And the Self-determination Theory is a comprehensive framework for comprehending the components that foster internal and external drive (Ryan & Deci, 2020). The dynamic connection between these phrases has been the driver of performance outcomes for persons seeking to modify their behaviour, develop competencies, be creative, set objectives, develop interests, make plans, cultivate their talents, and raise their engagement.

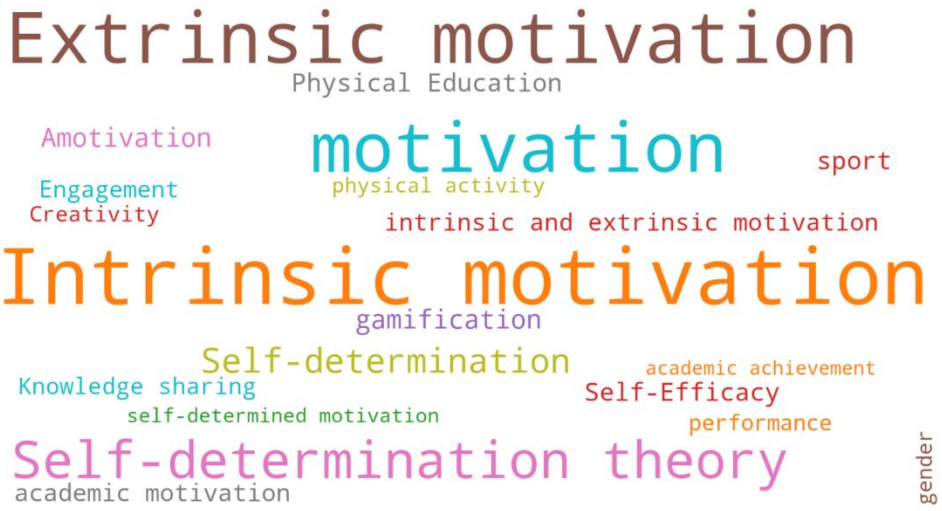


Figure 5: Most Crucial Keywords in Previous Research

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Based on Figure 5, we can cluster the keywords according to the specific themes, as tabulated in Table 1. Notably, although Figure 5 only displays the first 20 keywords, ScientoPy allows us to view an endless number of keywords selected by the authors. Six themes are constructed in this analysis: motivation, education, sport, performance, theory, and gender. In the context of motivation, this study identified seven motivational subtypes that have been the subject of previous research; extrinsic, intrinsic, combining both extrinsic and intrinsic, amotivation, motivation, academic motivation, and Self-determination motivation.

The keyword clustering highlighted that intrinsic and extrinsic motivation have various performance-related effects on numerous topics, such as academic motivation. Academic motivation is recognised as a critical success factor when highly motivated students actively participate in educational activities. Adamma et al. (2018) investigated the effect of extrinsic and intrinsic motivation on students' academic performance in mathematics. They discovered that motivation improves students' academic performance, and there is a gender difference in the relationship between motivation type and academic performance.

This study identified four keywords under the theme of education: physical education, knowledge sharing, engagement, and creativity. In physical education, Kalajas-Tilga et al. (2020) found that intrinsic motivation was the only significant predictor of teenagers' objectively recorded daily physical activity. Additionally, they concluded that psychological need fulfilment and intrinsic motivation in physical education modulated the influence of perceived autonomy support on objectively assessed physical activity. Hassandra et al. (2003) found social-environmental and individual differences linked with intrinsic motivation for physical education participation. Individual differences in perceived competence, perceived autonomy, physical appearance, and goal orientation were cited as factors influencing students' intrinsic motivation. In comparison, social environmental factors included lesson content, the physical education teacher, classmates, and school athletic facilities, as well as physical activity behaviours of the family and family encouragement, participation in extracurricular athletic activities, media, cultural values, and social preconceptions, according to them. Accordingly, a wide range of social consequences impacts the intrinsic motivation that students bring to their physical education class. When developing lessons for physical education, these factors need to be considered.

The third theme derived from the authors' keywords analysis pertinent to extrinsic and intrinsic motivation were sport, physical activity, and gamification. It is noted that a person's motivation is the driving force behind their actions, thoughts, emotions, and relationships with those around them (Abdullah, 2022). In sports, a high level of motivation is universally acknowledged as a necessary condition for athletes to perform at their highest levels. Weiss (2019) emphasises the role of motivation and sports by recommending that future research emphasise developmental techniques, examine sports as a means of increasing physical activity, and consider transdisciplinary perspectives on related themes. Scholars can likely contribute meaningfully to a greater understanding of juvenile athletic motivation in the coming decades by reflecting on paradigm shifts and research patterns over time.

