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EDITIR'S NOTE

Welcome to the latest issue of Education Dynamics, a Biannual Journal of Education, Physical Education, Lifelong Learning, Vocational, Yoga and, Special Education, proudly published by Alagappa University.

In this January 2022 edition, we are delighted to present a collection of active and essential investigations contributed by esteemed researchers from across India. Their dedication and scholarly endeavors have enriched this journal, establishing it as a beacon of international quality in the field of education. This issue encapsulates a diverse array of insights and perspectives, reflecting the dynamic landscape of educational discourse. Through rigorous research and thoughtful analysis, our contributors have illuminated various facets of education, physical education, lifelong learning, vocational training, yoga, and special education.

We extend our sincere gratitude to all the authors, Associate Editors, Editorial Board Members, and Peer Review Team Members whose unwavering commitment and expertise have shaped this creative volume. Their invaluable contributions have not only enriched the scholarly dialogue within our community but have also provided a platform for meaningful engagement with educators, society, and beyond.

As we continue our journey of fostering excellence in education and scholarship, we invite readers to explore the diverse range of topics and insights presented in this issue. Hope the knowledge shared here inspire ongoing dialogue, innovation, and collaboration in the pursuit of educational advancement.

Thank you for your continued support and engagement with Education Dynamics. Together, let us embark on a journey of discovery and transformation in the realm of education.

Editor

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EFFECT OF CIRCUIT TRAINING LADDER TRAINING AND COMBINED TRAINING ON SELECTED PHYSICAL VARIABLES AMONG UNIVERSITY HOCKEY PLAYERS

K. Kaviyarasan* & Dr. Murali Rajan**

Abstract

Background*: To develop the physical variables among university hockey players to practice the circuit training and ladder training.*

Purpose: *This study persevered in determining whether the circuit and ladder training effect physical variables such as speed, endurance and agility among university level Hockey players. For this study 60hockey players were randomly chosen from Arts & Science Colleges affiliated to Alagappa University were selected as subjects and their age range between 18to 25 years.*

Methods: *There were four groups of 15 players each, total subject were 60University hockey players. The group Circuit training is followed by group Bladder training is followed by group C Combined training and the control groups D have not underwent any training and the data was before and after twelve weeks of training. A pre-test was administered two days before the training period began, and a post-test was administered after the training period concluded. The following variables namely speed; endurance and agility were selected as criterion variables. All the subjects of four groups were tested on selected dependent variables at prior to and immediately after the training programme by using standardize test items respectively.*

Conclusion: *Combined Circuit training, ladder training has been beneficial to university level hockey players because it improves Speed, Endurance and Agility.*

Keywords: *Circuit, ladder**,** Hockey, Speed, Endurance, Agility*

Introduction

"A method of physical conditioning in which one moves from one exercise to another, usually in a series of different stations or pieces of equipment". In circuit Training each of several stations has a designated task. The student moves from station to station, generally in a prescribed order, completing the designated fitness task at each station. Activities should contribute to various components of physical fitness (strength, power, endurance, Agility and flexibility) (Morgan and Anderson (1953).Circuit training is an efficient and challenging form of conditioning. It works well for developing strength, endurance (both aerobic and anaerobic),

flexibility and coordination. Its versatility has made it popular with the general Public right through to elite athletes. For sports men and women, it can be used during the closed season and early pre-season to help develop a solid base of fitness and prepare the body for more stressful subsequent training. Circuit training is a continuous series of exercises attempting to improve as many components of physical fitness as possible especially endurance. Generally, six to twelve stations are up. Selection and sequence of the activities within a lap of circuit is made with consideration given to the continuous nature of the performance. A group of individuals spends two minutes at each station (Mathews, 1971).Ladder training is the multi-directional training, because the elements of strength, power, balance, agility, co-ordination, proprioception, core and joint stability, foot speed, hand eye coordination, reaction time and mobility. Each component should be integrated in to daily training session. Ladder skills are fun and functional ways to teach movement skills. By training, the mind and body to understand a verity of foot combinations. There are 4 basic skills is used when training with ladder. Runs, skips, shuffles and jump/hops. Ladder agility drills are an excellent way to improve foot speed, agility, coordination and overall quickness. They are an integral part of many SAQ programs and compliment many different sports and events. Speed ladder drills are about quality and form rather than producing overload. The drills are not meant to leave you fatigued or breathless in the way that shuttle runs might ("Ladder agility drills", 2014).

Methodology

The purpose of the study was to investigate effect of Circuit training, ladder training and combined training on selected physical variables among university hockey Players. It was hypothesized that there would be significant differences on selected dependent variables namely speed, endurance and agility due to the effect of circuit training ladder training and combined training among university hockey Players. For the present study, sixty hockey players from Arts & Science Colleges affiliated to Alagappa University, were chosen as the subjects was selected as subjects at random and their age ranged from 18 to 25 years. The subjects were divided into four equal groups of fifteen each. The subjects were randomly assigned to three equal groups of twenty each and named as Group 'A' –Circuit training, Group 'B' – Ladder Training, Group 'C' – Combined Training and Group D - Control group have not undergone any training programme. Speed was assessed by 50-meterdashand Endurance was assessed by Cooper 12min Run/walk

test and agility was assessed by t test. The data were collected before and after twelve weeks of training. Initially descriptive statistics and paired‘t’ test was applied to test the significance of mean gains made in each of the variables by the experimental groups. The analysis of covariance (ANCOVA) was also used to analyze the significant difference, if, any among the groups. Since four groups were compared whenever they obtained ‘F’ ratio for adjusted post test was found to be significant.

Table–1

The Summary of Mean and Dependent‘t’ Test for the Pre and Post Tests on Speed of Experimental Groups

Mean	Circuit Training Group-A	Ladder Training Group-B	Combined Training Group-C	Control Group- D
Pre-Test Mean	7.69	7.08	7.68	7.67
Post test Mean	7.08	6.74	6.40	7.65
't'test	2.26*	2.29*	4.04*	0.04

*Significant at .05 level

(Table value required for significance at .05 level for‘t’-test with df 14 is 2.15)

Table–1.2

Analysis of Covariance of Adjusted Post- Test Means on Speed for Experimental groups and Control Group

Tests	Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	‘F’ Ratio
	Circuit Training Group	Ladder Training Group	Combined Circuit & Ladder Training Group	Control Group					
PreTest	7.69	7.68	7.66	7.67	**Between**	0.007	3	0.002	0.07
					Within	1.83	56	0.03	
PostTests	7.08	6.74	6.40	7.65	**Between**	12.89	3	4.30	82.98*
					Within	2.90	56	0.05	
Adjusted post Test	7.07	6.74	6.40	7.66	**Between**	12.88	3	4.30	100.78*
					Within	2.34	55	0.04	

**Significant at .05 level of confidence* (Speed Score sin Seconds)

(The table value required for Significance at 0.05 levels with df 3 and 56 & 3 and 55 is 2.76 and 2.77)

Table–2

The Summary of Mean and Dependent 'T' Test for the Pre and Post Tests on Endurance of Experimental Groups

Mean	Circuit Training Group-A	Ladder Training Group-B	Combined Training Group-C	Control Group- D
Pre-Test Mean	2160.00	2159.33	2106.00	2162.00
Post test Mean	2336.00	2415.33	2488.00	2164.67
't'test	10.13*	14.89*	18.44*	0.12

*Significant at .05 level

(Table value required for significance at .05 level for't'-test with df 14 is 2.15)

Table–2.1

Analysis of Covariance of Adjusted Post- Test Means on Endurance for Experimental groups and Control group

Tests	Adjusted Post test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
	Circuit Training Group	Ladder Training Group	Combined Circuit & Ladder Training Group	Control Group					
Pre Test	2160.00	2159.33	2106.00	2162.00	**Between**	33405.00	3	11135.00	2.12
					With in	294693.33	56	5262.38	
Post Tests	2336.00	2415.33	2488.00	2164.67	**Between**	867793.99	3	289264.40	35.25*
					With in	459546.67	56	8206.19	
Adjusted Post Test	2326.56	2406.37	2517.29	2153.79	**Between**	992392.88	3	330797.60	59.09*
					With in	307907.20	55	5598.31	

**Significant at .05 level of confidence* (Endurance scores in meters)

(The table value required for Significance at 0.05 levels with df 3 and 56 & 3 and 55 is 2.76 and 2.77)

Table–3

The Summary of Mean and Dependent 'T' Test for the Pre and Post Tests on Agility of Experimental Groups

Mean	Circuit Training Group-A	Ladder Training Group-B	Combined Training Group-C	Control Group- D
Pre-Test Mean	10.60	10.59	10.54	10.51
Post Test Mean	9.93	9.85	9.59	10.49
't' test	2.22*	2.50*	2.93*	0.03

*Significant at .05 level

(Table value required for significance at .05 level for't'-test with df 14 is 2.15)

Table–3.1

Analysis of Covariance of Adjusted Post- Test Means on Agility for Experimental groups and Control Group

Tests	Adjusted Post Test Means				Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
	Circuit Training Group	Ladder Training Group	Combined Circuit & Ladder Training Group	Control Group					
Pre Test	10.60	10.59	10.54	10.51	**Between**	0.09	3	0.03	0.31
					Within	5.75	56	0.10	
Post Tests	9.93	9.85	9.59	10.49	**Between**	6.46	3	2.15	32.28*
					Within	3.74	56	0.07	
Adjusted Post Test	9.90	9.84	9.61	10.52	**Between**	6.86	3	2.29	63.78*
					Within	1.97	55	0.04	

**Significant at .05 level of confidence* (agility scores in seconds)

(The table value required for Significance at 0.05 levels with df 3 and 56 & 3 and 55 is 2.76 and 2.77)

Discussion on Findings

This study confirms thatCircuit training, ladder training and combined training produces improvement on Speed, Endrance and Agility.

From the results of the present investigation, it is also concluded that significant difference on Circuit training, Ladder training and combined trainingin developing dependent variables Speed, Endurance and Agility hence the hypothesis was accepted.

Conclusions:

On the basis of findings and within the limitations of the study the following conclusions were drawn:

1. Results of the present study explain clearly that physical variables the observed results significantly favored the experimental groups namely Circuit training, ladder Training and combined training as compared to control group.
2. Similarly, the impact of experimental group of was found as significantly higher than control group on Speed, Endurance and Agility.
3. It was concluded that university level hockey players should practice both circuit training and ladder training for positive enhancement of performance.
4. Thus, based on the result, it was concluded that combined training methods would provide better means and methods for developing physical variables that are needed for university hockey players.

References:

- *"Afework Asale Doffana. (2018). Effects of Interval Training, CircuitTraining and Combined Training on Selected Physical Fitness Variablesand Performance Variables among Wolaita Sodo University MaleFootball Players, International Journal of Scientific and EngineeringResearch., 9(4): 420*
- *Al-Haliq, M. (2015). Using the Circuit Training Method to Promotethe Physical Fitness Components of the Hashemite UniversityStudents. Advances in Physical Education., 5(03): 170.*
- *Babalola, J. F. (2011). Effects of 8-weeks circuit training programme onphysiological and performance characteristics of university racket gameplayers. Journal of Asian Scientific Research., 1(4): 143-149.*
- *Dhanaraj S. (2014), Effects of Ladder Training on Selected MotorFitness Variables Among Handball Players,International Journal of Scientific Research, 3:4,April*
- *Gopinathan, P. (2019). Effect of circuit training on speed, agility andexplosive power among inter collegiate handball players. International Journal of Yogic, Human Movement and Sports Sciences., 18(4): 401-424*
- *Jamil, Syarulniza Abdul, Nurhani Aziz, & Lim Boon Hooi(2015),Effects of Ladder Drills Training On Agility Performance,International Journal of Health, Physical Educationand Computer Science in Sports, Volume No.17,No.1.pp17-2*

- *Kumaran, S. (2018). Effect of Circuit Training on Selected PhysicalFitness Variables among Physical Education Students, InternationalJournal of Computational Research and Development., 3(1): 162-164.*
- *Nithesh, K R and S J Albert Chandrasekar (2017), Effect of LadderTraining on Selected Motor Abilities of School LevelSoccer Players, Asian Journal of Applied Research,Volume 03- Issue 05 -, pp-11-17.*
- *Raja, K and Mahendran A. (2016), Effect of Ladder Training Followedby Speed Training on Selected Physical Variables amongKho-Kho Players, International Journal of Physical Education, Yoga and Health Sciences, Vol.3, Issue -1,February.*
- *Srinivasan M. and Sathishkumar(2016), Effect of ladder training onselected physical fitness variables on school volleyballplayers, International Journal of Advanced Scienceand Research, Volume 1; Issue 1; January, pp. 39-40*

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EFFECTIVENESS OF MINDFULNESS STRATEGIES IN ENHANCING SELF-COMPASSION AMONG PRE-SERVICE TEACHERS

Geetha Kr.* & Dr. Parimalafathima M.**

Abstract

A scientific approach to understanding an individual's behavior, including attitude, performance, and interpersonal relationships, is offered by the field of educational research. The present study focuses on how mindfulness strategies enhance self-compassion among pre-service teachers. The researcher adopted an experimental research design with 20 pre-service teachers belonging to physical science majors from Alagappa University College of Education, Sivagangai district, Karaikudi, Tamil Nadu. Pre-assessment has been conducted before the treatment to assess the level of self-compassion among pre-service teachers. Mindfulness strategies, which include activities such as mindful breathing, practicing positive affirmations, presenting a focus worksheet, and mindfulness journal have been employed among the sample for three weeks daily during the physical science classes. Post-assessment has been conducted after the treatment was employed. Pre and post-assessment scores were analyzed by descriptive and inferential analysis. Results reveal that there is a significant increase in the mean score of post-assessment of self-compassion of pre-service teachers through mindfulness strategies than the pre-assessment. There is a significant difference found between the pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning age groups below 25, rural and urban areas.

Keywords: *Self-Compassion, Mindfulness, Self-Awareness, Strategy, Positive Affirmations*

Introduction

Multiplex emotional experiences derived from perception, recollection, or imagination of situations is entailed as emotions. Previous research line reveals that pre-service teachers experience mindfulness and practice it regularly, and they can share the same mindfulness techniques with their students in the classroom (Rechtschaffen, 2014). Mindfulness is a vital path for emotional regulation (Brown & Ryan, 2003). Mindfulness practice among pre-service teachers enhances classroom interaction and helps to implement mindfulness techniques with their students (Rechtschaffen, 2014). Being mindful is paying active attention to all situations. Mindfulness refers to one's thoughts and feelings without assigning them a positive or negative

value. The two essential components of mindfulness are acceptance and awareness. The capacity to focus attention on one's inner experiences and processes, like the present moment, is known as awareness. The capacity to see and accept certain streams of thinking, as opposed to condemn or ignore them, is acceptance. Mindfulness acts as the major element of self-compassion (Neff & Dahm, 2015). Cultivating a perspective on one's consciousness and identity that can lead to greater mental and interpersonal peace is the core of mindfulness. In being used to alleviate pain, tension, or anxiety, mindfulness is utilized in mindfulness-based therapies to help people relax more. Research findings revealed that mindfulness helps people accept their experiences—including uncomfortable emotions—instead of reacting to them with avoidance and aversion. Self-compassion and mindfulness are mediators for emotional well-being (Bluth & Blanton, 2014).

Need and Significance of the Study

Self-compassion is a major construct in contemporary behavioral study. Teaching is an emotional aspiration. Pre-service teachers need to face various emotion-stimulating situations at the time of their teaching-learning process. Pre-service teachers need to regulate their emotions and self-compassionate themselves. Numerous reviews of related literature strengthen the evidence related to mindfulness and self-compassion. Self-compassion serves as a fundamental factor for mindfulness and self-compassion (Fulton, 2018). Mindfulness improves executive control since it promotes present-moment awareness to enhance emotion regulation (Teper et.al. 2013). Keeping this in mind this study intends to investigate how mindfulness strategies enhance the self-compassion of pre-service teachers.

Objectives of the study

- To identify the level of self-compassion among pre-service teachers
- To develop and implement mindfulness strategies to enhance self-compassion among pre-service teachers
- To analyze the pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning the age group below 25, rural and urban areas.

Hypotheses of the study

- The level of self-compassion among pre-service teachers through mindfulness strategies is high.
- There is no significant difference between pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning the age group below 25, rural and urban areas.

Variables of the study

- Dependent Variable: Self-compassion
- Independent Variable: Mindfulness strategies

Delimitation of the study

- The study sample is confined only to pre-service teachers who opted for physical science as their major subject and were selected from Alagappa University College of Education, Karaikudi, Sivagangai district, Tamil Nadu.

Research Methodology

Research method- Experimental Design- Single group (Pre-Assessment and Post-Assessment)

Sample and sampling technique

The present study included 20 Pre-service teachers belonging to the physical science major from Alagappa University College of Education, Karaikudi, Sivagangai District, and Tamil Nadu. The convenience sampling technique was employed for this study.

The tool used for the study

The Self-Compassion Scale (SCS) developed by Neff, K.D, (2003) with a Cronbach's reliability of 0.76 for the present sample.

Mindfulness strategies employed in the study

Mindful breathing, practice positive affirmations, presents a focus worksheet, and mindfulness Journal.

Statistical Techniques used for this study

Descriptive analysis: Mean, Standard Deviation

Inferential analysis: t-test

Data Analysis and Interpretation

Hypotheses testing:

- The level of self-compassion among pre-service teachers through mindfulness strategies is high

Table: 1

Assessment	N	Mean	Standard Deviation
Pre-Assessment	20	46.8	6.78
Post- Assessment	20	61.0	2.52

From the above table 1, it is observed that the mean score of self-compassion of pre-service teachers in post-assessment (61.0) is greater than the mean score of self-compassion of pre-service teachers in pre-assessment (46.8). The significant increase in the post-assessment mean score of self-compassion indicates the effectiveness of mindfulness strategies in enhancing self-compassion among pre-service teachers.

- There is no significant difference between pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning age group below 25.

Table: 2

Age Below 25	N	Mean	SD	Calculated 't' value	Level of significance
Pre-Assessment	20	46.8	6.78	3.21	Significant
Post- Assessment	20	61.0	2.52		

*Significant at 5% level

From the above table 2, it is observed that the calculated't' value (3.21) is greater than the table value (2.02) at the 0.05 level of significance. Hence, the null hypothesis was rejected,

which represents that there is a significant difference between the pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning those below the age group of 25.

- There is no significant difference between pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning rural areas.

Table: 3

Rural	**N**	**Mean**	**SD**	**Calculated 't' value**	**Level of significance**
Pre-Assessment	9	49.88	5.17	3.9	Significant
Post- Assessment	9	60	1.92		

*Significant at 5% level

From above table 3, it is observed that the calculated't' value (3.9) is greater than the table value (2.12) at the 0.05 level of significance. Hence, the null hypothesis was rejected, which represents that there is a significant difference between the pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies in rural areas.

- There is no significant difference between pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning urban areas.

Table: 4

Urban	**N**	**Mean**	**SD**	**Calculated 't' value**	**Level of significance**
Pre-Assessment	11	44.24	8.34	4.89	Significant
Post- Assessment	11	61.06	4.51		

*Significant at 5% level

From the above table 4, it is observed that the calculated't' value (4.89) is greater than the table value (2.08) at the 0.05 level of significance. Hence, the null hypothesis was rejected,

which represents that there is a significant difference between the pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies in the urban area.

Major findings of the study

There is a significant increase in the mean score between the pre-assessment and post-assessment of self-compassion of pre-service teachers through mindfulness strategies. The increase in the post-assessment mean score of self-compassion of pre-service teachers indicates the effectiveness of mindfulness strategies in enhancing self-compassion. There is a significant increase found in post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning age groups below 25, rural and urban areas.

Discussion

The purpose of the present study is to implement and investigate mindfulness strategies in enhancing the self-compassion of pre-service teachers concerning age groups below25, rural and urban areas. Results reveal that there is a significant increase in the mean score of post-assessment of self-compassion of pre-service teachers through mindfulness strategies. There is a significant difference between the pre-assessment and post-assessment scores of self-compassion of pre-service teachers through mindfulness strategies concerning age groups below 25, rural and urban areas. A similar study conducted by Bergen-Cico et al.,2013substantiates with present study, and the results revealed that practicing mindfulness is necessary for educating self-compassion. Self-compassion and mindfulness skills are pivotal for the well-being of the individual (Baer et. al. 2012).

Conclusion

The findings of the current research have few implications for understanding mindfulness strategies in enhancing self-compassion among pre-service teachers in a significant manner. Mindfulness strategies seem to be the supreme way to enhance self-compassion among pre-service teachers. Mindfulness strategies-based intervention programs in teacher training colleges are at the beginning stage. Self-compassion of pre-service teachers exists already to some extent. Enrichment programs are required to enhance the self-compassion of pre-service teachers through mindfulness strategies at the teacher training college level.

References

- *Baer, R. A., Lykins, E. L., & Peters, J. R. (2012). Mindfulness and self-compassion as predictors of psychological wellbeing in long-term meditators and matched nonmeditators. The Journal of Positive Psychology, 7(3), 230-238.*
- *Bergen-Cico, D., Possemato, K., & Cheon, S. (2013). Examining the efficacy of a brief mindfulness-based stress reduction (brief MBSR) program on psychological health. Journal of American College Health, 61(6), 348-360.*
- *Bluth, K., & Blanton, P. W. (2014). Mindfulness and self-compassion: Exploring pathways to adolescent emotional well-being. Journal of child and family studies, 23, 1298-1309.*
- *Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. Journal of personality and social psychology, 84(4), 822.*
- *Fulton, C. L. (2018). Self-compassion as a mediator of mindfulness and compassion for others. Counseling and Values, 63(1), 45-56.*
- *Rechtschaffen, D. (2014). The way of mindful education: Cultivating well-being in teachers and students. WW Norton & Company.*
- *Teper, R., Segal, Z. V., &Inzlicht, M. (2013). Inside the mindful mind: How mindfulness enhances emotion regulation through improvements in executive control. Current Directions in Psychological Science, 22(6), 449-454.*
- *Neff, K. D. (2003b). Development and validation of a scale to measure self-compassion,Selfand Identity, 2, 223-250.*
- *Neff, K. D., & Dahm, K. A. (2015). Self-compassion: What it is, what it does, and how it relates to mindfulness. Handbook of mindfulness and self-regulation, 121-137.*

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THE IMPACT OF INTRINSIC AND EXTRINSIC MOTIVATION ON THE INITIATION, PERSISTENCE, AND ADAPTATION OF SELF-REGULATED LEARNING

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Abstract

The complex interplay between intrinsic and extrinsic motivation and how they affect the Initiation, Persistence, and Adaptation of self-regulated learning (SRL) are explored in this research. A vital component of both academic and long-term success, self-regulated learning is the deliberate manipulation and observation of one's mental processes and methods of learning. It is imperative for educators, researchers, and policymakers to comprehend the motivational variables that propel individuals to begin, persist, and adapt in their learning endeavours. This study examines the body of research, evaluates empirical findings, and suggests a thorough framework to clarify the complex relationship between motivation and self-regulated learning.

Keywords: *Initiation, Persistence, Adaptation, Self-Regulated Learning*

Introduction

Self-regulated learning is an active process in which learners actively set objectives, track their progress, and use flexible tactics to get the best possible learning results. Extrinsic and intrinsic motivation is equally important in determining how self-regulated learning experiences develop. An essential aspect of the human experience is motivation. Even in the lack of obvious external reinforcers, adults independently take up new activities and children impulsively investigate unfamiliar objects. Therefore, not every action is motivated by observable external stimuli or results (referred to as "extrinsic" motivation). Instead, some activities are motivated by more internal forces (referred to as "intrinsic" motivation), where the activity is seen as having its own result. According to Gottlieb, Lopes, and Oudeyer (2016), intrinsically motivated behaviours are computationally comparable to extrinsically driven behaviours in that they aim to minimise punishment and maximise goal attainment, which are represented mathematically as effort cost functions and value functions, respectively (Goal-Directed Empowerment: Combining Intrinsic Motivation and Task-Oriented Behavior | IEEE Journals & Magazine | IEEE Xplore, n.d.). Nevertheless, subjective internal value functions are hard to describe, and we don't really

know how they're calculated and integrated (On What Motivates Us: A Detailed Review of Intrinsic v. Extrinsic Motivation | Psychological Medicine | Cambridge Core, n.d.).