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Table 1: Specific Themes and Keywords Clustering

Theme	Keyword
Motivation	1. Extrinsic motivation 2. Intrinsic motivation 3. Intrinsic and extrinsic motivation 4. Amotivation 5. Motivation 6. Academic motivation 7. Self-determined motivation
Education	1. Physical education 2. Knowledge sharing 3. Engagement 4. Creativity
Sport	1. Sport 2. Physical activity 3. Gamification
Performance	1. Performance 2. Academic achievement 3. Self-determination 4. Self-efficacy
Theory	1. Self-determination Theory
Gender	1. Gender

Besides, gamification is also related to extrinsic and intrinsic motivation. This finding could enhance our understanding that gamification is the application of game features, mainly video game elements, into non-game contexts to promote motivation and engagement in learning. Students who feel disconnected from the learning process can benefit from incorporating gamification into educational settings (Alsawaier, 2018). Alsawaier (2018) contended that gamification could help reverse the current dismal state of student motivation and engagement in the classroom. Gamified learning treatments have the potential to boost student engagement and improve learning. Buckley and Doyle (2016) discovered that gamified learning interventions have a favourable effect on student learning, but the product differs according to whether the learner is intrinsically or extrinsically motivated. These findings will be of practical importance to teaching and learning practitioners in various educational situations and at all academic levels who aim to promote student engagement and boost learning.

Performance, academic achievement, self-determination, and self-efficacy are associated with the topic of performance in this study. In earlier studies, extrinsic and intrinsic motivation focused on this domain of interest. There is evidence that extrinsic and intrinsic motivation boost students' academic performance in the classroom, and there is a gender difference in motivation type and academic achievement (Adamna et al., 2018). In the public sector, the use of personnel and cultural controls is positively associated with employees' intrinsic motivation, while the use of results controls is positively associated with employees' extrinsic motivation; both intrinsic and extrinsic motivation is positively associated with performance (van der Kolk et al., 2019). To deliberate the impact of intrinsic and extrinsic motivation, it is imperative to note that interactional motivation has become a way to implement self-motivation because a motivated agent chooses behaviours for the sake of doing them, not for the value of the behaviours' results (Georgeon et al., 2012). Regarding self-efficacy, it is established that self-

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efficacy, intrinsic motivation, and academic identification each predict meaningful cognitive engagement independently (Walker et a., 2006).

In order to discuss the theory, this study determined that the Self-determination Theory was the most often employed theory in prior research on extrinsic and intrinsic motivation. Self-Determination Theory is a theory of human motivation and personality in social contexts that differentiates between autonomous and controlled motivation (Deci & Ryan, 2012). Experiments examining the effects of extrinsic rewards on intrinsic motivation were cited as the foundation for the concept. This indicates that this theory is supported by a substantial body of research employing both field studies and clinical trials to investigate significant social issues, particularly those pertaining to health behaviour change, education, psychotherapy, work motivation, sports and exercise, and prosocial behaviour.

In addition, cluster mapping was employed to determine the co-occurrence of authors' keywords in order to identify themes associated with extrinsic and intrinsic motivation throughout the years. Prior to creating a network map with VOSViewer, the employed dataset was pre-processed with SientoPy (a combination of Scopus and WoS metadata). Figure 6 illustrates the co-occurrence of authors' keywords as a visual overlay. The minimum number of co-occurrences for a keyword in measuring the co-occurrence of authors' keywords was 30. 18 keywords out of 5180 met the minimum qualifying score.

It can be deduced that the most frequently used keywords in 2013 and 2014 were "self-determination", "sports", and "gender". The more vibrant the colour (see Figure 6), it is thus, the more recent the study of those keywords. After 2017, "gamification", "physical activity", and "self-efficacy" were identified as the top three trending keywords. The findings of this investigation suggest that identifying trending research topics might be vitally significant for many fields. Nevertheless, despite its significance, very few works are devoted to this topic, particularly those focusing on extrinsic and intrinsic motivation. Thus, using this bibliometric study, readers and researchers can consider crucial criteria for identifying scientific themes related to extrinsic and intrinsic motivation that have become popular since 2013.

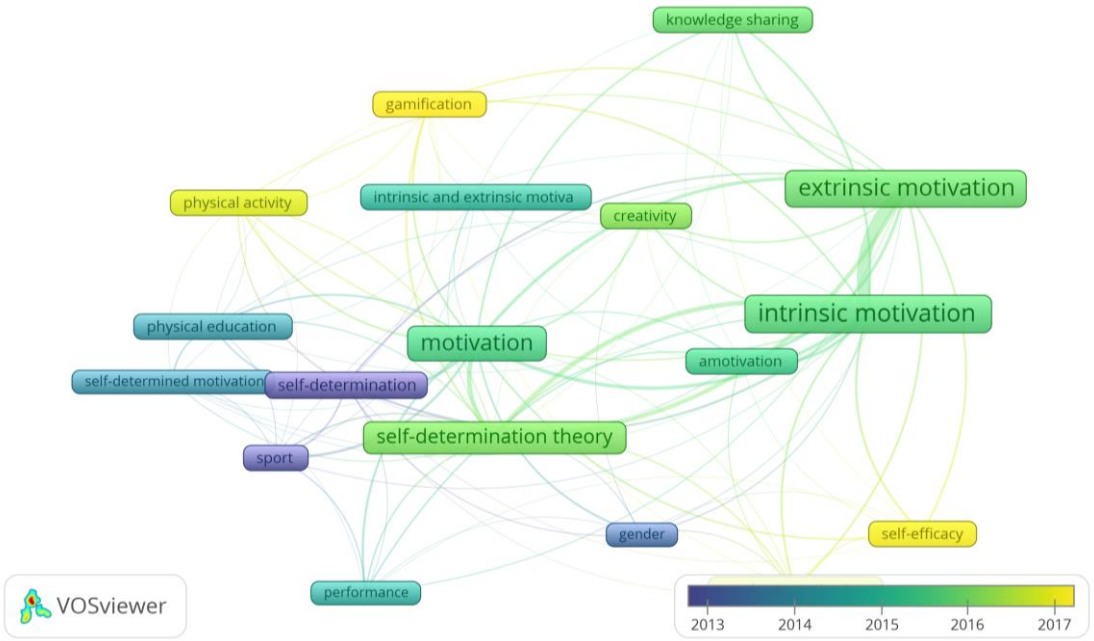


Figure 6: Overlay Visualisation of the Co-occurrence of Authors' Keywords

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Conclusion

This bibliometric analysis promotes the evaluation and integration of recognised paths in extrinsic and intrinsic motivation research and the formation of new tendencies. However, it is vital to note that this study has certain limitations. First, this study relied solely on the Scopus and WoS databases; hence, the results were dependent on these databases. Suppose more databases such as Microsoft Academic, Dimensions, or Google Scholar were added to the analysis. Therefore, distinct outcomes were achieved. Secondly, the essence of a bibliometric review is modest. Only papers meeting the search criteria and refining conditions outlined in the methodology ("extrinsic motivation" AND "intrinsic motivation") have been included. If additional keywords are added, the results may vary slightly.

Based on data retrieval analysis, the number of articles increased dramatically after 2000. In the WoS database, the hike in publications was promoted. Notably, extrinsic and intrinsic motivation study was mainly conducted within the "psychology" research field. In addition, "Frontiers in Psychology" was identified as the leading publication, followed by "Computers in Human Behaviour" and "Psychology of Sport Behaviour".

The most often used keyword is intrinsic motivation, followed by extrinsic motivation, motivation, and Self-determination Theory. The clustering of co-occurrence of authors' keywords revealed that "self-determination," "sports," and "gender" were the most frequently used terms in 2013 and 2014. Following the conclusion of 2017, "gamification," "physical activity," and "self-efficacy" was determined to be the top three trending keywords.

The findings of this study indicate that identifying trending research topics may be crucially important. Therefore, research pertaining to extrinsic and intrinsic motivation should be directed toward the formation of dimensions that specify the essential components of the extrinsic and intrinsic motivation constructs. In order to test the dimensions generated in the extrinsic and intrinsic motivation constructs, the empirical studies should be conducted qualitatively, quantitatively, or a combination of both. As a guide for future researchers, testing these elements can consider the keywords uncovered by this study.

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