Intrinsic and extrinsic motivation are the two key components at the centre of this complex journey that have a major impact on the start, perseverance, and adaptation of self-regulated learning (Seli, 2019). Understanding the intricate relationships between these motivating factors is crucial to understanding the complexity of each learner's unique learning trajectory. The term "intrinsic motivation" describes a person's inner motivation and desire. It entails doing something because you enjoy and find fulfillment in the process of it, as opposed to depending on outside incentives or demands (Krapp, 2005). This type of motivation is closely linked to individual passions, natural curiosity, and the joy of learning. People who are intrinsically motivated are more likely to take the initiative to start learning activities, maintain their efforts throughout time, and have an innate tendency to adjust to obstacles that come up during the learning process (Larson & Rusk, 2011).

Conversely, extrinsic motivation originates from outside sources like incentives, penalties, or social norms. It entails doing something in order to get a certain result or to stay out of trouble. Extrinsic motivation is a strong motivator, especially when there are material benefits or opportunities for acknowledgement. It may, however, have different effects on the start, perseverance, and adaptation of self-regulated learning since it can occasionally result in a reliance on outside rewards rather than a sincere enthusiasm for the process of learning (Rebitzer & Taylor, 2011).

This investigation explores the complex interplay between intrinsic and extrinsic motivation, looking at how each element influences the start of learning activities, maintains efforts throughout time, and promotes adaptive techniques in the face of difficulties. Understanding the complex interactions between various motivating factors helps we better understand the mechanisms behind self-regulated learning. This knowledge not only guides instructional strategies but also lays the groundwork for developing lifelong learners who are resilient and capable of navigating the challenges of gaining knowledge and skills.

Intrinsic Motivation - Driving Force of Self-Regulation

Motivation that arises from within rather than from external factors is known as intrinsic motivation (Condry & Chambers, 2015). It is thought to be a potent motivator for self-control,

encouraging people to start and continue engaging in personally rewarding and important activities. Intrinsic motivation is derived from internal desires, interests, and values as opposed to extrinsic motivation, which is influenced by outside variables like rewards, penalties, or society expectations.

The following are some salient features of the role that intrinsic motivation plays in propelling self-regulation:

Autonomy: When people feel like they have control or autonomy over their behaviour, intrinsic motivation frequently thrives. People are more likely to be driven by internal reasons when they believe they have the autonomy to select and control their own actions.

Expertise: A big part of intrinsic motivation is the drive for competence and mastery. When people are driven to advance their knowledge and abilities, learning and self-improvement become fulfilling endeavours in and of themselves.

Aim and Significance: Feeling purposeful and meaningful in one's actions is closely related to intrinsic motivation. Human intrinsic motivation is increased when people find personal meaning or a connection to their ideals in the work they accomplish.

Inquiry and Interest: Sincere interest and curiosity in a topic or activity are frequently the source of intrinsic motivation. When people are drawn to something, it's natural enjoyment that acts as a strong motivator.

Delighted Emotions: Positive feelings like happiness, fulfilment, and pleasure are linked to intrinsic motivation. The desire to carry out these behaviours is reinforced when one participates in activities that elicit these pleasant emotions.

Self-Determination Theory: This psychological paradigm highlights the significance of intrinsic motivation in promoting the best possible human performance. It is known as Self-Determination Theory (SDT). Autonomy, competence, and relatedness are three fundamental psychological demands that SDT contends are necessary for the emergence and upkeep of intrinsic motivation.

Extended-Duration Partnership: Persistent and long-lasting involvement with activities is typically the result of intrinsic motivation. Long-term commitment is more likely to be fostered

by intrinsic drive as opposed to extrinsic rewards, which might only provide momentary motivational boosts.

It is essential for educators, employers, and people to understand the role that intrinsic motivation plays in self-regulation. Enhancing intrinsic motivation can lead to self-regulation and persistent effort towards goals by establishing surroundings that encourage autonomy, offer chances for mastery, and are consistent with personal beliefs.

Extrinsic Motivation: Involved External Factors

Behaviour that is motivated by outside forces, such incentives, penalties, or recognition, as opposed to one's own emotions or sense of fulfilment, is referred to as extrinsic motivation (Deci & Ryan, 2012). Extrinsically motivated individuals don't always participate in things because they are pleasurable or fulfilling in and of themselves; rather, they do them because they result in a different outcome or reward.

1. **Financial Rewards:** One effective extrinsic motivation is money. Individuals may put in more hours, work longer hours, or take on more responsibility in the hopes of earning a rise in pay, a bonus, or other financial benefits.
2. **Acknowledgment and Awards:** External acknowledgement in the form of compliments, honours, or certifications can inspire people to work hard. People may strive for success in their endeavours because they want to be acknowledged or approved by others.
3. **Academic Ranking and Grades:** Students may be driven to achieve academic honours or high marks in an educational setting. One thing that keeps them going is when their academic achievements are recognised by others.
4. **Social Acceptance or Disapproval:** One of the most potent extrinsic motivators is the fear of social rejection or the desire for social acceptance. Individuals might follow social norms or expectations in order to win acceptance or stay out of trouble.
5. **Promotion to a Job:** The possibility of career advancement, job position advancement, or increased responsibility can motivate people to put in more effort and succeed in their professional endeavours.

Although extrinsic motivation has the potential to stimulate specific behaviours, it may not always result in long-term, consistent engagement or personal fulfilment. On the other hand, intrinsic motivation is thought to be more lasting and satisfying since it stems from internal

elements like enjoyment, personal interest, or a sense of purpose. An ideal combination of internal and extrinsic motivation can help create a driven and well-rounded person.

A Dynamic Relationship between Internal and External Motivation

Individuals' behaviour is greatly influenced by the complex interplay between internal and external motivation. An intrinsic drive, or internal motivation, is derived from one's own interests and sincere enjoyment of an activity. However, external motivation, which reflects extrinsic incentives, is impacted by external elements like rewards, recognition, or penalties. Internal drive is either increased or decreased by external motivators, which frequently interact with these two types of motivation. Finding a balance is essential since an over-reliance on outside rewards can cause an increase in the "over justification effect," which is a decrease in intrinsic drive. Understanding individual differences, appreciating the influence of external and internal influences, and creating an atmosphere that harmonises external incentives with internal ideals are all necessary to achieve optimal motivation.

Self-Regulated Learning

Self-regulated learning (SRL) is the process by which people take charge of their own education by establishing objectives, keeping track of their progress, and modifying their approach to meet those objectives (Zimmerman & Schunk, 2011). It incorporates behavioural tactics, motivation, and meta cognition thinking about one's own thinking.

Initiation of Self-Regulated Learning: Understandings and Techniques

The process of initiating self-regulated learning is complex and it starts with developing metacognitive awareness and knowledge of own learning preferences. Setting attainable, well-defined short- and long-term goals gives students a sense of purpose and direction. Sustaining engagement requires the use of motivational tactics, such as tying learning to personal interests and highlighting its importance. Individuals are given useful tools for acquiring knowledge when explicit learning procedures like summarization and self-testing are taught. Effective learning involves effective time management, job prioritisation, and the division of more ambitious objectives into smaller, achievable steps. Self-regulated learning is supported by optimising the learning environment and encouraging resource utilisation, as well as by reflective practices and regular feedback seeking that fosters an attitude of continual development. A lifetime

commitment to learning and autonomy are fostered by enhancing self-efficacy through positive reinforcement and acknowledging accomplishments. This allows people to take charge of their educational journey (Schunk & Zimmerman, 1998).

Fostering Intrinsic Motivation for Initiation

Creating an atmosphere that encourages people to take initiative and pursue objectives motivated by sincere interest and curiosity is one way to foster intrinsic motivation for initiative. Giving people a sense of autonomy the capacity to decide for themselves and accept responsibility for their actions is essential to achieving this. Initiatives gain intrinsic worth when they are linked to personal values and objectives, which gives them context and significance (Thomas, 2009). A sense of competence and success is cultivated through encouraging the acceptance of challenges and the development of challenging but realistic goals. An enthusiastic emotional attachment to the project is facilitated by encouraging comments, acknowledging hard work, and creating a welcoming and inclusive atmosphere.

Persistence in Self-Regulated Learning: Navigating Challenges

Overcoming obstacles and accomplishing long-term objectives require persistence in self-regulated learning. Adaptability, drive, and metacognitive techniques are necessary for successfully navigating difficulties. In self-regulated learning, persistence is a result of the dynamic interaction between motivation, adaptability, meta cognition, and successful tactics. People can overcome problems with resilience and find long-lasting success in their learning journeys by being dedicated to specific goals, viewing setbacks as chances for improvement, and keeping an optimistic outlook. Extrinsic motivation can be very important in self-regulated learning because it offers incentives outside of the self that can support and enhance internal motivation. People may become genuinely interested in studying and experience intrinsic satisfaction when they succeed and get a deeper comprehension of the material. For this reason, encouraging a consistent and significant engagement in self-regulated learning requires a harmonious synthesis of extrinsic and intrinsic motivators.

Educational Implications and Practical Applications of Strategies for Fostering a Motivationally Supportive self-regulated Learning Environment

The creation of a self-regulating learning environment that is motivationally supportive is crucial for academic success (Zimmerman, 1990). Setting goals and successfully managing their learning is made possible for pupils when learning objectives and expectations are communicated clearly. Encouraging pupils to connect with their interests through autonomy and choice within the curriculum fosters intrinsic drive. Positive feedback that acknowledges and celebrates accomplishments helps to maintain a positive learning environment. Including opportunities for collaborative learning fosters a feeling of belonging and shared success (Stefanou et al., 2004). Diverse learning styles are catered to via adaptive learning resources, which include technological integration and give students the resources they need for self-directed learning. Prioritizing skill development and mastery causes the learning process to take precedence over the desired results. Learning experiences that are scaffolded offer organized assistance that progressively develops autonomous self-control. Students who have a growth mentality are more likely to see obstacles as chances for personal development. Consistent introspection using notebooks and evaluations improves metacognitive awareness. Individualized learning plans adjust the educational experience to meet the needs of each student. By putting these tactics into practice, educators may foster a learning atmosphere where students are inspired, involved, and prepared for lifetime learning.

Conclusion

To sum up, the interaction between intrinsic and extrinsic motivation significantly influences how self-regulated learning begins, persists, and adapts. Extrinsic motivators, such prizes or recognition, are crucial in igniting engagement, especially in the early phases, but intrinsic motivation fuelled by real love for learning and personal interests serves as a strong and enduring force for initiation. The mutual influence of these motivating factors becomes evident as people set out on the path of self-regulated learning, impacting the perseverance and resilience required for success. Furthermore, with time, intrinsic drive usually turns into a guiding principle that strengthens a person's bond with the learning process. Each motivational style makes a unique contribution to the field of adaptability. By promoting meta cognition, curiosity, and a growth mindset which enable people to consider other options and persevere in the face of

difficulties intrinsic motivation stimulates adaptation. However, external rewards and recognition from extrinsic motivators can act as vital support during adaptive periods, hence reinforcing the importance of self-regulated learning. In the end, developing a comprehensive strategy for self-regulated learning requires a balanced combination of intrinsic and extrinsic motivation. Extrinsic motivators can offer the required push for consistent effort, but intrinsic motivators the personal connection and passion connected with learning—are needed to start the learning process. Intrinsic motivation serves as a stabilising force that keeps people engaged, encourages a passion of lifelong learning, and gives students the tools they need to face obstacles head-on and adopt a growth-oriented mindset. Acknowledging and utilising the dynamic interaction between intrinsic and extrinsic motivation is crucial in cultivating a lifetime dedication to self-regulated learning and realising each learner's full potential.

References

- Condry, J., & Chambers, J. (2015). Intrinsic motivation and the process of learning. In The hidden costs of reward (pp. 61–84). Psychology Press.
- Deci, E. L., & Ryan, R. M. (2012). Motivation, personality, and development within embedded social contexts: An overview of self-determination theory. The Oxford Handbook of Human Motivation, 18(6), 85–107.
- Goal-Directed Empowerment: Combining Intrinsic Motivation and Task-Oriented Behavior | IEEE Journals & Magazine | IEEE Xplore. (n.d.). Retrieved January 5, 2024, from https://ieeexplore.ieee.org/abstract/document/9284556
- Krapp, A. (2005). Basic needs and the development of interest and intrinsic motivational orientations. Learning and Instruction, 15(5), 381–395.
- Larson, R. W., & Rusk, N. (2011). Intrinsic motivation and positive development. Advances in Child Development and Behavior, 41, 89–130.
- On what motivates us: A detailed review of intrinsic v. Extrinsic motivation | Psychological Medicine | Cambridge Core. (n.d.). Retrieved January 5, 2024, from https://www.cambridge.org/core/journals/psychological-medicine/article/on-what-motivates-us-a-detailed-review-of-intrinsic-v-extrinsic-motivation/3FC35CD80D991744CD764AF2FBCD3BBB
- Rebitzer, J. B., & Taylor, L. J. (2011). Extrinsic rewards and intrinsic motives: Standard and behavioral approaches to agency and labor markets. In Handbook of labor economics (Vol. 4, pp. 701–772). Elsevier.
- Schunk, D. H., & Zimmerman, B. J. (1998). Self-regulated learning: From teaching to self-reflective practice. Guilford Press.
- Seli, H. (2019). Motivation and learning strategies for college success: A focus on self-regulated learning. Routledge.

- Stefanou, C. R., Perencevich, K. C., DiCintio, M., & Turner, J. C. (2004). Supporting autonomy in the classroom: Ways teachers encourage student decision making and ownership. Educational Psychologist, 39(2), 97–110.
- Thomas, K. W. (2009). Intrinsic motivation at work: Building energy and commitment. Berrett-Koehler Publishers.
- Zimmerman, B. J. (1990). Self-regulating academic learning and achievement: The emergence of a social cognitive perspective. Educational Psychology Review, 2, 173–201.
- Zimmerman, B. J., & Schunk, D. H. (2011). Self-regulated learning and performance: An introduction and an overview. Handbook of Self-Regulation of Learning and Performance, 15–26.

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EFFECT OF PLYOMETRIC GROSS AND MUD TRAINING ON SELECTED KINANTHROPOMETRIC VARIABLES AMONG COLLEGE WOMEN FOOTBALL PLAYERS

M. Nelliyan* & Dr. S.Nagarajan**

Abstract

The purposes of this study find out effect of plyometric gross and mud training on selected kin anthropometric variables among college women football players. The selected subjects were the participants of inter – collegiate football tournament, studying in Alagappa University College of Physical Education and Alagappa Government Arts College, Karaikudi. Their age range is 18 to 23 years. The selected subjects (N=45) were divided into three groups. Experimental group I (N=15) Plyometric mud training group, Plyometric gross training group and group II (N=15) acted as control group.

Keywords: Training, Kinanthropometric, Women, Football Players,

Plyometric Training

Plyometrics, also known as jump training or plyos, are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power (speed-strength). This training focuses on learning to move from a muscle extension to a contraction in a rapid or "explosive" manner, such as in specialized repeated jumping. Plyometrics are primarily used by athletes, especially martial artists, sprinters and high jumpers to improve performance, and are used in the fitness field to a much lesser degree.

Methodology

The purposes of this study find out an effect of plyometric gross and mud training on selected kinanthropometric variables among college women football players. The selected subjects were the participants of inter – collegiate football tournament, studying in Alagappa University College of Physical Education and Alagappa Government Arts College, Karaikudi. Their age range is 18 to 23 years. The selected subjects (N=45) were divided into three groups. Experimental group I (N=15) Plyometric mud training group, Plyometric gross training group and Group II (N=15) acted as control group.

The experimental groups were treated with their respective training for one and half hour per day for three days a week for a period of eight weeks. Thigh Girth measured by in Centimeters meters and Calf Girth measured by in Centimeters meters,

Table - I

Selection of variables and criterion measures

Sl. No	Criterion Variables	Test Items	Units of Measurement
1.	Thigh Girth	Flexible Metal Tape	In Centimeters
2.	Calf Girth		

Statistical Technique

The data will be collected before and after the experimental treatment. The data obtained from the experimental period will be statistically analyzed with paried‘t’ test at 0.05 level of significant improvement on Thigh Girth and Calf Girth from base line to post treatment.

Table - II

The Summary of Mean and Dependent ‘T’ Test for the Pre and Post Tests on Thigh Girth of Plyometric Gross, Plyometric Mud

Training and Control Groups

Sl.No	Groups	Pre Test Mean	Post Test Mean	‘ t ’ ratio	Table Value
1.	Plyometric Gross Group	45.20	50.00	44.90*	2.15
	Plyometric Mud Group	45.80	48.93	23.50*	2.15
2.	Control Group	46.40	46.20	0.90	2.15

***Significant at 0.05 level.**

The table II shows that the obtained dependent ‘t’ ratio values between the pre and post test means plyometric mud training group, plyometric gross training group and control groups are **44.90*, 23.50*** and 0.90 respectively. The table value required for significant differences with df 14 at 0.05 level is 2.15 Since the obtained ‘t’ ratio value of experimental groups are

greater the table value, it is understood that plyometric gross training group and plyometric mud training group had significantly improved the thigh girth.

Pre and Post Tests on Thigh Girth of Plyometric Gross Training and Plyometric Mud Training Group and Control Groups

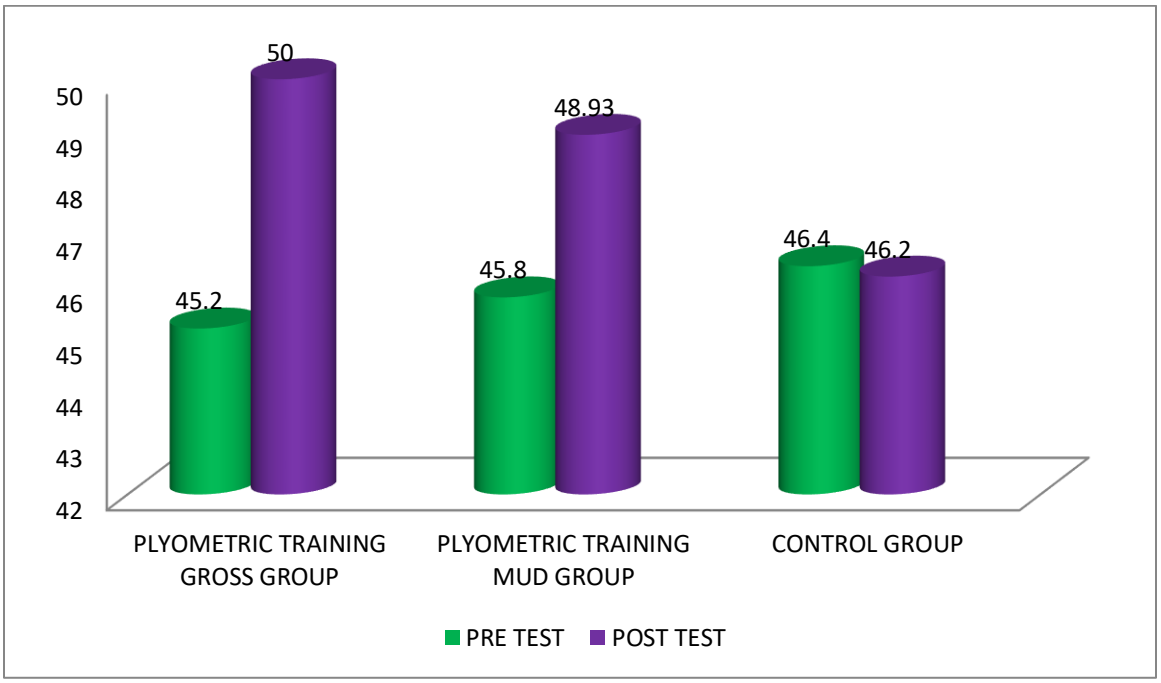


Table - III

The Summary of Mean and Dependen 'T' Test for the Pre And Post Tests on Calf Girth of Plyometric Gross, Plyometric Mud Training and Control Groups

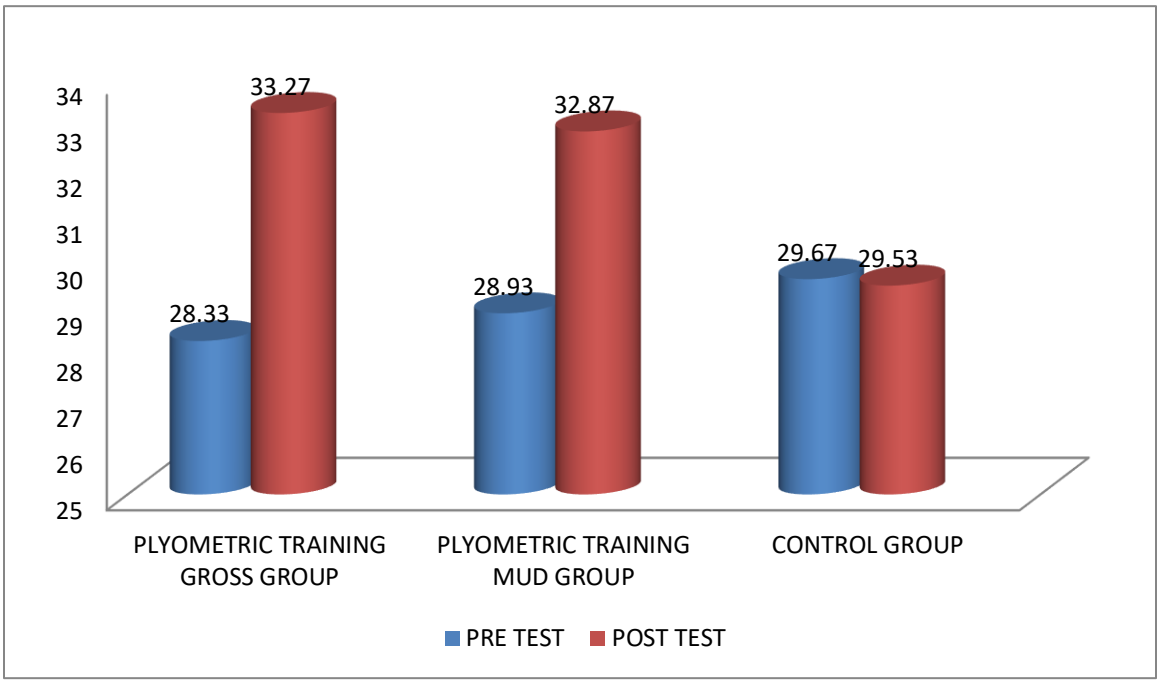
S.No	Groups	Pre Test Mean	Post Test Mean	' t ' ratio	Table Value
1.	Plyometric Gross Group	28.33	33.27	74.00*	2.15
	Plyometric Mud Group	28.93	32.87	25.66*	2.15
2.	Control Group	29.67	29.53	0.62	2.15

***Significant at 0.05 level.**

The table II shows that the obtained dependent 't' ratio values between the pre and post test means plyometric mud training group, plyometric gross training group and control groups

are **74.00*, 25.66*** and 0.62 respectively. The table value required for significant differences with df 14 at 0.05 level is 2.15 Since the obtained 't' ratio value of experimental groups are greater the table value, it is understood that plyometric gross training group and plyometric mud training group had significantly improved the calf girth.

Pre and Post Tests on Calf Girth of Plyometric Gross Training and Plyometric Mud Training Group and Control Groups



Conclusion

There was a significant improvement on selected dependent variable such as Thigh Girth and calf Girth on impact of different surface plyometric training on college women football players.

References

- *Mina Ahmadi, Hadi Nobari et.,al (2021) Effects of Plyometric Jump Training in Sand or Rigid Surface on Jump-Related Biomechanical Variables and Physical Fitness in Female Volleyball Players, Dec; 18(24): 13093. Published online 2021 Dec 11. doi: 10.3390/ijerph182413093*
- *Mehrez Hammami, Nicola Luigi Bragazzi et., al (2020) The effect of a sand surface on physical performance responses of junior male handball players to plyometric training, ; 12: 26. Published online 2020 Apr 25. doi: 10.1186/s13102-020-00176-x*

- *Javier Sanchez-Sanchez & Alejandro Martinez-Rodriguez (2020) Effect of Natural Turf, Artificial Turf, and Sand Surfaces on Sprint Performance. A Systematic Review and Meta-Analysis, Dec; 17(24): 9478.Published online 2020 Dec 17. doi: 10.3390/ijerph17249478*
- *Johan Lännerström, Lina C Nilsson et.,al (2021) Effects of Plyometric Training on Soft and Hard Surfaces for Improving Running Economy, Jul; 79: 187–196.Published online 2021 Jul 28. doi: 10.2478/hukin-2021-0071*
- *Gaurav Singh, Gaurav Singh Kushwah et.,al (2022) Effects of Sand-Based Plyometric-Jump Training in Combination with Endurance Running on Outdoor or Treadmill Surface on Physical Fitness in Young Adult Males, Jun; 21(2): 277–286. Published online 2022 Jun 1. doi: 10.52082/jssm.2022.277*
- *Tiago Cetolin, Anderson Santiago Teixeira et.,al (2021) High-Intensity Intermittent Exercise Performed on the Sand Induces Higher Internal Load Demands in Soccer Players, ; 12: 713106. Published online 2021 Jul 30. doi: 10.3389/fpsyg.2021.713106*
- *Byoung-Ha Hwang and Tae-Ho Kim (2019) The effects of sand surface training on changes in the muscle activity of the paretic side lower limb and the improvement of dynamic stability and gait endurance in stroke patients, Jun; 15(3): 439–444.Published online 2019 Jun 30. doi: 10.12965/jer.1938164.082.*
- *Rodrigo Ramirez-Campillo , Cristian Álvarez et.,al (2020) Effects of Combined Surfaces vs. Single-Surface Plyometric Training on Soccer Players' Physical Fitness, Sep;34(9):2644-2653.doi: 10.1519/JSC.0000000000002929.*

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IMPACT OF LIFE SKILLS LEARNING ON ACHIEVEMENT MOTIVATION AND LIFE SATISFACTION OF PRIMARY SCHOOL 5TH GRADE STUDENTS

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Abstract

Schools provide a significant contribution to children's education and training since they spend a significant portion of their life at school. The purpose of the study was to determine the impact of Life Skills learning on students' Achievement Motivation and Life Satisfaction. The Control Group was subjected to pre- and post-testing in this experimental initiative. The sample consisted of 80 students who are studying 5th grade in Padma Subramaniam Bala Bhavan Matriculation Higher Secondary School in Mangadu, Chennai, during the academic year 2022-2023. They were chosen using a random sampling technique and divided into two groups of 80 students: a control group (n=40) and an experimental group (n=40).A questionnaire on Achievement Motivation and Life Satisfaction with a brief multidimensional scale was used to collect data. During a month, the experimental group attended 8 sessions of Life Skills Learning. Analysis of Variance (ANOVA) was used to analyse the data. As revealed by the results of the Analysis of Variance, Life Skills Learning enhanced students' life satisfaction and encouraged them to strive for success ($p<0.05$). The research's findings and conclusions have a major impact for young children's access to counselling and academic resources.

Keywords: *Primary School Students, Life Skills, Achievement Motivation, Life Satisfaction and Analysis of Variance*

Introduction

This century will see more technical advancements than any other in human history, which will have a profound impact on many aspects of daily life. More than ever, this century will see the development of new strategies for handling both current and emerging problems, adapting to new developments, interacting with others, and overcoming environmental stresses. In order to live a healthy, passionate, happy, prosperous, and effective life, living in such circumstances requires particular skill sets. The main reason for this need is because a lot of people struggle to effectively deal with the challenges of everyday life and effectively handle the obstacles that all people encounter at some point in their lives. Many studies have shown that

psycho-social difficulties are the underlying cause of many health problems as well as psycho-emotional illnesses. Everybody faces challenges throughout their lives and must learn to deal with life's frustrations and problems, and each person handles these problems differently. Flexibility, prudence, and logical thinking are the three qualities of those who overcome these obstacles. Indeed, experts believe that mental health initiatives, such as life skills learning, must be implemented in order for students to exercise more control over their lives and maintain their mental health. The World Health Organization launched a program in 1993 to prevent diseases and improve people's mental health after introducing life skills learning in an article published in 1980–1984 by Botvin and Griffin (2004). Self-awareness, Empathy, interpersonal communication skills, decision making-problem solving, creative thinking, critical thinking, coping with stress and emotions were the five aspects of this learning program. Life skills encompass cognitive, emotional, and practical abilities that can ensure success and enjoyment in daily life, and the goals of training these abilities are a reflection of the demands of daily living.

Encouraging young children to participate in social and problem-solving programs will likely improve their academic achievement as well as their mental health. Failure, rage and aggressive behavior, or depression may result from the juvenile's lack of familiarity with crisis management methods and inability to cope with stressful situations in life, or it may even drag them into avoidance behavior such as smoking, addiction, and delinquency. This demonstrates the critical role of child life skills education and implies that when students are exposed to suitable training, they are able to discover more acceptable solutions to their difficulties. Various studies have demonstrated the usefulness of teaching kids problem-solving skills in reducing social isolation and rage. In a study, the effects of mental health interventions in schools and Life Skills Learning/Training classes were evaluated. The findings indicated that the program had a positive impact on students' academic performance as well as their personal lives, interpersonal relationships, and school attendance. In particular, the program's positive effects on students' academic performance were evident in increased attention spans, improved achievement motivation, and improved coping skills and assertiveness in their personal lives. Additionally, the program's effects on students' personal lives were felt in reduced aggression, decreased depression, and improved sense of responsibility and life satisfaction. As the study found, there were improvements in family ties and a decline in confrontations with peers and teachers on an interpersonal level. According to Williams et al. (2020), life skills are defined as functional

abilities that people acquire and employ successfully in one setting (such as athletics, physical education, the family, or the community) and then successfully utilize in other contexts. Conversely, an explicit approach entails using particular pedagogical techniques to deliver a life skills program. These techniques may include giving feedback, talking about the applications of life skills, assisting youth in creating action plans, and providing opportunities for youth to practice life skills (Turnnidge et al., 2014; Bean et al., 2018).

Teachers can use better approaches for executing educational initiatives if they understand the idea of motivation and are aware of different incentives and intentions and their implications for students' learning. Motivation is a component of energizing, tutoring, and maintaining. Achievement Motivation is one of the most significant acquired requirements of any human, encompassing a person's wishes to overcome challenges, excel, and meet high-level criteria. In reality, persons with strong Achievement Motivations are responsible and reliable, challenge takers, have high self-esteem, and can withstand external social pressures. According to the findings of the research, students with a high degree of Achievement Motivation do better in several aspects of their lives, including their studies and social lives. Even though the usefulness of life skills learning in raising Achievement Motivation has not been thoroughly studied, the results of these studies all indicate that Life Skills Learning has a favorable influence on raising Achievement Motivation. For example, Sepah Mansour (2007) conducted a study that found that Life Skills Training increased Achievement Motivation. Life Skills Training will lead to a more activist role in life, solid accountability at work, future planning, and critical thinking, all of which are directly related to Achievement Motivation. Further studies have shown how students' self-esteem is affected by Life Skills Training.

Life satisfaction is one of the personal characteristics that life skills learning is thought to positively enhance. A mental health indicator known as life satisfaction represents a person's perspective, overall evaluation of his life, and opinions on several facets of it, including family and education. In actuality, a variety of psychological factors, including optimism, positive emotion, and self-esteem, are correlated with life satisfaction. According to Laughlin and Huebner (2001), life satisfaction is a person's cognitive evaluation of the standard of their existence. The effectiveness of an optimistic upbeat approach is the idea of life satisfaction. Health or illness may result from a person's earlier experiences, including their contents and dissatisfactions with life issues, differing from the events that occur in later stages of their lives.

Erikson (1968) identified eight psycho-sociological stages that a properly developing individual should go through from birth to adulthood. Every step requires the person to take on and, hopefully, overcome new obstacles. Failure or success in each stage will have a significant impact on Life Satisfaction later in life. Stated in different ways, an individual's track record of accomplishments and setbacks will be evident in the way they handle the psycho-sociological tasks they are assigned, either now or in the future. According to Stanli and Markman, who cite Ali Ghanbari Hashemabadi and Kadkhodazadeh (2007), group learning's help people learn effective communication and relationship skills. Life satisfaction will be positively impacted by life skills learning. Life Skills Training is useful in enhancing self-esteem, which is one of the elements influencing Life Satisfaction. According to Forneris, Dansish, and Scot (2007), Life Skills Training can improve problem solving and provide social support. High school students' life satisfaction is positively impacted by life skills training.

In general, students enter primary and secondary school at the beginning of the adolescent period, which is referred to as the critical period. On the one hand, this is because students are adjusting to changes in their social lives and developing a new social identity. On the other hand, this makes it even more important for primary and secondary schools to provide Life Skills Learning. Other reasons for providing Life Skills Learning/Training courses in schools include the role of Achievement Motivation and Life Satisfaction in students' mental health, research gaps and a lack of sufficient relevant findings offered by bodies of research in the field, ignoring the effectiveness of Life Skills Learning/Training in the studied variables, and implementing the findings of this research in the Education System. So, the purpose of the current study is to evaluate how well Life Skills Learning affects fifth-grade students' motivation for achievement and level of Life Satisfaction.

Research Methodology

Pre and Post tests were administered to a randomly assigned Control Group in this applied, experimental research, as seen from the perspectives of goal and methodology. During the academic year of 2022–2023, fifth grade students from Padma Subramaniam Bala Bhavan Matriculation Higher Secondary School participated in the research population. Eighty students total were divided into two groups, the Control Group and the Experiment Group, each with 40 students. A random sample was taken from the research population. In order to do this, 40 fifth-

grade students at the school were chosen at random to form the Control Group and another 40 to form the Experiment Group. A pre-test was conducted at the start of the study to assess Life Satisfaction and Achievement Motivation using a questionnaire. Following that, the Experiment Group was given 8 sessions of 120 minutes over the course of a month to expose them to life skills learning. A post-test was provided at the end. To collect the data, the following tools were used.

Achievement Motivation Questionnaire (Quiz): Hermnes created the quiz back in 1970. It gives you 29 unfinished sentences with four options at the conclusion of each. Each option will be assigned a grade based on the degree of Achievement Motivation, which can be measured on a Low-High or High-Low scale. Hermnes (1970) measured the degree of credibility by using content validation, which was based on studies on the idea of achievement motivation. Each question's correlation coefficient was determined by taking into account the participants' achievement-oriented behaviors; the range of coefficients for the quiz's questions was 57% to 30%. Furthermore, Hermnes noted a correlation coefficient between this questionnaire (quiz) and the Thematic Appreciation Test (TAT).

Multidimensional Life Satisfaction Scale: Heubner (1994) developed this scale, which rates overall satisfaction using six items on a seven-point Likert scale. The validity and reliability of this scale have been confirmed by several investigations. In their study, Mohammadi and Jokar (2010) determined that the Cronbach's Alpha Coefficient for this scale is 76%. In this study, the Cronbach's Alpha was determined to be 88%.

Intervention: The Experiment Group received the World Health Organization's Life Skills Training (1994). The method will be briefly outlined; First, Ego Development (finding the good things that students have to offer, being able to tell the difference between "doing wrong" and being a "Wrong doer," identifying traits that attract and repel someone, and realizing that character changes coincide with various stages of growth). Second, Emotional Development (realizing that rejection and loneliness are feelings that others may experience, teaching coping mechanisms for these emotions, understanding that an individual's emotions originate from within and not from outside sources, recognizing unwanted emotions and learning coping mechanisms for them, and handling humiliation, embarrassment, and rejection situations).Thirdly, Social Development (recognizing and strengthening cooperative behaviors,

developing the abilities required for efficient conflict resolution, recognizing the behaviors that could result in rejection, ridicule, embarrassment, and humiliation, and learning to see the world from other people's perspective).Finally, Cognitive Development (identifying and assessing the importance of choices, distinguishing between rational and illogical views, providing strategies for applying rational beliefs in particular situations, and taking into account the positive and negative repercussions of decisions).

Analysis with Interpretation

Following the selection process, the subjects took a pretest. Over the course of a month, the Experiment Group received eight one-hour meetings. A post-test was administered once the sessions were over, and Analysis of Variance (ANOVA) was used to collect and analyse the results.

Table- 1

Average, Standard Deviation (SD), Leuven and Box Tests and Wilks Lambda Test of Achievement Motivation and Life Satisfaction in the Control and Experiment Group					
		Control Group		**Experiment Group**	
Variable	**Stages**	**Average**	**SD**	**Average**	**SD**
Achievement Motivation	Pre-test	58.43	5.92	64.65	6.79
	Post-test	63.66	7.88	78.81	6.10
Life Satisfaction	Pre-test	22.85	3.56	22.44	2.34
	Post-test	23.10	2.71	29.68	4.74
Leuven and Box Tests					
	Value	**F**		**Sig**	
Achievement Motivation and Life Satisfaction	28.47	1.86		0.240>0.05	
Wilks Lambda Test					
	Value	**F**		**Sig**	
Achievement Motivation and Life Satisfaction	0.292	45.73		0.002<0.05	

Source: Primary Data

As indicated in Table 1, the average and standard deviation computed for Achievement Motivation based on the pre-test of the students in the Control Group were 58.43 and 5.92,

respectively, while Life Satisfaction was calculated at 22.85 and 3.56, respectively. For Achievement Motivation, the average and standard deviation determined based on the post-test of the students in the Control Group were 63.66 and 7.88, respectively, and for Life Satisfaction, they were 22.85 and 2.71, respectively. The Experiment Group's average and standard deviation based on the pre-test for Achievement Motivation and Life Satisfaction were 64.65 and 6.79, respectively, while Life Satisfaction was 22.44 and 2.34. The average and standard deviation determined based on the post-test of the student in the Experiment Group were 78.81 and 6.10, respectively, whereas the scores for Life Satisfaction were 29.68 and 4.74.The Leuven and Box Tests were performed prior to applying the parametric test to Analysis of Variance in order to ensure that its assumptions were met. The Box Test revealed that the homogeneity criterion was successfully observed variance/covariance matrices (BOX=28.47, F=1.86, P=0.240), and it was not significant for any of the variables. The Leuven Test revealed that there was equality of variance between the groups, despite its insignificance for all the variables. Wilks Lambda Test results indicate that the group has a significant impact on Achievement Motivation and Life Satisfaction (Wilks Lambda= 0.292, F=45.73, P=0.002). The aforementioned test demonstrates the appropriate use of ANOVA. According to the results, at least one of the variables in the two groups differed significantly from the other.

Table- 2

ANOVA findings for calculating the difference in the Pre and Post-tests of Achievement Motivation and Life Satisfaction in the Control and Experiment Group

Variables	Total Square	DF	Average Square	F	Sig.
Achievement Motivation	1767.03	1	1767.03	48.84	0.000<0.05
Life Satisfaction	634.06	1	634.06	42.82	0.000<0.05

Source: Primary Data

As indicated in Table 2, that there is a significant difference (P=0.000) between the average values of Achievement Motivation (F=48.84) and Life Satisfaction (F=42.82) in the Life Skills Learning Group (Experiment Group) and the Control Group. In other words, based on the averages of the two groups, Life Skills Learning will increase Achievement Motivation and Life Satisfaction.

Conclusion

The goal of the current study is to determine how well life skills education can inspire fifth-grade students to pursue their goals and make progress while also raising their level of life satisfaction. The research indicates that teaching life skills to students in the experiment group will increase their motivation to achieve and their level of life satisfaction. This study's conclusions are consistent with other bodies of research undertaken by other researchers. According to the research's findings, students' achievement motivation can be increased through Life Skills Learning. In order to better understand the research findings, it should be made clear that life skills encompass a wide range of psycho-sociological and interpersonal skills that can aid a person in making sound choices, communicating effectively, developing coping mechanisms and management skills, and leading a healthy, productive life in which they exhibit a strong drive for success in a range of endeavours, the most significant of which is achieving academic success in the fifth-grade students. This kind of instruction will stimulate students and boost their activities to a new level, guiding them toward specific objectives by increasing their achievement motivation. Life Skills Learning can enhance an individual's view of themselves and others, as well as their feeling of self-worth, assertiveness, accountability, and interpersonal relationships. Furthermore, group interactions will provide opportunities for practicing verbal and nonverbal face-to-face communications while minimizing the possibility of misinterpretation. It appears that after learning excellent communication skills and how to deal with negativity, a person's communications improve significantly, giving them greater happiness with interactions with others. During the research process, researchers encountered several obstacles, including a deficiency of monthly sessions, follow-up sessions, and educational curriculum for life skills learning. It is recommended that the issues be properly addressed in further studies to improve the predictability of the results. It is also advised that curriculum designers for schools take necessary action to solve this problem and include courses on Life Skills Learning/Training that are specifically designed for these kinds of situations.

References

- *Albertyn, R. M., Kapp, C. A., & Groenewald, C. J. (2001). Patterns of empowerment in individuals through the course of a life-skills programme in South Africa. Studies in the Education of Adults, 33(2), 180-200.*
- *Ali Ghanbari Hashemabadi, B. &Kadkhodazadeh, T. (2007). The impact of life skills education on students' satisfaction with life. Journal of Educational Studies, 1, 2, 67-80.*

- *Bae, J. S., Cho, E. H., & Lim, T. H. (2021). Examining the role of life skills in mediating the relationship between the basic psychological needs and subjective well-being of Taekwondo student-athletes. International journal of environmental research and public health, 18(21), 11538.*
- *Bean, C., Kramers, S., Forneris, T., &Camiré, M. (2018). The implicit/explicit continuum of life skills development and transfer. Quest, 70(4), 456-470.*
- *Botvin, G. J., & Griffin, K. W. (2004). Life skills training: Empirical findings and future directions. Journal of primary prevention, 25, 211-232.*
- *Calmeiro, L., Camacho, I., & de Matos, M. G. (2018). Life satisfaction in adolescents: The role of individual and social health assets. The Spanish journal of psychology, 21, E23.*
- *Cronin, L., Marchant, D., Johnson, L., Huntley, E., Kosteli, M. C., Varga, J., & Ellison, P. (2020). Life skills development in physical education: A self-determination theory-based investigation across the school term. Psychology of Sport and Exercise, 49, 101711.*
  rdağ, S. (2022). Examining Life Satisfaction and Communication Skills of University Students as the Predictors of their Motivation. YüksekoğretimDergisi, 12(1), 51-60.
- *Erikson, E. H. (1968). Identity youth and crisis (No. 7). WW Norton & company.*
- *Feraco, T., Resnati, D., Fregonese, D., Spoto, A., & Meneghetti, C. (2023). An integrated model of school students' academic achievement and life satisfaction. Linking soft skills, extracurricular activities, self-regulated learning, motivation, and emotions. European Journal of Psychology of Education, 38(1), 109-130.*
- *Gomes, A. R., & Marques, B. (2013). Life skills in educational contexts: testing the effects of an intervention programme. Educational Studies, 39(2), 156-166.*
- *Hodge, K., Danish, S., Forneris, T., & Miles, A. (2016). Life skills and basic psychological needs. Positive youth development through sport, 33, 45-56.*
- *Huebner, E. S. (1994). Preliminary development and validation of a multidimensional life satisfaction scale for children. Psychological assessment, 6(2), 149.*
- *Javidi, K., &Garmaroudi, G. (2019). The Effect of Life Skills Training on Social and Coping Skills, and Aggression in High School Students. Novelty in Biomedicine, 7(3).*
- *Kumar, P. (2017). Morality and Life skills: The need and importance of life skills education. International Journal of Advanced Education and Research, 2(4), 144-148.*
- *Lak, Z., Rajabi, S., Moazedian, A., Pournikdast, S., &Sabetimani, M. (2013). The Effectiveness of Life Skills Training on Achievement Motivation and Life Satisfaction of Students. Journal of Educational and Management Studies, (3), 4.*
- *Lettau, J. (2021). The impact of children's academic competencies and school grades on their life satisfaction: What really matters?. Child Indicators Research, 14(6), 2171-2195. Huebner, E. S., Ash, C., & Laughlin, J. E. (2001). Life experiences, locus of control, and school satisfaction in adolescence. Social indicators research, 55, 167-183.*
- *Lazarus, R. S., Kanner, A. D., & Folkman, S. (1980). Emotions: A cognitive–phenomenological analysis. In Theories of emotion (pp. 189-217). Academic Press.*
- *Meyer, K. A. (2015). Students' perceptions of life skill development in project-based learning schools. Minnesota State University, Mankato.*
- *Mohammadi, Z., & Jokar, B. (2010). Perfectionism, emotional probleme and life satisfaction in iranian college students.*
- *Prasertcharoensuk, T., Somprach, K. L., & Ngang, T. K. (2015). Influence of teacher competency factors and students' life skills on learning achievement. Procedia-Social and Behavioral Sciences, 186, 566-572.*
- *Rathus, S. A. (1990). Psychology. New York, Holt Rinehart and Winston.*
- *Roh, Y. S., & Kim, S. S. (2015). Integrating problem-based learning and simulation: Effects on student motivation and life skills. CIN: Computers, Informatics, Nursing, 33(7), 278-284.*

- *Shechtman, Z., Levy, M., &Leichtentritt, J. (2005). Impact of life skills training on teachers' perceived environment and self-efficacy. The Journal of Educational Research, 98(3), 144-155.*
- *Sepah Mansour, M. (2007). Impact of Life Skills Training on achievement motivation, self-esteem and social adjustment. Taught and Behavior, 2, 6, 85-93.*
- *Tan, S. (2018). Life skills education: teachers' perceptions in primary school classrooms in Finland and Singapore (Master's thesis).*
- *Turnnidge, J., Côté, J., & Hancock, D. J. (2014). Positive youth development from sport to life: Explicit or implicit transfer?. Quest, 66(2), 203-217.*
- *Wilson, S. N., Williams, L. A., Thompson, W., Kuehn, E., Black, J. E., Dean, S., ... & Garn, G. (2020). The Power of Application in Learning Life Skills: A Case Study of a Game-Based Learning Approach. The Handbook of Applied Communication Research, 579-594.*

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EFFECT OF ASANA AND PRANAYAMA GET FAMILIAR WITH SYSTOLIC BLOOD PRESSURE AMONG COLLEGE STUDENTS

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Abstract

The current study's goal is to examine the Effect of Asana and Pranayama Get familiar with Systolic Blood Pressure among Physical Education Students. From Alagappa University in Karaikudi were chosen as the study's 60 men subjects. They lived in the period between 17 and 25. Three equal groups of twenty each were formed from the subject population. Three days a week for the twelve weeks of the practice period, group I practiced asana along with pranayama, group II practiced asana, and group III practiced pranayama. The data were gathered before and after the twelve-week practice program. The Sphygmomanometer measuring test was used to measure the physiological variable known as Systolic blood Pressure. The data were analyzed using Analyzing covariance (ANCOVA) method. The study's findings demonstrated that practicing asana with pranayama exercises and making alterations to one's pranayama exercises greatly enhanced one's Physiological Factors on Asana and Pranayama Get familiar with Systolic Blood Pressure among Physical Education Students.

***Key words**: Asana, Pranayama, Systolic Blood Pressure, ANCOVA*

Introduction

The Sanskrit word for a bodily posture is asana. In a broad sense, asana refers to a particular position that can be kept for an extended amount of time while being calm and pleasant. The "Yoga Sutras" (aphorisms), which Patanjali composed in the second century before Christ, include the fundamentals of yoga practice. (Mahananda Sharanappa, 2021). Yoga is an age-old practice that aims to balance and improve a person's physical, mental, emotional, and spiritual dimensions. It has been a long-standing custom in India that is slowly but surely spreading to Western society. "Yoga" refers to the super-conscious state of Samadhi, which is the merging of our individual consciousness with the Universal Divine Consciousness (Dhanaraj, 2023). Yoga is a philosophical discipline of physical exercise and pranayama that dates back between 2,000 and 4,000 years to what is now India. Numerous variations of yoga exist, each with unique practices but the same overall goal of controlling the mind and body (Siddappa Naragatti, 2020). The globe is adopting yoga more and more. It offers comfort to the anxious

mind. It is a blessing for the sick. The current fashion is meant to keep the average man attractive and in shape. Some people take it to increase their creativity, IQ, and memory. With its many benefits, technology is increasingly being included into schooling (Siddappa Naragatti, 2020). Yoga wasn't introduced to the west until the 19th century, but it was initially performed in India thousands of years ago. In recent decades, research has been done on it as a treatment for mental stress, obesity, diabetes, hypertension, dyslipidemia, coronary heart disease, and chronic obstructive pulmonary disease (Davendra Kumar Taneja, 2014). A top strategy for growth oneself and reach one's potential is through yoga. The common consensus is that during the more advanced phases of yoga, super conscious states are obtained, bringing about feelings of bliss, profound peace, and the development of psychic abilities. Indian mystics and philosophers have been refining yoga for thousands of years (Sarojini Devi, 2013). Yoga is regarded as among the most important, useful, and priceless techniques known to man for overcoming a variety of physical and psychological issues (Archika Sudhanshu, 2023). Yoga is a practice with a long history that aims to improve one's physical, mental, emotional, and spiritual well-being (Saroj Maroik, 2017). Yoga pranayama or the science of controlling breath, In Indian philosophy, the term “prana”— which refers to all kinds of energy in the universe—means "control of prana." The primary objectives of these breathing methods are relaxation and improved respiratory efficiency because breathing is the fundamental act of being (Ambareesha Kondam, 2015). Yoga is a traditional method of self-improvement that promotes harmony between the spirit, the body, and the mind. Yoga is a science and is incredibly helpful for boosting overall health, which may help some people reach the necessary amounts of physical exercise (Ambareesha K, 2017). Over the past few years, yoga has become a very important complementary therapy. It is a comprehensive way of life with countless advantages for both the body and the mind. However, it is still unclear how yoga activities result in these advantages (Vijay Kumar B.A, 2014).

The phrase pranayama consists of two parts: prana and ayama. The word praṇa means "life force" or "vital energy." The meaning of Ayama is "expansion" or "extension". Pranayama, thus, is "an increase or prolongation of the size of praoa." Practices of Pranayama address four essential aspects of breathing: (1) Breathing in (Puraka), (2) exhaling (Recaka), (3) retaining breath internally (Antah kumbhaka), and (4) retaining breath externally (Bahih kumbhaka) (L Nivethitha, 2016). Since the beginning of time, saints who lived in caves have employed pranayama methods—various forms of breathing exercises—to avoid illnesses and ensure their

long-term existence. According to Patanjali, who codified yoga knowledge about 600 BCE, controlling prana (the mind) is achievable via controlling inhalation and exhalation (Srinivasan T M, 1991). Terminology used in yoga, such as samadhi and pranayama are also commonly used in the Bhagavad-Gita. The rishis of ancient India understood that a healthy physique is always necessary for practicing Raja-yoga. The term for this is " Ahlu dharma sadhanam, Sharirmadyam." Raja-yoga is a method of concentration used to release the atma, or soul, from the shackles of maya and into paramatma. So they developed what is known as "Hatha yoga," which includes pranayama, mudra, and asana (Pallav Sengupta, 2012).

Heart diseases are the most prevalent kind of cardiovascular disease (CVD) (CHD). Globally, cardiomyopathy, illness of the rheumatic heart (RHD), and stroke represent the main causes of mortality. Less than 10% of fatalities globally were brought on by CVD in the early 20th century, but that number rose to 30% by the end of the century (Chittakath Shaima, 2016). Heart is a vital organ that pumps blood, oxygen and vitamins to all parts of the body. For this pumping of oxygen and nutrients heart muscle itself requires oxygen and nutrient supply which is supplied by the coronary arteries (Mani Deepika, 2017). The heart pumps blood at a beats per minute of 72, or 1.2 hertz, with a beat lasting around 0.830 milliseconds. This increases blood circulation, which carries and distributes nutrients and oxygen and keeps the body's fluid balance and temperature stable. (Vanessa Novaes Barros, 2019).

Sample

Sixty men physical education Students were chosen from Alagappa University in Karaikudi to participate in the study in order to attain this goal. From 17 to 25 years old, they were. The subjects were split into three equal groups, each with twenty subjects. For the twelve weeks of the practice period, group I practiced asana together with pranayama, group II practiced asana, and group III practiced pranayama for three days each week.

Variable

The Sphygmomanometer measuring test was used to measure the physiological variable known as Systolic blood Pressure. When data were collected, they were analyzed using the paired sample 't' test, which is used to detect improvements that are statistically significant, then the one-way analysis of covariance, which is used to detect differences that are statistically significant, and finally the schefee's post hoc test, which was used to determine which of the

three experimental groups performed the best. The table below contains the results of the analysis of the Systolic blood Pressure data from the pre- and post-test results of the three experimental groups.

Procedure

The patient is not able to observe the mercury column when the sphygmomanometer is set up on a bench. Following five minutes of calm relaxation, the subject's blood pressure is taken; this measurement should be taken before any other. The individual is seated with their elbow roughly at heart level and their arm resting on the bench. After attaching the cuff, the pressure is raised to around 180 mm Hg. In the cubital fossa, the stethoscope is positioned above the brachial artery. Roughly two millimeters of pressure are discharged every second. Both the diastolic pressure—the pressure at which all noises stop—and the systolic pressure—the pressure at which the initial sounds are heard—are measured.

Information Gathering and Analysis

Table I presents pre and post-test means, standard deviations and dependent 't' test values on Systolic blood pressure of three experimental groups.

Table- I

The Summary of Mean and Dependent 'T' Test For

The Pre and Post-Tests on Systolic Blood Pressure of ThreeExperimental Groups

Mean	Asana	Pranayama	Asana and Pranayama
Pre- test	124.40	124.25	125.05
SD	1.64	2.02	1.96
Post-test	121.30	121.25	120.00
SD	1.30	1.62	1.95
't'-test	19.30*	12.47*	19.71*

(Table value required for significance at 0.05 level for't'-test with df 19 is 2.20)

(Scores in millimeters of mercury)

The paired sample't' was computed on selected dependent variables. The results are presented in the above Table I. The't' test value of asana group, pranayama group and combined (asana and pranayama) group are 19.30, 12.47 and 19.71 for systolic blood pressure. The

experimental groups‘t’ values are significantly higher than the required table value of 2.20 with degrees of freedom 19 at 0.05 level of confidence. The result of the study shows that Asana group, Pranayama and combined group have significantly improved the performance of systolic blood pressure. The one way analysis of covariance on systolic blood pressure of three experimental groups has been analyzed and presented in Table II.

Table- II

Values of Analysis of Covariance for Three Experimental Groups on Systolic Blood Pressure

Adjusted post-test means							
Asana	**Pranayama**	**Asana and Pranayama**	**SOV**	**SS**	**Df**	**MS**	**F-ratio**
121.42	121.48	119.64	**B.S**	42.35	2	21.17	**27.41***
			W.S	43.25	56	0.77	

(The table value required for Significance at 0.05 levels with df 2 and 56 is 3.15)

(Scores in millimeters of mercury)

Table-II shows that the adjusted post-test mean value of Systolic blood pressure for Asana group, Pranayama group and combined (Asana and Pranayama) group are 121.42, 121.48 and 119.64 respectively. The obtained F-ratio of 27.41 forthe adjusted post-test mean is greater than the table value of 3.15 with degrees of freedom 2 and 56 required for significance at 0.05 level of confidence. The results of the study indicate that there are significant differences between the experimental groups on Systolic blood pressure.

To determine which of the paired means had a significant difference, Scheffe’s test was applied as Post-hoc test and the results are presented in Table III.

Table – III

Scheffe's Post-Hoc Test Mean Differences on Systolic Blood Pressure among Three Experimental Groups

Asana	Pranayama	Asana and Pranayama	Mean Differences	Confidence Interval Value
121.42	121.48	-	0.06	**0.69**
121.42	-	119.64	1.78*	
-	121.48	119.64	1.84*	

(Scores in millimeters of mercury)

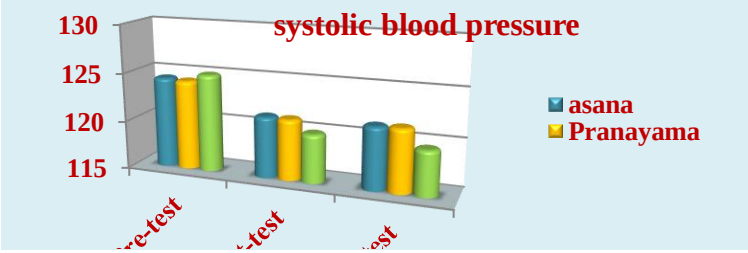
*Significance at 0.05 levels

Results of Post – Hoc Test on Systolic blood pressure

In the above table, the results of Scheffe's Post-hoc test are presented. The table shows that the Asana group and the Pranayama group had a mean difference of 0.06, which is less than the 0.69 confidence interval value. It shows that there is no significant difference between Asana group and Pranayama group on systolic blood pressure. The mean difference between Asana group and combined (Asana and Pranayama) group, Pranayama group and combined (Asana and Pranayama) group are 1.78* and 1.84* respectively. They above the 0.69 confidence is interval value. That makes it clear that the group that performed both Asana and Pranayama at the same time increased their systolic blood pressure in response to the training more than the groups that performed each practice separately. Figure-IV visualizes the pre-post, and adjusted post-test mean values for systolic blood pressure for the Asana, Pranayama, and combination groups.

Figure – IV

The Graphical Representation of the Pre Post and AdjustedPost-Test Means Values of Asana Group Pranayama Group and Combined (Asana and Pranayama) Group on Systolic Blood Pressure



Discussion of the Results

However, because of the many types of pranayamas, the low number of accessible RCTs, and the variability of methodological quality, the data must be seen as preliminary. In order to include pranayamas as a supplement to pharmaceutical treatment and obtain consistent outcomes, methodological advancements are needed (Jeniffe, 2017). Based on the investigation's findings, the data were statistically evaluated using analysis of covariance (ANCOVA) to see whether the groups differed significantly from one another. To determine the level of significant difference between groups, if any, the 0.05 level of confidence was fixed (Ramachandran, 2023). Yoga asana and pranayama programs help to advance physiological factors like pulse rate and reduce body fat percentage. Additionally, these activities significantly lower anxiety and work-related stress, which leads to a healthy lifestyle (Parthiban, 2019). Although yoga therapy can be used to treat and restore certain chronic illnesses, its primary function is prevention. Significant improvements in physiological variables were seen in our study, indicating that yoga treatment is effective and enhances women's quality of life by lowering stress levels and decreasing weight (Kaleeswari, 2021).

Discussion on Hypothesis:

(i) It was predicted that practicing asana with pranayama, asana practices, and pranayama among college-aged male physical education Students would significantly increase the Physiological Variable of Systolic blood pressure.

(ii) The findings of the current study showed that a twelve weeks asana practice program combined with pranayama and asana groups significantly improved the selected

Physiological Variable of Systolic blood pressure. Group factors had not significantly improved at the same time as asana practices. Therefore, at a significance level of 0.05, the first hypothesis was partially accepted and partially rejected.

(iii) It was predicted that there would be a large difference in the amount of improvement on the chosen independent variable between the experimental groups I and II and the treatment group III. The findings of the post-hoc analysis showed that the physiological variable of systolic blood pressure would significantly differ between the asana with pranayama, asana, and pranayama. The second hypothesis was thus accepted at a 0.05 threshold of significance.

Conclusion

The results showed that practicing asana along with pranayama substantially improved male physical education Students' Systolic blood pressure compared to asana practices. According to the research, pranayama practices that combine asana with breathing exercises, or asana can be promoted to improve Systolic blood pressure. The goal-oriented approach that should emphasize the value of asana with pranayama, pranayama practices, and integrate their timetable for the advancements of physical fitness preserves flexibility as well as Systolic blood pressure of the physical education Students.

References:

- Siddappa Naragatti, (2020). The Study of Yoga Effects on Health. *International Journal of Innovative Medicine and*
- Health Science, Volume (12), 98-110.
- Mahananda Sharanappa. H, Jyoti. A. Upadhye, (2021). The Effect of Yogasana and Pranayama on physiological,
- Physical and Psychological changes among sports hostel student. *International Journal of Creative Research*
- *Thoughts (Ijcrt),*9(2), 4295-4305.
- Dhanaraj. S (2023). Twelve Weeks Practice of Isolated and Combined Effect of asana and pranayama on
- Selected Variables vital capacity and stress. *Journal of Emerging Technologies and Innovative Research,*
- 10(7), 2349-5162.
- Davendra Kumar Taneja, (2014). Yoga and Health. *Indian journal of community medicine,* 39(2), 68-72.
- Sarojini Devi K.S.S., Usha Rani, M. (2013). Effect of Yogic Exercise and Physical Exercise on Physical
- Health and Mental Health. *Journal of Evolution of Medical and Dental Sciences,* 2 (18), 3031-3039.
- Archika Sudhanshu, Urvi Sharma, HS Vadiraja, Rakesh Kumar Rana, Richa Singhal, (2023). Impact of Yoga on Periodontal Disease and Stress Management. *International Journal of Yoga,* 10(3), 121-127.
- Saroj Maroik, Chandra Sankar Hazari, Bhim Chandra Mondal, (2017). Effect of yoga on health. *International Journal of Yoga, Physiotherapy and Physical Education,* 2(2), 75-77.

- Ambareesha Kondam, M. Suresh, Kate Nilesh Netaji, M. Chandrasekhar, (2015). A Comparative Study on Effect of Pranayama and Suryanamaskar Yogic Exercise on Static Spirometry Values in Normal Young Healthy Individuals. National Journal of Medical Research & Yoga Science, 1(1), 1-3.
- Ambareesha K, Balida Mallikarjuna Rao, M. Suresh, Shoba Rani K. Chandrasekar M. (2017). Effect of Yogic exercise on static Spirometery values in normal healthy individuals. *International Journal of Research and Development in Pharmacy & Life Science*, 6(4), 2682-2684.
- Vijay Kumar B. A, Sachin Gudge, Mahesh Patil, Satish Mudbi, Siddeshwar Patils, (2014). Effects of Practice of Pranayama on Control of Life Disorders Style. *J of Evolution of Med and Dent Sci*, 3(31), 8712-8718.
- L Nivethitha, A Mooventhan, and NK Manjunath,(2016). Effects of Various Prāṇāyāma on Cardiovascular and Autonomic Variables. *National Library of Medicine.* 36(2), 72-77.
- Srinivasan T N, (1991). Pranayama and Brain Correlates. Ancient Science of Life, 11(1&2), 1-6.
- Pallav Sengupta, (2012). Health Impacts of Yoga and Pranayama: A State-of-the-Art Review. *International Journal of Preventive Medicine*, 3(7), 444-458.
- Chittakath Shaima, Puthamohan Vinayaga Moorthi, Naser Kutty Shaheen, (2016). Cardiovascular diseases: Traditional and non- traditional risk factors. *Journal of Medical & Allied Sciences*. 6 (2), 46-51.
- Mani Deepika, R. Panchumarthy Ravisankar. Devi Priya, J. Surekha P. (2017) Cardiovascular Disease Death Rate - Current Scenario in the State of Andhra Pradesh. *International Journal of Pharmaceutical Sciences Review and Research.* 47(2), 102-110.
- Vanessa Novaes Barros, (2019). The heart cycle: review. *MOJ Women's Health*. 8(1), 66-69.
- Jenifer Z., Julio Mizuno, Emmanuel G, Henrique L, (2017). The hypertensive effect of Yoga's breathing exercises: A systematic review. Com*plementary Therapies in Clinical Practice*. 28, 38-46.
- Kaleeswari, G.; Kalyani, C. Vasantha, Jayarani, J. S, Rohilla, Kusum K. (2021). Effect of yoga on pulse rate and blood pressure among women. *Journal of Family Medicine and Primary Care.* 10(10), 3670-3674.

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IMPACT OF VARIED EXERCISE REGIMEN COMBINED WITH YOGA ONSELECTED BIOCHEMICALVARIABLESAMONGMIDDLE-AGED TYPEIIDIABETIC PATIENTS

V.Preethi* & Dr. S. Saroja**

Abstract

The research aimed to determine how different exercise regimens along with yoga affected certain low-density lipoprotein level sin middle-aged type II diabetes individuals. Only forty-five (n=45) women from the Dindigul District and its environs were chosen for the study. The age group was 40–55 years old. Group I was Physical Exercise (n=15), Group II was Yogic Practices (n=15), and Group III was the Control Group (n = 15). The subjects were split into three equal groups of fifteen each. The course ran for six weeks, five days a week. A 45-minute training session was all that was required. As the control group, Group III received no particular instruction. Blood serum is the biological variable of low-density lipoprotein. Before and following the training session. The data were gathered from the Experimental and Control groups. Analysis of Covariance (ANCOVA) and the dependent "t" test for statistical analysis. The paired mean differences were ascertained by applying Scheffe's test as a post hoc test in cases where the adjusted post-test means' "F" ratio was deemed statistically significant. Every instance had a predetermined level of confidence of0.05.

Keywords: Diabetic Patients, Yogic Practices, Physical Exercises.

Introduction

Lipids are soluble in alcohol and other solvents; they are insoluble in water. Triglycerides are formed when dietary fats are broken down and absorbed in the small intestine. These triglycerides are subsequently encapsulated into lipoprotein. The cholesterol, Blood tests called cholesterol and triglyceride tests quantify the overall quantity of fatty compound sin the blood, specifically cholesterol and triglycerides. The blood carries cholesterol along with a protein. A lipoprotein is the name for this cholesterol-protein bundle. Low-density lipoprotein (LDL) is a type of lipoprotein that transports cholesterol and triglycerides through the bloodstream. Often referred to as “bad cholesterol," LDL carries cholesterol from the liver to cells throughout the body. While cholesterol is essential for various bodily functions, including cell membrane

structure and hormone production, high levels of LDL cholesterol can lead to plaquebuildupin the arteries, a condition called atherosclerosis.

Physical exercise refers to any bodily activity that enhances or maintains physical fitness and overall health and wellness. It involves the movement of muscles and requires energy expenditure. Physical activity, when combined with a healthy diet and proper medical management, can play a crucial role in managing LDL cholesterol levels in individuals with Type II diabetes

The goal of all yoga techniques is to arrive to a condition of truth where the individual soul unites with the ultimate soul, also known as God. Yoga has the best remedies for ailments of the mind and body. It improves internal bodily functions and encourages the body's organs to function more actively. Yoga retrains the mind in addition to the body.

Yoga has been suggested as a complementary therapy for managing various aspects of Type II diabetes, including its potential impact on lipid profiles, including LDL cholesterol. While yoga alone may not directly change LDL cholesterol levels, it can contribute to overall improvement sin health that may in directly affect lipid profile sin diabetic patients.

Methodology

The goal of the study was to determine the yoga and physical activity affected biochemical variables such as low-density lipoprotein in middle-aged type II diabeticindividuals.ThePTAmethodwasusedtotestlow-densitylipoprotein (Mg/dl). Forty-five (n=45) women were chosen from the Dindigul District as the subjects. The subjects were split up into three equal groups of fifteen each: Group I was assigned to physical exercise, Group II was assigned to yogic practices, and Group III was assigned as the control group. For six weeks, the instruction was provided five days a week. Each 45-minute training session was conducted. Group III served as a control group and received no particular instruction

Analysis of Data

Table-I

Mean Values of Low-Density Lipoproteins on Experimental Groups and Control Group

Groups	Pre-Test	Post-Test	Mean difference	't' ratio
Physical Exercise Group-I	142.3	116.5	25.84	15.16
Yogic practices Group-II	146.2	135.7	10.50	7.47
Control Group	152.9	156.9	4.31	3.19

*Significant at 0.05 level of confidence

Table I shows that the obtained 't' values of physical exercise, yogic and control groups are 15.16,7.47, and 3.19 respectively which are lesser than the required table value of 2.15 df 14 at 0.05 level. It was discovered that there exist not significant differences between the experimental and control groups pre and post-test values for low density lipoprotein.

Table-II

Computation fan analysis of covariance on lipoprotein (Mg/dl)

Adjusted Post-Test Mean value			Source of variance	Sum of Square	df	Mean Square	'F' ratio
Physical Exercise Group	Yogic Practice Group	Control Group					
136.4	120.4	152.4	Between	77541.32	2	3770.6	15.08*
			Within	10249.81	42	250.0	

*Significant at 0.05 level of confidence

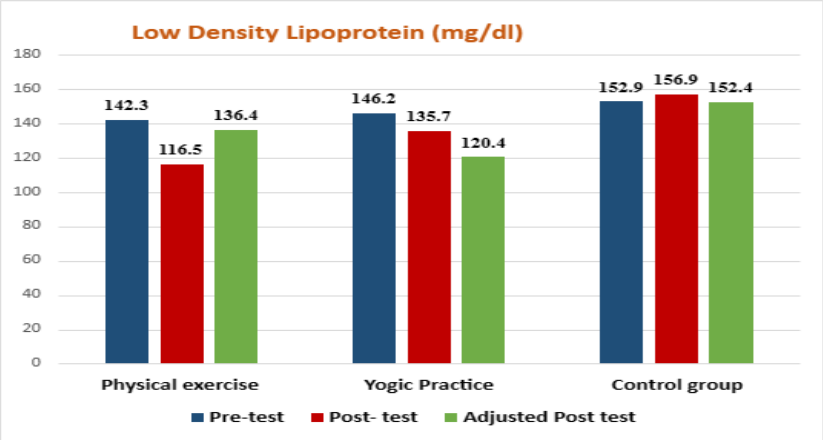
Table II shows that the adjusted post-test means of low-density lipoprotein for experimental groups and control group was 136.4, 120.4 and 152.4 respectively. The obtained "F" value on low density lipoprotein (15.08) is high earthen then necessary table value (3.23 of 2, 42 df) at the 0.05 level of confidence. It follows that the raise significant difference in the adjusted post-test means of low-density lipoprotein between the physical exercise, yogic practices and control groups.

Table-III

Scheffe's Post hoc Test for Differences between the adjusted post-test paired means of low-Density Lipoprotein

Physical exercise	Yogic practice	Control group	Mean difference	Confidence Interval
136.4	120.4		16.00*	14.67
136.4		152.4	16.00*	14.67
	120.4	152.4	32.00*	14.67

Table -III shows that the Experimental Group I and Group II, Experimental group I and Control Group, and Experimental Group II and Control Group, the adjusted post-test mean difference is, respectively, 16.00, 16.00, and 32.00, and it is greater than the confidence interval value of 14.67, which indicates a significant difference at 0.05 confidence level. Figure-1 Pre, Post, Adjusted post-test mean value of experimental and control groups of low-density lipoprotein (mg/dl)



Discussion on Findings

The study's further findings show that adjusted post-test means of Experimental GroupI, Experimental Group II, and Control Group differs significantly in terms of Low-density lipoprotein.

Conclusion

- A substantial difference was seen in low density lipoprotein levels between the experimental and control groups following the training session.
- The study revealed that when it came to lowering low density lipoprotein, group II yogic practice performed noticeably better than group I physical activity. But when it came to low density lipoprotein, the control group showed no improvement.

Reference

- *Johnson, K. L., Garcia, M. R., & Lee, S. H. (2018). Association between LDLparticle size and type 2 diabetes progression: A longitudinal study. Journal ofClinicalLipidology,15(3),210-225.*
- *Patel, A. B., Lewis, C. D., & Nguyen, T. H. (2019). LDL cholesterol and itscorrelation with insulin resistance in patients with type 2 diabetes: A cross-sectionalanalysis.DiabetesResearchand ClinicalPractice,28(5),450-465.*
- *Wang,X.Y., Kim,J. H.,&Rodriguez, E.S.(2020).TheimpactofLDLlevelson diabetic complications in type 2 diabetes: A retrospective cohort study.JournalofDiabetes andits Complications,10(2),75-88.*
- *Smith, J. R., Johnson, A. B., & Brown, C. D. (2020). Low-density lipoproteincholesterol levels in relation to type 2 diabetes:A comprehensive review.DiabetesCare,25(4),123-135.*

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ETHICS IN ACADEMIC PUBLISHING: UNVEILING UNETHICAL PRACTICES, LEGAL IMPLICATIONS, AND REMEDIAL MEASURES

R. Ramya* & Dr. G. Rajeswari**

Abstract

This conceptual paper delves into the intricate realm of ethics in academic publishing, exposing various unethical practices that have subtly permeated this scholarly landscape. The exploration encompasses a comprehensive analysis of the ethical considerations governing the dissemination of knowledge, scrutinizing issues such as plagiarism, data fabrication, and authorship disputes. Through a critical examination of these practices, the paper sheds light on the erosion of academic integrity and the deleterious impact on the credibility of scholarly work. Legal implications form a pivotal aspect of the discussion, as the paper dissects the consequences of engaging in unethical behaviors within the realm of academic publishing. Drawing on relevant legal frameworks, the analysis explores the potential ramifications for individuals and institutions involved in such transgressions. The exploration extends beyond individual actions to scrutinize the role of academic institutions and publishers in fostering an environment that discourages unethical practices. In response to the identified challenges, the paper proposes a range of remedial measures aimed at fortifying the ethical fabric of academic publishing. These measures encompass the implementation of robust editorial policies, the promotion of responsible research conduct, and the cultivation of a culture that prioritizes academic integrity. Additionally, the paper advocates for increased awareness and education within academic communities to empower researchers, authors, and editors to navigate the ethical complexities inherent in the publishing process. In essence, this conceptual paper serves as a thought-provoking exploration of the ethical dimensions of academic publishing, unraveling the intricacies of unethical practices, dissecting their legal implications, and offering proactive measures to safeguard the integrity of scholarly endeavors. Through this comprehensive analysis, the paper aims to contribute to a heightened understanding of the ethical challenges facing the academic publishing landscape and provide a foundation for fostering a culture of responsible and ethical research dissemination.

Keywords: *Research Ethics, Academic Publishing, Unethical Practices, Legal Implications.*

Introduction

In the intricate tapestry of academia, the dissemination of knowledge through academic publishing stands as a cornerstone, shaping the intellectual landscape and advancing human understanding. However, within this noble pursuit of knowledge lies a complex web of ethical considerations, where the principles that underpin scholarly integrity are sometimes compromised. This conceptual paper embarks on a profound exploration into the multifaceted realm of ethics in academic publishing, aiming to unveil the subtle yet pervasive unethical practices that have infiltrated this hallowed domain. There has been criticism that ethical barriers and oversight are an important barrier to research in countries with low and middle incomes (Bitter et al., 2020).The scholarly community operates on the fundamental principles of honesty, transparency, and the pursuit of truth. Yet, as the pressure to publish increases and academic competition intensifies, a shadowy underbelly of unethical practices has emerged, threatening the very foundation of academic integrity. A growing number of questions are being raised about 'questionable research practices' (QRPs) and blatant research fraud in the physical sciences and social sciences, and many biases align with only publishing positive findings (Fanelli et al., 2015; Tourish & Craig, 2020).Through a critical lens, we dissect these practices to understand their origins, manifestations, and the corrosive impact they have on the credibility and trustworthiness of academic discourse. Exploration of the ethical duty of skepticism and self-criticism through social science research, exploring some of the most common moral dilemmas social scientists encounter when conducting research, as well as recommending several possible solutions to them, even if none of them satisfy everyone (Bos, 2020).As we navigate the terrain of unethical practices, it becomes imperative to unravel the legal implications woven into the fabric of academic publishing. The paper meticulously examines the consequences of engaging in such transgressions, exploring the legal frameworks that govern scholarly conduct. From copyright infringement to defamation, the legal ramifications extend beyond individual researchers to implicate institutions and publishers, drawing attention to the collective responsibility of the academic community to foster an environment intolerant of ethical breaches. However, this exploration is not confined to a mere unveiling of academic missteps. In response to the identified challenges, the paper proposes a comprehensive set of remedial measures designed to fortify the ethical foundations of academic publishing. At the forefront of these remedies is a call for robust editorial policies that prioritize ethical considerations, providing a bulwark against the encroachment of dishonest practices. The paper advocates for the promotion

of responsible research conduct, urging researchers, editors, and institutions to cultivate a culture that values intellectual honesty and scholarly integrity.

Furthermore, it extends beyond individual actions to scrutinize systemic factors contributing to unethical practices. Issues such as inadequate ethical guidance, power imbalances, and the relentless pursuit of individual accolades are dissected to uncover their role in fostering an environment conducive to ethical lapses. The paper contends that addressing these systemic issues is essential for creating an ecosystem where ethical considerations are not only upheld but also ingrained in the very fabric of academic pursuit.In the quest for ethical rectitude, the paper confronts not only the microcosm of academic publishing but also the macrocosm of social and distributive injustices. It emphasizes the ethical imperative to consider the broader societal implications of research and advocates for a more inclusive and equitable dissemination of knowledge. The principles of social justice become intertwined with scholarly ethics, reinforcing the idea that ethical research is not merely a personal responsibility but a collective commitment to advancing the common good. This conceptual paper serves as a thought-provoking journey through the intricate terrain of ethics in academic publishing.

Unveiling Unethical Practices

This paper delves into the heart of unethical practices, exposing issues such as plagiarism, data fabrication, and authorship disputes that have cast a pall over the sanctity of scholarly communication.

Plagiarism: Unethical practices often manifest in the form of plagiarism, where authors present someone else's work as their own. This undermines the originality and authenticity of scholarly contributions, eroding the foundation of academic integrity.

Data Manipulation: Manipulating or fabricating research data is another unethical practice that distorts the scientific record. This not only misleads fellow researchers but also has far-reaching consequences, as subsequent studies and policy decisions may be based on flawed information.

Ghostwriting: The phenomenon of ghostwriting involves individuals or entities drafting manuscripts on behalf of researchers, who then claim authorship. This practice not only skews the attribution of intellectual contributions but also introduces conflicts of interest and raises questions about transparency.

Predatory Publishing: The rise of predatory journals preying on researchers for publication fees without providing rigorous peer review has become a major concern. These journals prioritize profit over scholarly quality, jeopardizing the credibility of published research.

Emerging Ethical Issues

"Emerging ethical issues were synthesized in ten units of meaning: (1) research integrity, (2) conflicts of interest, (3) respect for research participants, (4) lack of supervision and power imbalances, (5) individualism and performance, (6) inadequate ethical guidance, (7) social injustices, (8) distributive injustices, (9) epistemic injustices, and (10) ethical distress" (Drolet et al., 2023).

Research Integrity: Research integrity involves maintaining honesty and transparency throughout the research process. It includes the avoidance of plagiarism, fabrication, and falsification of data, ensuring that the research accurately represents the methods and results. Upholding research integrity is essential for the credibility and trustworthiness of scientific endeavors.

Conflicts of Interest: Conflicts of interest arise when researchers or institutions have financial or personal interests that may compromise the objectivity and impartiality of their research. Managing and disclosing conflicts of interest is crucial to maintain the integrity of the research and to prevent any undue influence on the research outcomes.

Respect for Research Participants: Ethical research requires a commitment to respecting the rights, autonomy, and well-being of research participants. This involves obtaining informed consent, protecting privacy, and ensuring that participants are not subjected to harm. Maintaining a respectful and ethical relationship with participants is fundamental to responsible research conduct.

Lack of Supervision and Power Imbalances: Inadequate supervision and power imbalances within research relationships can lead to ethical challenges. Ensuring proper mentorship and a balance of power between supervisors and researchers is crucial to prevent exploitation, provide guidance, and foster a positive and ethical research environment.

Individualism and Performance: The pressure for individual achievement and performance metrics can contribute to ethical concerns in research. This may lead to issues such as data

manipulation or the prioritization of personal success over collaborative and ethical research practices. Promoting a collaborative and ethical research culture is essential to mitigate these challenges.

Inadequate Ethical Guidance: Insufficient ethical guidance and education can result in researchers being ill-equipped to navigate complex ethical dilemmas. Providing comprehensive ethical training and clear guidelines is essential to empower researchers to make ethically informed decisions throughout the research process.

Social Injustices: Research should be conducted in a manner that addresses and mitigates social injustices. Failure to consider the broader societal implications of research may perpetuate inequalities. Ethical research demands a commitment to promoting social justice and ensuring that research contributes positively to the well-being of communities.

Distributive Injustices: Distributive injustices refer to the unequal distribution of research benefits and burdens. Ethical research requires consideration of how the outcomes and impacts of research are distributed among different groups, ensuring that the benefits are equitably shared and that vulnerable populations are not disproportionately burdened.

Epistemic Injustices: Epistemic injustices involve unfairness in the production, dissemination, and recognition of knowledge. This can include issues such as exclusionary practices that marginalize certain perspectives or the appropriation of knowledge without proper credit. Ethical research necessitates a commitment to recognizing and addressing epistemic injustices.

Ethical Distress: Ethical distress arises when researchers encounter situations where they feel unable to adhere to ethical principles due to external pressures or constraints. Acknowledging and addressing ethical distress is crucial to maintaining the well-being of researchers and ensuring that ethical considerations are not compromised in challenging circumstances.

Legal Implications

Legal frameworks governing academic publishing vary globally and may encompass copyright laws, intellectual property rights, and fraud statutes. However, the effectiveness of these frameworks in addressing and deterring unethical practices remains a subject of scrutiny. As a rule of ethics, transparency tends to be more prevalent than other codes of ethics due to its pro-ethical nature (Jobin et al., 2019). Enforcing legal measures in the academic publishing

realm presents challenges, such as jurisdictional issues and the cross-border nature of scholarly collaboration. The lack of standardized international regulations further complicates efforts to curb unethical behavior. Examining notable cases where legal action was taken against individuals or entities involved in unethical publishing provides insights into the complexities of legal proceedings and their impact on the academic community.

Research misconduct refers to actions that violate the integrity of the research process, including fabrication, falsification, plagiarism, and other unethical practices. The consequences of research misconduct can vary depending on the policies of the institution or organization involved, as well as the legal framework in the relevant jurisdiction. Constitutional punishments, however, are generally not directly applicable to research misconduct. Constitutional law typically pertains to the fundamental principles and rules that govern a country or state. The consequences for research misconduct are usually outlined in institutional policies, funding agency guidelines, and codes of conduct. Common consequences may include:

Investigation: Institutions often conduct thorough investigations into allegations of research misconduct. This may involve forming a committee to review evidence, interview relevant parties, and determine whether misconduct has occurred.

Withdrawal of Funding: If the research was funded by a grant or contract, funding agencies may withdraw financial support if misconduct is proven. This can have significant implications for ongoing and future research.

Publication Retraction: Journals may retract publications that are found to contain fraudulent or unethical data. This is a serious consequence, as it affects the academic record and the credibility of the researcher.

Job Termination or Academic Sanctions: Researchers found guilty of misconduct may face disciplinary actions, including termination of employment, suspension, or other academic sanctions imposed by their institution.

Loss of Professional Standing: Research misconduct can damage a researcher's reputation within the scientific community, potentially leading to difficulties in obtaining future research opportunities, collaborations, or positions.

While there may not be constitutional punishments specifically for research misconduct, legal consequences can arise if the misconduct involves activities such as fraud, embezzlement, or other criminal actions. In some cases, individuals may face civil lawsuits for damages resulting from fraudulent research.

Remedial Measures

In the face of burgeoning concerns surrounding ethics in academic publishing, implementing robust remedial measures is imperative to restore the integrity of scholarly dissemination. Recognizing the gravity of unethical practices such as plagiarism, data fabrication, and authorship disputes, this discourse delineates a strategic framework for rectification. A cornerstone of the proposed remedial measures is the establishment and enforcement of stringent editorial policies across academic journals and publishing platforms. These policies should explicitly articulate ethical guidelines, leaving no room for ambiguity. Editors play a pivotal role in upholding these standards by rigorously scrutinizing submissions, employing plagiarism detection tools, and ensuring that proper attribution and acknowledgment are accorded to authors.

Strengthening Ethical Guidelines: Academic institutions, publishers, and professional organizations should be collaborating to establishing and strengthen ethical guidelines. Clear and comprehensive guidelines can serve as a deterrent and guide researcher in navigating ethical challenges.

Education and Awareness: Promoting awareness about ethical publishing practices through educational programs and workshops is essential. Researchers, especially early-career scholars, need to be equipped with the knowledge and skills to navigate the complex landscape of academic publishing ethically.

Enhancing Legal Measures: Policymakers should work towards creating and harmonizing legal framework that address the unique challenges of academic publishing. This may involve collaboration at the international level to establish a unified approach to combatting unethical practices.

Promoting Open Science: Embracing open science practices, such as transparent data sharing and pre-registration of studies, can mitigate unethical behavior by fostering a culture of accountability and collaboration.

Parallelly, there is a pressing need for the promotion of responsible research conduct. Institutions and research organizations must prioritize ethical training for researchers at all career stages. This involves cultivating an awareness of ethical considerations, elucidating the consequences of misconduct, and fostering a culture where ethical behavior is ingrained in the research ethos. Addressing the systemic issues contributing to unethical practices is equally paramount. Institutions must strive to rectify power imbalances and ensure adequate supervision, particularly for early-career researchers. Collaborative efforts within the academic community are needed to shift the emphasis from individual achievement to collective progress, mitigating the pressures that fuel unethical behavior. Moreover, the integration of comprehensive ethical guidance into academic curricula is essential. Researchers should be equipped with the knowledge and tools to navigate ethical dilemmas, fostering a proactive rather than reactive approach to ethical considerations. This entails not only theoretical education but also practical training scenarios that simulate real-world ethical challenges. In the pursuit of ethical rectitude, transparency emerges as a linchpin. Journals and publishers should prioritize open communication about their ethical standards, review processes, and any corrective actions taken in response to ethical breaches. Transparency builds trust within the academic community and holds both individual researchers and institutions accountable for their ethical conduct. In summation, remedying the ethical challenges in academic publishing demands a multifaceted approach. By fortifying editorial policies, promoting responsible research conduct, addressing systemic issues, integrating ethical guidance into education, and championing transparency, the academic community can collectively foster an environment where integrity and ethical considerations prevail. These remedial measures not only serve as a corrective response to current challenges but also lay the groundwork for a more ethically robust future in scholarly communication

Conclusion

The exploration of ethics in academic publishing reveals a complex landscape fraught with challenges that demand immediate attention and decisive action. Unearthing unethical

practices such as plagiarism, data fabrication, and authorship disputes underscores the urgent need for a collective commitment to restoring the integrity of scholarly communication. To address these issues effectively, the academic community must prioritize the implementation of robust remedial measures. The establishment and enforcement of stringent editorial policies across publishing platforms, coupled with vigilant editorial oversight, are pivotal. Journals and publishers should invest in advanced plagiarism detection tools and embrace transparent communication about their ethical standards and review processes to rebuild trust. Promoting responsible research conduct is paramount, necessitating comprehensive ethical training for researchers. This education should extend beyond theoretical knowledge to practical scenarios, empowering researchers to navigate ethical dilemmas with resilience and integrity. Additionally, efforts to rectify systemic issues, such as power imbalances and inadequate supervision, must be pursued collaboratively across institutions. As a proactive step, integrating ethical guidance into academic curricula is essential, ensuring that ethical considerations become ingrained in the research ethos from the earliest stages of a researcher's career. Lastly, fostering a culture of transparency within the academic community will not only hold individuals and institutions accountable for their ethical conduct but also contribute to the collective effort to maintain the credibility of academic publishing. By embracing these recommendations and suggestions, the academic community can usher in a new era of ethical resilience, where scholarly pursuits are characterized by transparency, responsibility, and a steadfast commitment to the highest standards of integrity. Through these concerted efforts, the foundation of academic publishing can be fortified, ensuring that the pursuit of knowledge remains a beacon of trust and reliability in the global intellectual landscape.

References:

- Jobin, A., Ienca, M., & Vayena, E. (2019). The global landscape of AI ethics guidelines. *Nature machine intelligence*, *1*(9), 389-399.
- Fanelli, D., Costas, R., & Larviere, V. (2015). Misconduct policies, academic culture and career stage, not gender or pressure to publish, affect scientific integrity. PLoS ONE, 10(6): e0127556.
- Tourish, D., & Craig, R. (2020). Research misconduct in business and management studies: Causes, consequences, and possible remedies. *Journal of Management Inquiry*, *29*(2), 174-187.
- Bos, J. (2020). *Research ethics for students in the social sciences* (p. 287). Springer Nature.https://doi.org/10.1007/978-3-030-48415-6_1#DOI
- Bitter, C. C., Ngabirano, A. A., Simon, E. L., & Taylor, D. M. (2020). Principles of research ethics: A research primer for low-and middle-income countries. *African Journal of Emergency Medicine*, *10*, S125-S129.https://doi.org/10.1016/j.afjem.2020.07.006

- Drolet, M. J., Rose-Derouin, E., Leblanc, J. C., Ruest, M., & Williams-Jones, B. (2023). Ethical Issues in research: perceptions of researchers, research ethics board members and research ethics experts. *Journal of Academic Ethics*, *21*(2), 269-292.
- https://doi.org/10.1007/s10805-022-09455-3

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DEVELOPING COMMUNICATION SKILLS AMONG HIGHER SECONDARY STUDENTS

S. Jessy* & Dr. J. Jayachithra**

Abstract

This research study emphasizes the significance of effective communication abilities in the personal, academic, and professional development of students. The paper presents techniques for developing critical thinking and communication skills in students and emphasizes the importance of communication skills in the beauty arts industry through a literature review. The article emphasizes the significance of communication skills and lists some key communication skills that higher secondary students should focus on.

Keywords: *Developing, Communication Skills, Higher Secondary Students*

Introduction

Effective communication has become an indispensable skill in today's world. Given the diverse and interconnected nature of society, it is crucial to nurture this ability in higher secondary students. The young generation is the cornerstone of shaping a better future for themselves and the world around them. To ensure their success in both academic and professional endeavors, as well as in their personal relationships, it is crucial to arm them with robust communication skills. A comprehensive approach is needed, which takes into account both verbal and nonverbal aspects of communication. By instilling self-assurance in students and equipping them with the tools to articulate their thoughts clearly, thoughtfully, and convincingly, we can empower them to face the challenges and seize the opportunities that lie ahead.

Literature review

Yusuf & Adeoye (2012), explored to help teachers develop critical thinking and communication skills in students. A five-step model is suggested for developing critical thinking, while task-based activities can promote communication competence. Teachers should understand the importance of these skills and learn techniques to enhance them, with in-service training and capacity-building workshops recommended for professional development.

Tee et. al. (2022), reported of customer dissatisfaction with beauty treatment services at beauty centers are increasing. This study suggests improving communication skills among

cosmetology students in the Upper Secondary Vocational Education Program (USVEP) in the beauty arts course. The findings highlight the importance of communication skills in selecting employees, increasing customer loyalty, and maintaining excellent performance in the workplace. Training modules are required to keep cosmetology students updated with new knowledge and skills.

Communication Skills

Effective communication is a crucial life skill that enables individuals to stand out from the crowd. It involves more than just expressing your thoughts and ideas clearly, but also requires a range of other skills, including active listening, respect for others' opinions, empathy, friendliness, and the confidence to speak up. In today's fast-paced world, employers are constantly seeking individuals with excellent communication skills, as they play a pivotal role in the success of a team and the company as a whole. To be an effective communicator, it is essential to reflect on and evaluate the ways in which you apply these skills in your personal and professional lives. The art of communication involves several key elements, which include conveying your message effectively, engaging in active listening, asking relevant questions, and providing constructive feedback. Additionally, it's crucial to be aware of non-verbal cues, such as body language, tone of voice, and facial expressions, as they can significantly impact how your message is received. Being an effective communicator requires a combination of skills and behaviors that can be developed and refined over time with practice and dedication. It's worth noting that communication is a two-way process, and both the speaker and the listener must be actively involved to ensure the message is understood correctly. This is where active listening comes in, which involves listening with an open mind, asking questions, and taking notes to show that you are engaged in the conversation. In summary, improving your communication skills can help you build stronger relationships and succeed in your personal and professional endeavors. By developing the essential skills and behaviors of effective communication, you can become a better listener, a more persuasive speaker, and a more collaborative team member.

Communication Skills for Higher Secondary Students:

Effective communication is a vital skill that higher secondary students must acquire to excel in higher education, the workforce, and social settings. It is crucial for students to develop strong communication skills as it enhances their academic and personal growth, improves their

interpersonal relationships, and helps them to develop skills that will benefit them in their future careers. Let's look at some key communication skills that higher secondary students should focus on:

1. **Listening Skills:** Active listening is the foundation of effective communication. Encourage students to listen attentively, ask questions for clarity, and show engagement while conversing. Effective listening helps students to comprehend others' perspectives better and respond appropriately.

2. **Speaking Skills:** It is important to motivate students to communicate their ideas effectively coherently and confidently by practicing articulating ideas, using proper grammar, and organizing information logically. Public speaking and presentation skills are particularly significant, as they will need to deliver presentations in both academic and professional settings.

3. **Writing Skills:** Good writing skills are crucial for success in academics and future careers. Students must learn to write well-structured essays, reports, emails, and other written documents. Emphasize proper grammar, spelling, punctuation, and the ability to convey ideas coherently.

4. **Nonverbal Communication:** Nonverbal communication is a critical component of effective communication. Nonverbal cues such as body language, facial expressions, gestures, and tone of voice can significantly impact how messages are perceived. Therefore, it is essential to educate individuals, particularly students, about the importance of nonverbal communication. This knowledge will enable them to convey their messages effectively, build rapport, and enhance their overall communication skills.

5. **Empathy and Understanding:** Encourage students to develop empathy by putting themselves in others' shoes and considering different perspectives. This skill is valuable for effective interpersonal communication and building positive relationships.

6. **Conflict Resolution:** Teach students how to manage conflicts and disagreements constructively. They should learn to listen, express their viewpoints calmly. We should strive to find solutions that are equitable and advantageous for all individuals or groups involved.

7. **Digital Communication Etiquette:** In today's world, digital communication is prevalent, and students must be educated about appropriate online behavior, netiquette, and the potential consequences of online interactions.

8. **Active Participation:** Encourage students to actively participate in class discussions, group activities, and extracurricular events. Participation helps them develop confidence in expressing their ideas and engaging with others.

9. **Critical Thinking:** Effective communication often involves critical thinking. Students should learn to analyze information, evaluate arguments, and express their opinions based on evidence and reasoning.

10. **Adaptability**: Communication styles can vary depending on the context and audience. Teach students to adapt their communication approach to different situations, whether they're talking to peers, teachers, or professionals.

11. **Feedback and Self-Reflection:** It's important to motivate students to actively seek feedback on their communication skills, and then encourage them to reflect on both their strengths and areas that need improvement. By doing so, it can help individuals become more self-aware and lead to continuous growth in their communication abilities.

12. **Cultural Sensitivity:** In an increasingly diverse world, students should be aware of cultural differences that can impact communication. Effective cross-cultural communication requires understanding and respecting diverse perspectives.

The inclusion of effective communication skills in the higher secondary education system, whether it be in a classroom setting or through extracurricular activities, can greatly enhance students' overall skill sets. Once these skills are learned, they will become a valuable asset, they can pave the way for academic, professional, and personal success. By offering chances for pupils to enhance their ability to communicate effectively, they can learn to articulate their thoughts and ideas more clearly, listen attentively to others, work collaboratively, and build strong relationships. Ultimately, by acquiring these skills, students are better equipped to face the challenges of the future with confidence and success.

Key Strategies to Foster Effective Communication among Higher Secondary Students:

Having effective communication skills is essential for expressing one's thoughts, ideas, and emotions with clarity and efficiency. For higher secondary students, mastering communication skills is essential as they face academic challenges, social interactions, and career exploration. To foster effective communication among higher secondary students, several key strategies can be

implemented, such as building trust, active listening, using appropriate body language, and practicing effective written and verbal communication.

1. **Creating a safe and supportive learning environment**: It is crucial in helping high school students develop effective communication skills. A classroom culture where students feel comfortable sharing their thoughts and opinions without fear of being judged is essential. Teachers can achieve this by encouraging open discussions and active listening. Emphasizing respect for diverse perspectives can also help broaden students' horizons and expose them to different ways of thinking. Giving constructive feedback is a crucial method of supporting students in their learning and development.
2. **Incorporating diverse learning activities**: It helps to engage students and enhance their communication skills. Role-playing scenarios can be used to practice different communication styles, and participating in debates and group projects can help build confidence and improve critical thinking skills. Delivering presentations and engaging in public speaking opportunities will help students develop their communication skills and overcome stage fright.
3. **Providing opportunities for reflection and growth:** It is another critical aspect of helping students develops effective communication skills. Encouraging students to analyze their communication strengths and weaknesses, set personal goals for improvement, and reflect on their progress helps them become more self-aware and better equipped to communicate effectively in various situations.
4. **Utilizing online tools and resources:** It is also essential in enhancing students' communication skills. Teachers can connect students with global audiences through virtual discussions and simulations. Creating and sharing multimedia presentations can also help students develop their digital literacy skills and increase their engagement in the classroom.
5. **Collaboration with experts and community partners:** It is also important in helping students develop effective communication skills. Inviting speakers from various fields to share their communication expertise and partnering with local organizations to provide students with real-world communication experiences may help students develop communication skills in practical, meaningful ways.

Empowering high school students with the fundamental communication skills they need is crucial in preparing them for success in the future. By creating a supportive and engaging learning environment, providing opportunities for reflection and growth, and collaborating with experts and community partners, teachers can help students become confident, articulate, and successful individuals who are ready to make their mark on the world.

Conclusion

To thrive in personal, academic, and professional domains, high school students must master the art of communication. Being an effective communicator involves a wide range of abilities, such as attentive listening, articulate speaking, and proficient writing. By honing these skills, students can improve their academic performance by implementing certain strategies, establishing stronger connections with others, and preparing for their future occupations. With consistent effort and unwavering commitment, anyone can improve their communication aptitude and become a skilled and competent communicator.

References

- Yusuf, F. A., & Adeoye, E. A. (2012). Developing critical thinking and communication skills in students: Implications for practice in education. *African research review*, *6*(1), 311-324.
- Tee, T. K., Ahmad Puad, F. N., Kamis, A., Yee, M. H., Abd Hamid, R. I., Shafie, S., & Bedor, S. A. (2022). Enhancing Cosmetology Students' Communication Skills in Malaysian Upper Secondary Vocational Education Program. *International Journal of Evaluation and Research in Education*, *11*(1), 260-271.
- Jessy, S., & Jayachithra, J. (2023). REVOLUTION IN LEARNING ENGLISH THROUGH LIFE SKILLS. *EDUCATION 5.0: REVOLUTIONIZING LEARNING FOR THE FUTURE*, 62.
- Iksan, Zanaton & Zakaria, Effandi & Meeran, Subhan & Osman, Kamisah & Koh, Denise & Mahmud, siti nur diyana & Krish, Pramela. (2012). Communication Skills among University Students. Procedia - Social and Behavioral Sciences. 59. 71–76. 10.1016/j.sbspro.2012.09.247.
- Peter, Jeen & SINGARAVELU, GOVINDARAJAN. (2021). Review of ReseaRch A STUDY ON THE DEVELOPMENTAL PROCESS OF ENGLISH COMMUNICATION SKILL AMONG HIGH SCHOOL STUDENTS OF PUDUCHERRY. Review of Research. 8. 1-5.
- Nora Cruz (Author), 2019, Improving the oral communication skills of senior high school students through the use of task-based strategy, Munich, GRIN Verlag, https://www.grin.com/document/490074
- Abdikarimova, M. , Tashbolot kyzy, A. and Abdullaeva, Z. (2021) Developing Students Verbal Communication Skills and Speech Etiquette in English Language Teaching. *Open Journal of Modern Linguistics*, **11**, 83-89. doi: 10.4236/ojml.2021.111007.
- https://www.zippia.com/advice/life-skills/

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SOWING SEEDS OF SUSTAINABILITY: EXPLORING THE KEY CATALYST OF ENVIRONMENTAL EDUCATION IN FOSTERING SUSTAINABLE DEVELOPMENT AND ECOLOGICAL RESILIENCE

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Abstract:

This research delves into the transformative potential of environmental education as a central catalyst for sowing the seeds of sustainability, promoting sustainable development, and fortifying ecological resilience in the face of contemporary environmental challenges. Against the backdrop of escalating concerns surrounding climate change, biodiversity loss, and resource depletion, the study endeavors to unravel the intricate dynamics through which environmental education shapes attitudes, knowledge, and behaviors towards environmental stewardship. The investigation scrutinizes diverse educational approaches and programs, examining their efficacy in empowering individuals to make informed decisions that contribute to sustainable practices. By synthesizing theoretical frameworks, case studies, and empirical evidence, the research aims to identify the most effective strategies in environmental education, acknowledging the complex interplay between formal and informal learning environments. Moreover, the research explores the symbiotic relationship between environmental education and ecological resilience. It seeks to understand how an environmentally literate populace can act as a linchpin in mitigating environmental challenges and bolstering community-level resilience. The study also probes into the potential cascading effects of such education, investigating its impact on policy formulation, community engagement, and the broader societal shift towards sustainability. The synthesis of existing literature and empirical findings is anticipated to offer a nuanced understanding of the interconnected roles played by environmental education, sustainable development, and ecological resilience. The research underscores the importance of integrating environmental education into mainstream educational curricula and informal learning settings, emphasizing its pivotal role as a catalyst for positive environmental change. Ultimately, the findings of this research aspire to inform educators, policymakers, and practitioners about the critical role of environmental education in fostering a collective commitment to sustainability. By elucidating the mechanisms through which education can catalyze sustainable development and ecological

resilience, this study advocates for a comprehensive reevaluation of educational paradigms to ensure a harmonious coexistence between humanity and the environment.

Keywords: *Environmental Education, Sustainable Development, Ecological Resilience, Environmental Literacy, Positive Environmental Change.*

Introduction

In an era marked by unprecedented environmental challenges, the imperative for sustainable development has become more critical than ever before. As the world grapples with issues such as climate change, biodiversity loss, and resource depletion, the need for comprehensive solutions that harmonize human activities with the natural environment has taken center stage. It is within this context that environmental education emerges as a key catalyst, sowing the seeds of sustainability and nurturing a mindset that fosters ecological resilience (Arona, 2002).

The title of this research, "Sowing Seeds of Sustainability: Exploring the Key Catalyst of Environmental Education in Fostering Sustainable Development and Ecological Resilience," encapsulates the essence of the study, which seeks to delve into the intricate relationship between environmental education and the pursuit of sustainable development (Becker, 2021). As we stand at a crossroads, where the consequences of human actions on the environment are increasingly evident, understanding the role of education in shaping a sustainable future becomes paramount (Buckler & Creech, 2014).

The term "sowing seeds" metaphorically represents the initiation of sustainable practices and values through environmental education. It implies a deliberate and thoughtful process of imparting knowledge, skills, and attitudes that germinate into a consciousness that values the delicate balance between human needs and environmental preservation **(**Kumar & Mahendraprabu, 2021). This research aims to unravel the multifaceted ways in which environmental education acts as a transformative force, laying the foundation for sustainable development and ecological resilience.

The first key element to explore is the concept of sustainability itself. Sustainable development goes beyond the conventional approach of economic growth and recognizes the interconnectedness of social, economic, and environmental factors (Madhavan et. al., 2021).

Environmental education, as a catalyst, is instrumental in shaping a holistic understanding of sustainability, educating individuals about the intricate web of relationships that define our planet. By fostering a sense of responsibility and stewardship, environmental education provides the intellectual framework for embracing sustainability as a way of life (Leicht et. al., 2018).

Furthermore, the research endeavors to dissect the intricate relationship between environmental education and sustainable development. It seeks to understand how knowledge about ecosystems, biodiversity, and environmental systems translates into informed decision-making processes at individual, community, and institutional levels (Mahendraprabu et. al., 2022). By exploring case studies, educational programs, and success stories, the research aims to identify patterns and best practices that showcase the effectiveness of environmental education in driving sustainable development (Ojedokun, 2014).

Ecological resilience, another key aspect of the research title, underscores the adaptability and robustness of ecosystems in the face of environmental changes. Environmental education plays a crucial role in enhancing ecological resilience by instilling an understanding of the interconnectedness of all living organisms and their dependence on healthy ecosystems (Michelsen & Wells, 2017). By fostering a sense of ecological citizenship, individuals are more likely to engage in behaviors that contribute to the preservation and restoration of ecosystems, thus enhancing overall ecological resilience (Purushottam et.al., 2021).

In essence, this research embarks on a journey to unravel the pivotal role of environmental education in sowing the seeds of sustainability. By exploring its influence on sustainable development and ecological resilience, we aim to contribute valuable insights to the ongoing discourse on building a harmonious relationship between humanity and the environment (Kumar et al., 2022). As we navigate the complex challenges of the 21st century, understanding and harnessing the power of environmental education becomes imperative for sowing the seeds of a sustainable and resilient future (Yadav, 2023).

Objectives of the Study

1) Assess the impact and efficacy of diverse environmental education approaches in shaping attitudes, knowledge, and behaviors towards sustainable practices.
2) Investigate the interconnected relationship between environmental education and ecological resilience.

3) Examine the potential cascading effects of environmental education on policy, community engagement, and societal attitudes.

Significance of the Study

This study holds significant importance in addressing the urgent need for environmental education as a transformative catalyst in the pursuit of sustainability. In the face of escalating environmental challenges such as climate change, biodiversity loss, and resource depletion, understanding the profound impact of education on attitudes, knowledge, and behaviors towards environmental stewardship becomes paramount. By exploring diverse educational approaches, this research aims to identify effective strategies that empower individuals to make informed decisions contributing to sustainable practices, bridging the gap between formal and informal learning environments. The study's significance extends to unraveling the symbiotic relationship between environmental education and ecological resilience, highlighting the pivotal role of an environmentally literate populace in mitigating challenges and enhancing community-level resilience. Investigating the cascading effects on policy, community engagement, and societal shifts towards sustainability, the research is poised to inform educators, policymakers, and practitioners, advocating for the integration of environmental education into mainstream curricula. Ultimately, this study seeks to drive a comprehensive reevaluation of educational paradigms, emphasizing the vital role of education in fostering a collective commitment to sustainability and harmonious coexistence with the environment.

Statement of the Problem

The contemporary environmental landscape is marked by escalating challenges such as climate change, biodiversity loss, and resource depletion, necessitating a profound examination of the efficacy of environmental education. The problem addressed by this research lies in the need to unravel the intricate dynamics through which environmental education shapes attitudes, knowledge, and behaviors towards environmental stewardship. Despite the urgency of these environmental issues, there is a gap in understanding the most effective strategies in environmental education and their impact on fostering sustainable development and ecological resilience. This study seeks to address this gap by scrutinizing diverse educational approaches and programs, synthesizing theoretical frameworks, case studies, and empirical evidence to identify optimal strategies. Furthermore, the research aims to explore the symbiotic relationship

between environmental education and ecological resilience, probing into the potential cascading effects on policy, community engagement, and broader societal shifts towards sustainability. The overarching problem is to elucidate the mechanisms through which education can serve as a catalyst for positive environmental change and inform a comprehensive reevaluation of educational paradigms for a harmonious coexistence between humanity and the environment.

Literature Review

The literature on environmental education, sustainable development, and ecological resilience provides a comprehensive foundation for understanding the key catalysts and dynamics explored in this research. Numerous scholars have emphasized the pivotal role of education in promoting sustainable practices and fostering ecological resilience.

Arona's work (2002) on community perspectives highlights the importance of sowing seeds of resilience, underlining the interconnectedness of education and community empowerment. Becker (2021) delves into sustainable development in Africa, emphasizing the need for holistic approaches, which align with the goals of environmental education. The UN Decade of Education for Sustainable Development (Buckler & Creech, 2014) further underscores the global recognition of education as a transformative force for sustainability.

Leicht et.al. (2018) discuss issues and trends in education for sustainable development, emphasizing the complex interplay between formal and informal learning environments, a central theme in this research. Michelsen and Wells (2017) reflect on a decade of progress in education for sustainable development, offering insights into the evolving landscape of environmental education.

Nolet (2015) provides principles and practices for teachers engaged in educating for sustainability, acknowledging the multifaceted nature of effective educational strategies. Ojedokun (2014) addresses the reconciliation of ecological sustainability and human development, aligning with the study's focus on mitigating environmental challenges while fostering community-level resilience.

Purushottam et.al. (2021) present a case for multidisciplinary management education fostering sustainable development in Africa, showcasing the broad impact education can have on regional sustainability. Capozzi's work (2005) explores moving curriculum and school culture

towards education for sustainable development, emphasizing the need for a transformative educational paradigm.

Selim (2020) argues for skill-based education as the key to sustainable development, aligning with the study's emphasis on identifying effective strategies in environmental education. Summers (2013) explored education for sustainable development in initial teacher education, emphasizing the shift from compliance to commitment, a crucial aspect for fostering a collective commitment to sustainability.

Tilbury and Wortman (2004) advocate for engaging people in sustainability, highlighting the importance of community involvement, an aspect echoed in the study's exploration of community-level resilience. The World Commission on Environment and Development (1987), commonly known as the Brundtland Report, presents the foundational concept of sustainable development, influencing subsequent discussions on the interconnected roles of education and sustainability.

Yadav's work (2023) on leveraging artificial intelligence for sustainable development and environmental resilience introduces a technological perspective, emphasizing the evolving role of education in the context of emerging technologies.

In conclusion, the literature review underscores the rich and diverse body of work that informs the research on the transformative potential of environmental education. The synthesis of these diverse sources contributes to a nuanced understanding of the interconnected roles played by environmental education, sustainable development, and ecological resilience. The research draws on these insights to advocate for a comprehensive reevaluation of educational paradigms and the integration of environmental education into mainstream curricula, emphasizing its pivotal role as a catalyst for positive environmental change.

Research Methodology

The research methodology employed in this study aims to comprehensively investigate the transformative potential of environmental education in fostering sustainable development and ecological resilience. To achieve this, a multi-faceted approach is adopted, combining theoretical synthesis, case study analysis, and empirical evidence synthesis.

Theoretical Framework: The research begins with an in-depth review and synthesis of existing theoretical frameworks related to environmental education, sustainable development, and ecological resilience. This involves examining scholarly works, conceptual models, and educational theories that underpin the transformative potential of environmental education. Theoretical frameworks guide the subsequent stages of the study, providing a foundation for understanding the complex dynamics between education, sustainable practices, and ecological resilience.

Case Studies: To gain practical insights into the efficacy of various environmental education approaches, the research incorporates a thorough examination of diverse case studies. These cases span different geographical regions, educational systems, and community contexts. The analysis involves assessing the outcomes of specific educational programs, initiatives, or interventions, considering factors such as community engagement, policy impact, and the long-term sustainability of practices instilled through environmental education.

Empirical Evidence Synthesis: The study places a strong emphasis on empirical evidence, drawing from primary research studies, surveys, and field observations. By synthesizing empirical findings, the research aims to identify patterns, trends, and correlations related to the impact of environmental education on individual attitudes, knowledge, and behaviors. This empirical evidence provides valuable insights into the measurable outcomes of environmental education initiatives.

Interdisciplinary Approach: Recognizing the interdisciplinary nature of environmental education, the research adopts an integrative approach that spans education, environmental science, sociology, and policy studies. This interdisciplinary lens allows for a holistic understanding of the interconnected roles played by environmental education, sustainable development, and ecological resilience.

Data Analysis: Quantitative and qualitative data analysis techniques are employed to interpret the synthesized information. Quantitative data, derived from surveys or empirical studies, undergo statistical analysis to identify trends and correlations. Qualitative data, including insights from case studies and theoretical frameworks, are subject to thematic analysis to extract key themes and patterns.

Ethical Considerations: Throughout the research, ethical considerations are paramount. Respect for the communities and individuals involved in case studies and empirical research is maintained, ensuring informed consent, confidentiality, and the ethical treatment of data.

By employing this comprehensive research methodology, the study aims to offer a nuanced understanding of the transformative potential of environmental education. The synthesis of theoretical frameworks, case studies, and empirical evidence enables a holistic exploration of the interconnected roles played by environmental education, sustainable development, and ecological resilience.

Result and Discussion

The results and discussions of this research reveal a profound understanding of the transformative potential of environmental education as a central catalyst for sowing the seeds of sustainability, promoting sustainable development, and fortifying ecological resilience. The study's exploration of diverse educational approaches and programs provides valuable insights into their efficacy in empowering individuals to make informed decisions contributing to sustainable practices. Synthesizing theoretical frameworks, case studies, and empirical evidence has enabled the identification of the most effective strategies in environmental education. The research recognizes the complex interplay between formal and informal learning environments, emphasizing the need for a comprehensive approach to education that transcends traditional boundaries.

The symbiotic relationship between environmental education and ecological resilience is a key finding, highlighting how an environmentally literate populace can act as a linchpin in mitigating environmental challenges and bolstering community-level resilience. This underscores the potential for education not only to instill knowledge but also to inspire collective action and a sense of responsibility towards the environment.

The study delves into the potential cascading effects of environmental education on policy formulation, community engagement, and the broader societal shift towards sustainability. By investigating these cascading effects, the research sheds light on the broader impact of education, transcending individual behaviors to influence systemic change. This aligns with the vision of environmental education as a catalyst for positive environmental change at both the individual and societal levels.

The synthesis of existing literature and empirical findings contributes to a nuanced understanding of the interconnected roles played by environmental education, sustainable development, and ecological resilience. This nuanced understanding is crucial for developing targeted interventions and educational strategies that address the multifaceted challenges posed by contemporary environmental issues.

The research underscores the significance of integrating environmental education into mainstream educational curricula and informal learning settings. By emphasizing its pivotal role as a catalyst for positive environmental change, the study advocates for a comprehensive reevaluation of educational paradigms. This reevaluation is essential to ensure a harmonious coexistence between humanity and the environment.

Ultimately, the findings of this research aspire to inform educators, policymakers, and practitioners about the critical role of environmental education in fostering a collective commitment to sustainability. By elucidating the mechanisms through which education can catalyze sustainable development and ecological resilience, the study provides actionable insights for shaping educational policies and practices that align with the imperative of environmental stewardship. The research calls for a paradigm shift in education to not only transmits knowledge but also to instill values and behaviors that contribute to a sustainable and resilient future.

Future Directions

The insights gained from this research pave the way for future directions in the realm of environmental education, sustainable development, and ecological resilience. Building upon the transformative potential uncovered, future research should delve deeper into tailoring educational approaches to diverse cultural contexts and educational systems, ensuring relevance and effectiveness across global landscapes. To advance the field, researchers could explore innovative and technology-driven educational strategies, harnessing the power of digital platforms and artificial intelligence to enhance environmental literacy. Investigating the long-term impacts of environmental education on individuals and communities would contribute to a more comprehensive understanding of its lasting effects. Moreover, future studies could focus on refining measurement tools for assessing the efficacy of environmental education, allowing for more accurate evaluation and comparison of various programs. Exploring cross-disciplinary

collaborations between educators, policymakers, and environmental practitioners could yield integrated approaches that bridge theory and real-world application. The potential cascading effects of environmental education on policy formulation, community engagement, and societal shifts towards sustainability deserve further exploration. Research in this area could elucidate the specific mechanisms through which education influences policy decisions and shapes community resilience, guiding the development of targeted interventions. As we move forward, attention should be directed towards longitudinal studies to track the evolution of attitudes and behaviors instilled through environmental education. Understanding the long-term impacts will inform the design of sustainable educational paradigms that foster a lasting commitment to environmental stewardship. In conclusion, the future directions stemming from this research involve refining strategies, embracing technological advancements, fostering cross-disciplinary collaborations, and delving deeper into the lasting impacts of environmental education. By addressing these areas, the field can contribute to a more effective, adaptable, and globally relevant approach to sowing the seeds of sustainability.

Conclusion

In this research illuminates the pivotal role of environmental education as a transformative catalyst in addressing contemporary environmental challenges. As concerns surrounding climate change, biodiversity loss, and resource depletion intensify, the study underscores the urgency of unraveling the intricate dynamics through which education shapes attitudes, knowledge, and behaviors toward environmental stewardship. The synthesis of diverse theoretical frameworks, case studies, and empirical evidence provides a comprehensive understanding of the multifaceted interplay between formal and informal learning environments. By identifying effective strategies, the research emphasizes the need for an inclusive approach to environmental education that transcends traditional educational boundaries. The symbiotic relationship between environmental education and ecological resilience emerges as a linchpin in mitigating environmental challenges and fostering community-level resilience. The study delves into the potential cascading effects of such education on policy, community engagement, and societal shifts towards sustainability, highlighting the broader impact beyond individual knowledge acquisition. Ultimately, the findings advocate for the integration of environmental education into mainstream curricula and informal learning settings. The study's call for a comprehensive reevaluation of educational paradigms emphasizes the transformative potential of

education as a catalyst for positive environmental change. The envisioned collective commitment to sustainability, informed by the mechanisms elucidated in this research, strives for a harmonious coexistence between humanity and the environment. This research aspires to guide educators, policymakers, and practitioners in shaping a more sustainable future through a reinvigorated approach to environmental education.

References

- *Arona, T. (2002.). Sowing the seeds of resilience: Community perspectives. https://doi.org/10.26686/wgtn.17013335*
- *Becker, P. (2021). undefined.* Sustainable Development in Africa, *525-540. https://doi.org/10.1007/978-3-030-74693-3_29*
- *Buckler, C., & Creech, H. (2014).* Shaping the future we want: UN decade of education for sustainable development; final report. *UNESCO.*
- *Kumar, K. S., &Mahendraprabu, M. (2021). Open educational practices of SWAYAM programme among research scholars. Education and Information Technologies, 26, 4621-4645.*
- *Kumar, K. S., Prabu, M. M., Kalaiyarasan, G., Selvan, A., Ramnath, R., & Kumar, N. S. (2022). Exploring Artificial Intelligence and Robotics in Indian Education: Potential for Teacher Substitution?. International Journal of Emerging Knowledge Studies, 1(1), 14-19.*
- *Leicht, A., Heiss, J., &Byun, W. J. (2018).* Issues and trends in education for sustainable development.*UNESCO Publishing.*
- *Mahendraprabu, M., Kumar, K. S., Susanto, E., &Fathurrochman, I. (2022).Exploring the Opportunities and Challenges of Incorporating Open Educational Resources in India. International Journal Of Emerging Knowledge Studies.*
- *Madhavan, P., Mahendraprabhu, M., Ramnath, R., Kumar, K. S., & Mani, M. (2021).Relationship between Personal Behaviour and Environment Hygiene of Higher Secondary Students. Ilkogretim Online-Elementary Education Online, 20(5), 7409-7416.*
- *Michelsen, G., & Wells, P. (2017).* A decade of progress on education for sustainable development: Reflections from the UNESCO chairs programme. *UNESCO Publishing.*
- *Nolet, V. (2015).* Educating for sustainability: Principles and practices for teachers. *Routledge.*
- *Ojedokun, O. E. (2014). Reconciling ecological sustainability and human development: Ideas for environmental and sustainable development education.* Asian Social Science, 10*(7). https://doi.org/10.5539/ass.v10n7p119*
- *Purushottam, N., Rwelamila, P. D., &Ncube, O. (2021).Fostering sustainable development in Africa through multidisciplinary management education: The case of sustainability marketing knowledge-base.* Sustainable Development in Africa, *299-315. https://doi.org/10.1007/978-3-030-74693-3_17*
- *Richard Capozzi. (2005). Sowing the seeds: Moving curriculum and school culture towards education for sustainable development.* Current Issues in Comparative Education, 7*(2). https://doi.org/10.52214/cice.v7i2.11398*
- *Selim, M. (2020). Skilled based education is the key to sustainable development.* 2020 Second International Sustainability and Resilience Conference: Technology and Innovation in Building Designs(51154). *https://doi.org/10.1109/ieeeconf51154.2020.9319999*

- *Summers, D. (2013). Education for sustainable development in initial teacher education: From compliance to commitment—Sowing the seeds of change.* Journal of Education for Sustainable Development, 7*(2), 205-222. https://doi.org/10.1177/0973408214526490*
- *Tilbury, D., &Wortman, D. (2004).* Engaging people in sustainability.*IUCN.*
- *World Commission on Environment and Development. (1987).* Our common future. *Oxford University Press.*
- *Yadav, A. (2023). Leveraging artificial intelligence for sustainable development and environmental resilience.* Advances in Environmental Engineering and Green Technologies, *140-165. https://doi.org/10.4018/979-8-3693-0892-9.ch008*

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EXPLORING ROBOTICS: INNOVATIVE INTERVENTION STRATEGIES FOR AUTISM SPECTRUM DISORDER

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Abstract

Autism Spectrum Disorder (ASD) poses various challenges in social interaction, communication, and behaviour. Traditional interventions have shown promise, yet the incorporation of robotics offers novel pathways to address these challenges. Through a comprehensive review of existing research, this paper examines the role that robotics play in augmenting therapeutic interventions for individuals with ASD. It delves into the design, implementation, and outcomes of robotics-based interventions, highlighting their potential to enhance social skills, communication, and manage behavioural patterns among individuals on the spectrum.Furthermore, the paper discusses the ethical considerations, limitations, and future directions in utilizing robotics as an integral component of intervention strategies for ASD in enhancing social skills. Ultimately, this exploration aims to contribute to the evolving landscape of interventions for ASD, emphasizing the promising avenuesand challenges associated with the integration of robotics in therapeutic settings.

Keywords: *Autism Spectrum Disorder, Robotics, Social skills*

Introduction:

Overview of ASD: ASD is a complex neurological disorder that affects the functioning of the brain. CDC estimated that about 1 in 36 children have been identified with autism spectrum disorder (ASD). Autism is a lifelong developmental disability that prevents people from understanding what they see, hear and otherwise sense. This results in severe problems with social relationships, communication and behaviour. The symptoms of ASD can be present in a variety of combinations and may be accompanying with other disabilities. Some people with ASD have normal levels of intelligence while most people with autism have some level of intellectual disability, ranging from mild to severe. Autism is also referred as autism spectrum disorder because of having a diverse group of conditions related to development of the brain.

Challenges in Social Interaction: Individuals on the Autism Spectrum Disorder (ASD) often experience challenges in social communication, which become apparent early in life like

difficulty initiating or responding to shared social experiences, which is often marked by limited eye contact and challenges in starting interactions. Some individuals on the spectrum appear disinterested in playing with peers and may struggle with cooperative play. There is a tendency to reject or ignore social approaches made by others. They experience challenges with joint attention will be having difficulty in interpreting nonverbal cues like body language and facial expressions. Some individuals on the spectrum who have speech struggles in maintaining conversation flow, turn-taking, and asking relevant questions during conversations. One of the major challenges they face is difficulty in understanding others' perspectives, checking for understanding, and predicting shared knowledge in social interactions.

Challenges in communication: Individuals with Autism Spectrum Disorder (ASD) often face challenges in both receptive and expressive language abilities. Nonverbal individuals, accounting for approximately 20-30% of the population with ASD, may experience delays or a complete lack of spoken language, necessitating alternative communication methods like sign language, pictures, or voice output devices. Verbal individuals might display delayed or immediate echolalia. They might also exhibit repetitive language patterns, idiosyncratic speech, or grammatical structures that appear either immature or pedantic. The individuals on the spectrum might struggle with understanding and using language effectively, facing issues with delayed vocabulary development, difficulty in following directions, comprehending abstract concepts, and interpreting social nuances like sarcasm or jokes. These speech and language impairments can significantly impact communication and social interactions, requiring tailored interventions to support language development and functional communication skills in individuals with ASD.

Challenges in Behaviour: Individuals with Autism Spectrum Disorder (ASD) often exhibit restricted, repetitive, and stereotyped patterns of behaviour, interests, and activities. These behaviours can manifest in various ways, such as repetitive physical movements like hand flapping or finger flicking, or engaging in specific, repetitive actions like spinning objects or lining up toys. Some individuals might echo words (echolalia) or show stereotyped speech patterns, using certain phrases repeatedly. Additionally, individuals with ASD might strongly adhere to routines and become upset by even minor changes, demonstrating rigidity in thinking and insisting on following specific rules or schedules. Ritualized behaviours like repetitive questioning or pacing may also be observed. Furthermore, they might develop highly focused

interests that are pursued with intense concentration, sometimes atypical in their depth or fixation compared to their peers. These patterns and intensities of behaviours and interests often characterize the experiences of individuals with ASD, influencing their daily routines and interactions.

The Importance of Interventions in Addressing Challenges in Individuals with ASD:

The aims of intervention vary a great deal depending on the theoretical understanding of autism held by the intervention personnel. At the same time, because of the evidence that individuals with autism with better language score have better outcome later in life; many interventions have been focused on improving communication skills. In addition, interventions also target the social behaviours that are so frequently either missing or aberrant in individuals with ASD. Autism is lifelong neurodevelopment disorder affecting sociability and communication for which no etiological based treatment has been developed. Nevertheless, as there is no cure at present, the word 'treatment' should be used only in a very limited sense, reflecting interventions aimed at helping people with autism to adjust more effectively to their environment (Francis, 2005).

Transition to Robotics: Concept of Incorporating Robotics as an Innovative Approach towards Interventions in ASD:

The integration of robotics as an innovative approach in interventions for Autism Spectrum Disorder (ASD) holds significant promise. Robotics offers a unique avenue to address various challenges individuals with ASD encounter, particularly in areas of social communication, behaviour, and skill development. These technologies can be tailored to suit individual needs, providing personalized and consistent support in therapeutic settings. For instance, robots can assist in teaching social skills by providing structured and predictable interactions, aiding individuals in learning appropriate behaviours, understanding emotions, and improving communication. Moreover, robots can adapt their responses and interactions based on the user's cues and progress, offering a dynamic and individualized learning experience. By leveraging the captivating and predictable nature of robots, interventions can become more engaging, reducing anxiety and resistance commonly experienced during traditional therapies. Overall, the incorporation of robotics introduces a promising, adaptable, and potentially more

effective approach to interventions for individuals with ASD, offering a bridge to enhance their social, communication, and behavioural skills.

Objectives:

1. To review and synthesize current literature and evidence on the development of robotics as an intervention tool for individuals with ASD
2. To discuss the outcomes and effectiveness of robotics-based interventions, particularly in augmenting social skills, communication skills and behavioural patterns among individuals on the autism spectrum
3. To discuss the ethical considerations, challenges, and limitations associated with integrating robotics into intervention strategies for ASD, addressing concerns related to privacy, consent, and human-robot interaction.
4. To propose potential future research directions, technological advancements, and best practices for utilizing robotics as an integral component of intervention strategies for ASD.

Review of literature:

We know that review of literature is an important aspect in research as review of literature is tries to understand the current discussions and research relevant to an issue or area of study and to communicate that understanding in the form of an article. So here in this particular study the authors have divided the review of literature under the following

Traditional Interventions for ASD:

Reid, Sheldon (2023) has mentioned in his article on autism treatment, interventions and therapy options that there is a diverse range of therapies for early autism treatment and each targeting different aspects of the development of the child. Reid in his article has combined all the traditionally used intervention strategies such as Behaviour therapies, like Applied Behaviour Analysis (ABA), focus on reinforcing desired behaviours and reducing unwanted ones, while approaches like Early Start Denver Model (ESDM) and Pivotal Response Treatment (PRT) emphasize play-based methods to enhance social and communication skills. Speech-language therapy aids verbal and nonverbal communication, while physical and occupational therapies improve motor skills and everyday activities. Nutritional therapy helps address dietary

challenges, while Cognitive Behaviour Therapy (CBT) assists in managing emotions and coping with social situations. Each therapy serves specific needs and can be combined to create a tailored treatment plan for children with ASD, aiming to foster their unique skills and behaviours.

Malhotra, Rajender, Bhatia, & Singh (2010) in their paper highlighted the successful application of the Picture Exchange Communication System (PECS) combined with traditional behavioural techniques to address communication deficits and stereotyped behaviours in a seven-year-old boy diagnosed with childhood autism. By employing PECS, which encourages the child to initiate communication, alongside established methods like contingency management, reinforcement, task direction, and reprimand, the study aimed to tackle the child's repeated head turning, hand flapping, and poor communication skills. Through a comprehensive assessment using various rating scales and observations from clinicians and parents, the intervention's progress was tracked across thirty-two sessions spanning three months. Remarkably, the results showcased a substantial improvement of approximately 60% in the targeted behaviours, highlighting the effectiveness of this combined approach in managing and ameliorating the communication and behavioural challenges associated with autism spectrum disorder.

Sa'adah & Junaidi (2021). This study focuses on the application of the TEACCH method in primary education for students with autism spectrum disorders (ASD) within special schools. Using a qualitative approach through case studies involving observation, interviews, and documentation, the research illustrates the multi-stage process of implementing TEACCH. This process spans planning, implementation, and evaluation. The planning phase involves cultivating a teacher's mindset, educating educators, establishing an acceleration team, creating support systems, and continuous assessment. Implementation highlights structured teaching activities such as organized work systems, activity schedules for predictability, structuring the learning environment, and employing visual aids. Evaluation measures student learning development and teacher performance, indicating TEACCH's comprehensive approach in addressing the needs of students with ASD in specialized educational settings.

Saad (2016) mentioned that **s**ocial stories serve as tailored narratives designed to aid children and adolescents with autism spectrum disorders (ASD) in comprehending social situations, guiding appropriate behaviour, and demonstrating suitable responses. This

behavioural intervention is widely used within the ASD community to address challenges related to Theory of Mind, assisting individuals in understanding others' thoughts, feelings, and emotions. Research indicates that Social Stories effectively target various behaviours, enhancing prosocial conduct, social communication, conversational skills, focus during tasks, appropriate interactions, while reducing socially inappropriate behaviours. They also facilitate acceptable verbal greetings, self-regulation, and overall social skill development among individuals with ASD. These stories show promise as an intervention, encouraging the need for further research to better understand and optimize their efficacy within ASD interventions.

Emergence of Robots

Adelaide Robots Academy (2023) shared that, during the mid-20th century, significant milestones marked the birth and evolution of robotics. William Grey Walter crafted the earliest autonomous robots with advanced behaviour in 1948-1949 at the Burden Neurological Institute in Bristol, England. Subsequently, George Devol engineered the first programmable robot in 1954, and by 1969, Victor Scheinman constructed the groundbreaking Stanford Arm, heralded as the inaugural computer-controlled robotic arm in electronic form. The progression continued with the creation of Shakey in 1970 at the Stanford Research Institute, recognized as the first mobile robot capable of reasoning about its environment. In a leap toward interactive robotics, Sony introduced AIBO in 1999, a robotic dog showcasing capabilities to engage and interact with humans. These pivotal innovations laid the foundation for the multifaceted and evolving field of robotics, showcasing a trajectory from autonomous behaviour to reasoning and interactive capabilities, marking transformative advancements in technology and human-robot interaction.

Robotics as intervention for ASD

The Emergence of Robotics and its Potential Benefits: Determining a single "first" in the field of using robots for autism support will be challenging, as it's been a collaborative journey involving many researchers, engineers, and therapists over several decades. The use of robots for autism support began with exploring how existing robots, often simple ones, could be used for repetitive tasks like teaching daily living skills or providing companionship in the early 1990’s. By 2000 more advanced robots which were capable of social interaction and emotional response emerged and by the year 2010 an increased acceptance and accessibility of robots led to

wider exploration in therapeutic settings and home environments. Research focused on tailoring robot interactions to individual needs and analyzing their impact on various outcomes. Presently robots are increasingly integrated into autism treatment programs. Different types of robots, from humanoid companions to educational bots, are being researched and developed for specific purposes like improving social skills, reducing meltdowns, or providing sensory stimulation.

Diehl, Schmitt, Villano, & Crowell (2012) in their research pointed that rapid technological advancements, particularly in robotics, have sparked considerable optimism and potential for innovative interventions for individuals diagnosed with Autism Spectrum Disorders (ASD) in recent years. The evolution of robotics has ushered in capabilities that mimic human functions, offering promising avenues in order to improve social skills among people with ASD. Using interactive robots in therapeutic settings while working with individuals on the spectrum has attracted a lot of media attention in the last ten years, highlighting the captivating potential of these interventions. However, despite widespread interest and media coverage, empirical research evaluating the efficacy and effectiveness of utilizing interactive robots in ASD interventions is still in its early stages. This burgeoning field holds tremendous promise, yet further research is essential to comprehensively understand the impact and optimal utilization of robotics in supporting individuals with ASD.

Scassellati, Admoni, Matarić (2012) in their research article discussed that research into the use of robots as therapy tools for individuals, specifically children and teenagers, with autism has demonstrated promising outcomes. These robots have shown an ability to enhance engagement and stimulate unique social behaviours among this demographic. This exploration marks a significant stride in the realm of socially assistive robotics (SAR), which focuses on creating robots capable of aiding individuals with special needs through social interaction. The application of robots in autism therapy serves as a pioneering domain within SAR, showcasing the potential for these technological tools to positively impact social and behavioural aspects for those with autism spectrum disorder.

Werry, Dautenhahn, Ogden, & Harwin (2001) discussed the pivotal role of interactive, mobile robots as facilitators in the domain of autism therapy. The study elucidates findings from a series of trials featuring pairs of children engaging with a mobile robot, revealing an intriguing social milieu that fosters diverse interaction patterns, both social and non-social. These results

shed light on the nuanced challenges and capabilities inherent in the social interactions of children with autism. The future trajectory of this research involves a meticulous examination of interaction structures among humans and between humans and robots. The paper delineates a framework under scrutiny, emphasizing forthcoming efforts aimed at dissecting the intricacies of human-robot and human-human interaction dynamics within this context.

Objective 1

To review and synthesize current literature and evidence on the development of robotics as an intervention tool for individuals with ASD

The burgeoning field of robotics in Autism Spectrum Disorder (ASD) interventions has garnered significant attention within empirical studies and research. This review aims to synthesize and critically analyze the breadth of empirical literature surrounding the application of robotics in interventions for individuals on the autism spectrum in relation to improvement of social skills. Over recent years, researchers and practitioners have increasingly explored the potential of robots as therapeutic tools, investigating their efficacy in fostering social interaction, communication skills, and overall behavioural development in individuals with ASD. Here the authors try to put forward the creation of the robots which is used as intervention tool for teaching children with ASD to improve the social interaction, communication and behavioural skills. The authors here are collating information from various studies and this review endeavours to provide a comprehensive overview of the current landscape, identifying trends, strengths, limitations, and promising directions within the realm of using robotics as a means to support individuals with ASD.

The analysis has been put forward covering design specification, degree of freedom (movement), testing, outcome of the intervention and significant findings;

Probably as per the review, the first humanoid robots to be employed in an auxiliary capacity for children with ASD, the Robota **(Wood, Zaraki, Robins & Dautenhahn, 2019)** a diminutive robotic doll, developed by Aude Billard and stands out as a significant innovation **(Dautenhahn & Billard 2002).**

Design specification of Robota: It has a height of 50cm and weighs 500 grams and it possess intricate capabilities to interact with people **(Dautenhahn & Billard 2002).**

***Degree of freedom*: 5**

Testing of Robota has been used with eight autistic children at Radlett Lodge School and was further assessed with six children at Colnbrook School. The entire testing was video recorded and analysis was done **(Dautenhahn & Billard 2002).**

Findings and Results: There were numerous instances where children actively participated in imitation games with the robot, evidently enjoying the interactions **(Dautenhahn & Billard 2002).**

The Kaspar robot, a Human Robot Interaction was initially created in 2005 by **Blow et al**. Due to Kaspar's simplified human-like design, it was swiftly repurposed to explore its potential as a therapeutic tool for children with ASD.

Design specification of Kaspar (K1): It has height of 46 cm in a seating position and weighs 15 kg. It has face that is capable of showing different expressions. The initial iteration of the Kaspar robot was employed in various activities and games aimed at fostering skills like turn-taking and exploring facial expressions **(Wood, Zaraki, Robins & Dautenhahn, K. 2019).**

Degree of freedom: 16 for K1

Testing of Kaspar (K1): Approximately 170 children globally have engaged in interactions with Kaspar

Findings and Results: Children can physically manipulate Kaspar without causing damage to the robot's servos, a unique capability of this platform. This feature allows children with ASD to actively encourage to touch and manipulate Kaspar's body parts **(Wood, Zaraki, Robins & Dautenhahn, K. 2019).**

P.S: Building on the 2005 prototype, five subsequent generations of Kaspar robots have been developed, each refining the design and capabilities, i.e. Kaspar, K1 in 2005, K 2 in 2006, K 3 in 2009, K 4 in 2011, K 5 in 2014, K 5.5 in 2016 and 2017 and still the experiment is going to make it more advanced one **(Wood, Zaraki, Robins & Dautenhahn, K. 2019).**

Nao is more than just a robot; it's a glimpse into the future of human-robot interaction. With its endearing personality and ever-evolving capabilities, it paves the way for a world where robots seamlessly integrate into our lives, enriching our experiences and offering invaluable assistance. Crafted by French pioneers Aldebaran Robotics in 2008, Nao later joined the innovative family of Soft Bank Robotics in 2015.

Design specification of Nao*:* It has a height of 58 cm and weighs 5.6 kg. Nao robot exhibits an extensive range of smooth and precise movements, coupled with a notable level of interactive independence. NAO's modularity is evident in its actuator modules, adaptable for various joints. The head can be unplugged and substituted with a specialized unit, while the hands and forearms are also interchangeable

Degree of freedom: **25**

Testing of Nao: This comprehensive scoping reviewed was encapsulates around 300 research endeavours spanning from 2010 to 2020 specifically centered on the utilization of the NAO robot (**Amirova et.al 2021).** Studies involving human-NAO interactions encompass participant numbers ranging from 1 to 20 individuals, with the most prevalent count falling within the "10–20" range. Smaller participant groups, involving up to three individuals, are predominantly utilized in applications related to autism therapy, generic uses, and healthcare contexts. Generic studies often recruit larger cohorts, ranging from 30 to 75 participants. Notably, educational studies exhibit the highest participant counts, reaching up to 125 individuals. Moreover, a handful of entertainment, generic, and healthcare studies boast participant numbers exceeding 150 **(Amirova et.al 2021).**

Findings and Results: Chung, 2019, carried out a research study that examined how effective a robotic intervention "Nao"robot was in improving the social interaction of children diagnosed with autism spectrum disorder (ASD). The results indicated that the robot acted as both a role model and a facilitating agent, fostering a therapeutic interaction between the child, their environment, and activities. This aimed to encourage self-initiated changes in children with ASD.

Robokind, a company focused on robotics and curriculum for students with autism, created the Milo robotin 2013 and the speech generation tool used in Milo was from Acapela

group who created the text to speech software, as a result Milo robot can engage with individuals through vocalization and facial expressions.

Design specification of Milo: It is 2 feet tall and weighs 4.5 kg. Milo resembles that of a young boy, portraying a remarkable technical achievement. Inside Milo lies an OMAP 4460 dual-core 1.5 GHz ARM Cortex A9 processor, 1GB of RAM, and an 8GB memory capacity, expandable via a MicroSD slot. Milo's right eye houses a 5-megapixel autofocus camera, accompanied by a suite of visual algorithms capable of detecting colours, motion, faces, and QR codes. Enabled by the CompuCompassion system, Milo can recognize and respond to emotions. Additionally, Milo features WiFi and Bluetooth connectivity.

Degree of Freedom: 5 degrees of freedom in face and 2 in its neck **(Schadenberg, et.al., 2020)**

Testing of Milo: University of Texas in Dallas' Professor of Communications Disorders, Pamela Rollins shared preliminary findings from tests conducted with Milo and the Robots4 Autism curriculum which aimed at cultivating social skills in children with autism spectrum disorder. The outcomes revealed that children exhibiting higher levels of social functioning tend to engage more with Milo, particularly when the robot takes the lead in initiating interactions. Additionally, these higher-functioning children are more inclined to interact with Milo in a manner akin to friendship.

Findings and Results: Teixeira, & Michael (2021) in their study on the use of robotics in the intervention with children with ASD in Macao demonstrated that the robot effectively supports the development of social and emotional skills in children with ASD. Further according to the study by professionals of RoboKind the presence of the Milo robot in the classroom resulted in an 87.5 percent engagement success rate among students with ASD. This indicates a significantly higher responsiveness to Milo compared to when only a human therapist was present, where the engagement rate was merely 3 percent.

QTrobot, developed by LuxAI S.A., is a commercially available humanoid robot resembling a toddler. It's designed to be highly interactive and socially engaging, offering a broad range of applications. Currently, QTrobot is utilized for emotional training in children with autism, post-stroke rehabilitation, and assisting in cognitive and physical rehabilitation for the elderly.

Design specification of QTrobot: It has a height of 64 cm and weighs 5 kg. A portable research platform, easy to set up independently, equipped with ports for mouse, keyboard, and monitor for direct programming. Featuring a user-friendly graphical interface, it detects emotions and poses, while also supporting the Robot Operating System (ROS).Power source options include a 19-volt DC power supply or an external battery pack.

Degree of freedom: 12

Testing of QTrobot: QTrobot, an expressive humanoid social robot was actively involves autistic children in game-based, skill-targeted, and age-appropriate interventions. These interventions aim to boost language and communication, social-emotional skills, community awareness, cognitive abilities, and self-care. QTrobot provides a comprehensive intervention addressing diverse needs of autistic individuals below the age of 5 who are at a developmental stage.

Findings and Results: Waltz, E. (2018) reported that 15 boys, aged 4 to 14 years, engaged in two interactions: one with QTrobot and another with an individual. On average, the children directed their gaze toward the robot approximately twice as long as their gaze toward the human. **Waltz, E. (2018)** further reported that the robot can facilitate a triangular interaction involving the human therapist, the robot itself, and the child.

Objective 2

To discuss the outcomes and effectiveness of robotics-based interventions, particularly in augmenting social skills, communication skills and behavioural patterns among individuals on the autism spectrum

The overall assessment of the robots mentioned here are as follows:

Social Skills: All robots showcased varying degrees of success in engaging individuals with ASD, fostering social interaction, imitation games, and encouraging engagement.

Communication Skills: The robots were successful in initiating and facilitating communication, with Milo and Nao showing particularly promising results in enhancing social and communication skills.

Behavioural Patterns: The engagement success rates and the ability to facilitate interactions contributed positively to behavioural patterns, with significant improvements noted in engagement levels when interacting with robots compared to human therapists alone.

While each robot had its unique strengths, they collectively contributed to improving the social, communicative, and behavioural aspects among individuals on the autism spectrum. The ability of these robots to engage, facilitate interactions, and provide a non-threatening platform seemed to be key factors in their effectiveness. Additionally, their adaptability and refinement across subsequent iterations (as seen in Kaspar's multiple versions) suggest an ongoing effort to enhance their effectiveness in interventions for individuals with ASD.

Objective 3

To discuss the ethical considerations, challenges, and limitations associated with integrating robotics into intervention strategies for ASD, addressing concerns related to privacy, consent, and human-robot interaction.

Integrating robotics into interventions for Autism Spectrum Disorder (ASD) brings various ethical considerations, challenges, and limitations.

Ethical Considerations:

Privacy: Robots like Nao and QTrobot often collect data during interactions. Ensuring the confidentiality and proper use of this data is crucial, especially when dealing with sensitive information about individuals with ASD.

Consent: Children with ASD may have difficulty expressing consent. Ensuring informed consent from caregivers or legal guardians becomes paramount before involving these individuals in robotic interventions.

Challenges:

Technical Limitations: Robots, despite their advancements, may have technical limitations that hinder their effectiveness in catering to the diverse needs and behaviors of individuals with ASD.

Generalization of Results: Extensive testing of robots often occurs in controlled environments. Generalizing results to real-world scenarios with varying contexts and individuals' behaviors can be challenging.

Limitations:

Human-Robot Interaction (HRI): Despite efforts to create engaging and non-threatening robots, individual preferences and responses to HRI may vary significantly among those with ASD. For instance, while some may engage well with the robots, others may not find them beneficial or comfortable.

Dependency and Overreliance: There's a risk of individuals becoming overly dependent on robots for social interaction, potentially hindering their natural social development or interactions with humans.

Incorporating robotics into ASD interventions requires a delicate balance between technological advancements, ethical considerations, and the individual needs and preferences of those with ASD. Continuous evaluation, adaptation, and ethical oversight are essential to ensure the responsible and beneficial integration of robotics in these interventions.

Objective 4

To propose potential future research directions, technological advancements, and best practices for utilizing robotics as an integral component of intervention strategies for ASD

Utilizing robotics as an integral part of intervention strategies for Autism Spectrum Disorder (ASD) requires a multifaceted approach. Future research should delve into longitudinal studies, diversity considerations, real-world applications, and ethical frameworks to comprehend the long-term impact, personalize interventions, and ensure responsible use. Technological advancements need to focus on adaptive AI, sensory integration, emotional intelligence, and natural language processing to create robots capable of tailored, responsive interactions with individuals on the spectrum. Best practices involve collaborative design, user-centered approaches, continuous evaluation, and comprehensive training to optimize the usability and effectiveness of robotic interventions. Integrating these efforts through interdisciplinary collaboration and evidence-based practices ensures accessibility, affordability, and ethical

implementation, maximizing the potential of robotics in fostering social, communication, and behavioural enhancements for those with ASD.

Summary of Findings:

The exploration of robotics in interventions for Autism Spectrum Disorder (ASD) unveils a diverse landscape of promising innovations. Robota, standing at 50 cm and weighing 500 grams, showcased its capacity for intricate interactions, engaging children in imitation games and fostering evident enjoyment among participants. Kaspar, in its various iterations, offered unique opportunities for physical manipulation by ASD children without damage, promoting interaction and exploration. Meanwhile, Nao's modularity, boasting 25 degrees of freedom, demonstrated its effectiveness in improving social interactions, acting as both a role model and a facilitator for therapeutic engagement. Milo, with its advanced technical components and emotion recognition, exhibited potential in cultivating social skills and garnering high engagement rates, especially among higher-functioning children. Lastly, QTrobot, equipped with 12 degrees of freedom, engaged ASD children below the age of 5 in game-based interventions, showcasing a longer gaze duration and the ability to facilitate triangular interactions between the child, therapist, and the robot. These collective findings underscore the multifaceted potential of robotics in ASD interventions, offering avenues for improved engagement, skill development, and emotional support among individuals on the spectrum.

The significance of integrating robotics into therapeutic settings for individuals with ASD:

The integration of robotics into therapeutic settings for individuals with Autism Spectrum Disorder (ASD) presents a profound paradigm shift with multifaceted implications. These technologies offer a unique bridge between traditional therapy and modern advancements, providing a tailored, interactive, and consistent approach for individuals on the spectrum. Robotics, exemplified by systems like Nao, Kaspar, Robota, Milo, and QTrobot, facilitate engagement through structured interactions, aiding in skill development, socialization, and emotional support. Their adaptability, modularity, and ability to foster imitation games create a safe and predictable environment, crucial for individuals with ASD who thrive on routine and predictability. Moreover, robots like Milo, with advanced technical components and emotion recognition, enable personalized interactions that respond to emotional cues, fostering empathy and understanding. This integration not only augments therapeutic interventions but also

addresses the shortage of resources in traditional therapy, providing consistent and reliable support, ultimately empowering individuals with ASD to navigate social interactions and daily challenges more confidently.

Final Remarks on the promising avenues and challenges in utilizing robotics for ASD interventions:

The burgeoning landscape of robotics in Autism Spectrum Disorder (ASD) interventions heralds a promising frontier, yet it navigates a terrain fraught with challenges. These technologies, epitomized by Nao, Kaspar, Robota, Milo, and QTrobot, offer unparalleled potential in fostering engagement, skill development, and emotional support among individuals on the spectrum. However, their integration poses challenges related to cost, accessibility, and cultural acceptance. The intricate designs and functionalities of these robots often come with a hefty price tag, limiting widespread access to such interventions. Moreover, cultural stigmas and apprehensions about technology-driven therapies might impede their adoption in certain communities. Additionally, ensuring ethical and responsible use of robotics in therapy, along with establishing guidelines for privacy and data security, remains paramount. Yet, the strides made in refining these robotic systems underscore a transformative trajectory, offering hope for improved therapeutic outcomes and a more inclusive future for individuals with ASD. Addressing these challenges while harnessing the potential of robotics can pave the way for a more comprehensive, accessible, and impactful approach to ASD interventions.

Suggestions:

To advance the field of robotics in Autism Spectrum Disorder (ASD) interventions, a comprehensive approach is needed. Continued research and development should focus on refining existing robotic systems like Nao, Kaspar, Robota, Milo, and QTrobot, aiming to enhance their efficacy, affordability, and accessibility. Establishing ethical guidelines and standards is paramount to ensure responsible use and safeguard individual rights, encompassing aspects such as data privacy and cultural sensitivities. Moreover, initiatives should provide training for professionals and caregivers, facilitating optimal implementation and utilization of these technologies. Longitudinal studies must monitor the sustained impact of robotic interventions on individuals with ASD. Finally, fostering collaboration and knowledge sharing

among stakeholders can drive the development of standardized protocols, maximizing the potential benefits of robotics in supporting individuals with ASD across various settings.

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Conflict of Interest:

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References:

- *Alghamdi, Maha, NouraAlhakbani, and Abeer Al-Nafjan. 2023. "Assessing the Potential of Robotics Technology for Enhancing Educational for Children with Autism Spectrum Disorder" Behavioral Sciences 13, no. 7: 598. https://doi.org/10.3390/bs13070598*
- *Amirova, A., Rakhymbayeva, N., Yadollahi, E., Sandygulova, A., &Johal, W. (2021). 10 Years of Human-NAO Interaction Research: A Scoping Review. Frontiers in Robotics and AI. Vol. 8. https://doi.org/10.3389/frobt.2021.744526*
- *Awal, Abdul. (2023). Ethics in Research: A Comparative Study of Benefits and Limitations. 7. 10-14.*
- *B Scassellati, H Admoni, M Matarić (2012). Robots for use in autism research. Annual review of biomedical engineering, vol 14, pages: 275-294*
- *Chung, E.Yh. Robotic Intervention Program for Enhancement of Social Engagement among Children with Autism Spectrum Disorder. J DevPhysDisabil 31, 419–434 (2019). https://doi.org/10.1007/s10882-018-9651-8*
- *Dautenhahn, K., &Billard, A. (2002). Games Children with Autism Can Play With Robota, a Humanoid Robotic Doll. In S. Keates, P. J. Clarkson, P. M. Langdon, & P. Robinson (Eds.), Universal Access and Assistive Technology (Chapter Number). In Proc. 1st Cambridge Workshop on Universal Access and Assistive Technology (CWUAAT). London: Springer-Verlag.*
- *Diehl, J. J., Schmitt, L. M., Villano, M., & Crowell, C. R. (2012). The Clinical Use of Robots for Individuals with Autism Spectrum Disorders: A Critical Review. Research in autism spectrum disorders, 6(1), 249–262. https://doi.org/10.1016/j.rasd.2011.05.006*
- *Elendu, C., Amaechi, D. C. ., Elendu, T. C., Jingwa, K. A., Okoye, O. K., John Okah, M., Ladele, J. A., Farah, A. H., &Alimi, H. A. (2023). Ethical implications of AI and robotics in healthcare: A review. Medicine, 102(50), e36671. https://doi.org/10.1097/MD.0000000000036671*
- *Gitimoghaddam, M., Chichkine, N., McArthur, L., Sangha, S. S., & Symington, V. (2022). Applied Behavior Analysis in Children and Youth with Autism Spectrum Disorders: A Scoping Review. PerspectBehavSci, 45(3), 521–557. https://doi.org/10.1007/s40614-022-00338-x*
- *https://autism-light.blogspot.com/2016/01/milo-robot.html*
- *https://educationonline.ku.edu/community/social-difficulties-in-autism-spectrum-disorder*
- *https://en.wikipedia.org/wiki/History_of_robots*
- *https://en.wikipedia.org/wiki/Nao_(robot)*
- *https://luxai.com/blog/validating-clinical-effectiveness-of-at-home-early-intervention-for-autistic-children-by-social-robot-qtrobot/*
- *https://robots.ros.org/qtrobot/*
- *https://robotsguide.com/robots/kaspar*

- *https://robotsguide.com/robots/qtrobot/*
- *https://sciencebusiness.technewslit.com/?p=26532*
- *https://www.autismparentingmagazine.com/repetitive-behavior-autism-children/*
- *https://www.cdc.gov/ncbddd/autism/data.html*
- *https://www.cdc.gov/ncbddd/autism/features/new-autism-spectrum-disorder-report.html*
- *https://www.eduporium.com/blog/how-the-robokind-robots-for-autism-and-sel-make-an-impact/*
- *https://www.herts.ac.uk/kaspar/impact-of-kaspar.*
- *https://www.prnewswire.com/news-releases/advanced-robotics-meet-milo-an-intelligent-robot-that-is-really-good-at-teaching-children-with-autism-social-skills-562351711.html*
- *https://www.robokind.com/recess/how-a-robot-named-milo-helps-special-needs-students-in-pendleton-sc-learn*
- *https://www.roboticsacademy.com.au/history-of-robots/#:~:text=The%20first%20electronic%20autonomous%20robots,England%2C%20in%201948%20and%201949.*
- *https://www.westernsydney.edu.au/__data/assets/pdf_file/0006/1254786/Literature_review_purpose.pdf*
- *https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders?gclid=EAIaIQobChMIvKHn_ISvgwMVn6VaBR1dawRZEAAYASAAEgLk9fD_BwE*
- *Kewalramani, S., Allen, KA., Leif, E. et al. (2023). A Scoping Review of the Use of Robotics Technologies for Supporting Social-Emotional Learning in Children with Autism. J Autism DevDisord. https://doi.org/10.1007/s10803-023-06193-2*
- *Kouroupa, A., Laws, K. R., Irvine, K., Mengoni, S. E., Baird, A., & Sharma, S. (2022). The use of social robots with children and young people on the autism spectrum: A systematic review and meta-analysis. PloS one, 17(6), e0269800. https://doi.org/10.1371/journal.pone.0269800*
- *Loftus, Y. (2023, December 29). Language Processing Disorder: Is It Linked to Autism? https://www.autismparentingmagazine.com/autism-language-processing-disorders/*
- *Maenner MJ, Warren Z, Williams AR, et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. MMWR SurveillSumm 2023;72(No. SS-2):1–14. DOI: http://dx.doi.org/10.15585/mmwr.ss7202a1*
- *Malhotra, S., Rajender, G., Bhatia, M. S., & Singh, T. B. (2010). Effects of picture exchange communication system on communication and behavioral anomalies in autism. Indian journal of psychological medicine, 32(2), 141–143. https://doi.org/10.4103/0253-7176.78513*
- *Reid, Sheldon (2023) https://www.helpguide.org/articles/autism-learning-disabilities/autism-treatments-therapies- interventions.htm#:~:text=everything%20at%20once.-,Behavior%20therapy,connection%20between%20behaviors%20and%20consequences*
- *Sa'adah. A, Junaidi.R.A. (2021). Implementation of TEACCH in learning for students with autism spectrum disorders in special school. Journal of Disability, 1 (2), 45 - 56.*
- *Saad, M A E (2016). The Effectiveness of Social Stories among children and adolescents with Autism Spectrum Disorders: Meta- Analysis International Journal of Psycho-Educational Sciences, Volume (5), Issue (2), September, 2016*
- *Schadenberg, B. R., Reidsma, D., Heylen, D. K. J., & Evers, V. (2020). Differences in Spontaneous Interactions of Autistic Children in an Interaction With an Adult and Humanoid Robot. Frontiers in Robotics and AI, 7, Article 28. https://doi.org/10.3389/frobt.2020.00028*
- *Teixeira, Vitor& Lai, Michael. (2021). The use Robotics in the intervention with children with ASD in Macao: An exploratory study with Milo. 1-26. 10.34632/investigacaoeducacional.2021.10041.*

- *Waltz, E. (2018). Therapy Robot Teaches Social Skills to Children With Autism. IEEE Spectrum. https://spectrum.ieee.org/automaton/robotics/robotics-hardware/therapy-robot-teaches-social-skills-to-children-with-autism*
- *Werry, I.P., Dautenhahn, K., Ogden, B., &Harwin, W.S. (2001). Can social interaction skills be taught by a social agent? The role of a robotic mediator in Autism Therapy. Cognitive Technology.*
- *Wood, L. J., Zaraki, A., Robins, B., &Dautenhahn, K. (2019). Developing Kaspar: A Humanoid Robot for Children with Autism. International Journal of Social Robotics, 13, 491–508. https://doi.org/10.1007/s12369-019-00563-6*

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THE FUNCTION OF MULTIMEDIA PACKAGE IN ENHANCING READING PROFICIENCY

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Abstract

As multimedia package involves a variety of visual and auditory elements into learning resources, it is essential for improving language reading proficiency. This thematic abstract looks into how language learning experiences are improved when multimedia elements are carefully integrated into packaging. Multimedia package engages students on multiple sensory levels and creates a more fully engaged and effective learning environment by combining text with images, videos, and interactive elements. Info graphics and illustrations are examples of visual aids that act as contextual clues to help with retention of vocabulary and comprehension. Furthermore, learners are exposed to actual language through audio improvements like pronunciation guides and interactive dialogues, which help them, improve their auditory skills. The engaging and inclusive nature of learning is enhanced by the dynamic combination of these multimedia elements, which not only grabs attention but also adapts to different learning styles. This abstract promotes a comprehensive approach to language development that goes beyond usual text-based learning by effectively using multimedia packaging as a powerful tool to enhance reading materials.

Keywords: *multimedia package, reading proficiency, visual and auditory elements, auditory skills, different learning styles*

Introduction

The definition of multimedia, according to the Oxford Dictionary, is "using more than one medium of expression or communication." We can see that our world is changing quickly because of the development of technology, and it is vital that we adapt to these changes. The traditional approach, the development of multimedia helps to ease the development of reading skills and may even help students improve them. Teaching reading is difficult and makes students boring and hard to learn. These days, multimedia cannot be changed. This is due to the fact that it is overflowing with many parts, including text, images, music, video, and animation. We use each of these components on a daily basis. Although it can be used in many different

fields, its contribution to language instruction is important. Multimedia is actually redefining the concept of learning itself. By adding a variety of elements to make learning more dynamic and effective, multimedia significantly enhances learning for students as opposed to limiting themselves to a parametric appearance, such as reading text from a book. Technology has been used to both support and improve language learning, according to the American Council on the Teaching of Foreign Languages (ACTFL, 2013). It assists educators in helping students fulfil their reading proficiency goals in a more effective style.

The use of multimedia packaging alongside of traditional text-based educational materials is revolutionary. It overcomes the limitations of traditional approaches by combining a variety of visual and auditory components, providing a more captivating and immersive learning environment. Multimedia components, like pictures, videos, and interactive elements, are used to support textual content contextually as well as using learners' attention. This combination not only allows a range of learning styles but also produces a lively atmosphere that promotes efficient understanding and memory.

Value of Multimedia

"According to Freitas & Kouroupetroglou (2008), speech technologies and their applications that help people with low vision or blindness access printed or electronic information, daily activities, and public and private facilities are presented. The authors believe that one of the most significant ways to help people who are blind or have low vision in the state-of-the-art accessibility field is speech communication". "Computer technology can help children with special needs receive an education in a regular classroom. Although many students' disabilities could be overcome by computer technology, before more widespread use of the technology can become a reality, obstacles like cost and insufficient training must be removed" Hasselbring & Glaser (2000). "Klesch et.al. (1997) state that the development of the multimedia package Territory Voices is a teaching/learning tool that supports the learning of initial language literacy skills through a combination of text-based and computer-based activities". Multimedia has grown essential for teaching language and reading skills because of its rapid development. Multimedia is essential because the monotonous chalk and talk approach is out of date. Since the students are second-language learners, they must practice and create a lot to develop their reading skills, but multimedia makes it simpler for them to do that.

Colourful graphics and useful diagrams are a few examples of visual aids which act as catalysts for the understanding of difficult language concepts, helping students learn specifics that may be difficult to understand through text alone. Additionally, by showing students to practical usage of languages through interactive dialogues and pronunciation guides, audio elements help improve their auditory skills and foster a closer relationship with the language.

Elements of Multimedia

Multimedia is a form of communication that incorporates multiple types of media content, such as text, audio, images, animations, and videos, to convey information or tell a story. Multimedia elements come collectively to produce a complex and captivating user experience.

Text

The most basic element of multimedia is text, which is also most simple to use. When compared with the other components, it can have the biggest influence on the multimedia interaction's quality. It is the most fundamental and efficient form of multimodal communication. Text is used as slogans, subtitles, and headlines. Its objective is to communicate particular information or support information obtained from other media. Text types, sizes, colours, and background colours are all used in it. A font is a group of characters from a specific style family that are all the same size and style. Text usually used to convey important information. This is because, in contrast with other forms of multimedia, texts are simpler to understand. Texts are the most often used element in education. However, the word can be much more engaging when multimedia text is used as opposed to plain text, improving the effectiveness of learning. To stimulate the intellectual abilities of the students, more colours can be used for the background and text. In order to draw students in, the words written in chalk in a traditional classroom could be changed to more colourful texts and beautiful backgrounds.

Graphics

Graphics include pictures, photos, illustrations, drawings, clip art, icons, and any other non-textual content found on a website or in social media. Students' comprehension will improve when reading comprehension skills are imparted through graphics. Students' memory skills will improve because images are simple to remember and understand. This is because of the simple

fact that images require a great deal of cognitive abilities, including colour, form, line, dimension, and creativity. This will help the students in observing what they have learned openly.

GIFs and Other Forms of Animation

Graphic image files, or GIFs as it is short for graphic image files, are small files that show a single image or a fast-moving series of images to simulate motion. The GIFs' repetition aids in the students' retention and recollection of the subject matter. An animation is a collection of images combined to create the illusion of movement. Digital animation, both 2D and 3D, is used in multimedia. Videos are not the same as animations. This is because animation usually comes from drawings, whereas video is captured from actual events. Only a few animation programmes, including Adobe Flash, Authorware, and Director, are utilised in the field of education. Students can use this software to present a project that they including by using their own ideas and creativity. This enhances their creativity while making learning enjoyable. Additionally, animation can make learning easier and faster for students. The development of reading skills can be made much simpler, quicker, and more enjoyable with the help of computer animation.

Audio

This multimedia application makes use of music, sound effects, recorded narration, and dialogue. It refers to these as the sound or audio elements. The ability for students to record their learning makes it an effective tool that allows them to engage with the teacher's course materials whenever and wherever they choose. The boring approach of the teacher talking and writing on the board could be replaced with engaging background music and an effective audio recording. When audio is included into a PowerPoint presentation, it improves student focus and comprehension. Since physically challenged students are unable to read, it greatly helps in their ability to listen and understand.

Video

Multiple frames of still images are combined to create moving images and sound in a visual multimedia application designated video. It can give students visual stimulation to improve their comprehension of what they are learning. Without allowing the classroom,

students are exposed to the outdoors. It's important for them to develop their abilities and obtain more experience. With the use of videos, students could easily comprehend and be able to understand abstract and complex reading concepts. A report to a 2015 study by the software company Kaltura, 93% of teachers think that using videos for instruction improves the classroom experience. When native users' videos teach reading skills, it gives students a chance to practise pronouncing words correctly. Videos that were created with students' visualisation in mind also help them keep the information for a lifetime.

Benefits of Multimedia for Improving Reading Ability

The integration of multimedia in developing reading skills offers a multitude of advantages, transforming traditional approaches to literacy education.

- **Students are Stimulated and Motivated by Multimedia**

Multimedia instruction in reading skills takes diversity in the classroom a step further and improves the process of achieving it. It encourages students to become motivated and interested in developing their reading abilities. It gives students a variety of chances to make learning enjoyable by presenting the same material in different manners. When using multimedia to improve reading comprehension, students become active participants rather than recipients of information. Language lessons are no longer boring and teacher-centered and evolve into more dynamic in every way.

- **It has become Easier to Evaluate Students' Progress**

By using computer-programmed activities to monitor students' performance, teachers can save time by not having to spend as much effort assessing each and every student's performance. Assessments that are regularly given help those who are slow learners in practicing and overcoming challenges. Unconsciously, the students are being evaluated, helping in their advancement.

- **Encourages Independent Learning**

Students can learn from a new perspective and become more independent learners through multimedia. The foster students participate more actively in the learning process, which can be challenging in a traditional, boring classroom. By using technology with features like voice recognition and interactive multimedia exercises, students can improve their reading

abilities at their own speed. It gives every student the chance to take part in every activity. It addresses diversity in the classroom and facilitates the development of reading abilities.

- **An Increase in the Level of the Retention**

With words and videos, the use of images aids in the development of the cognitive domain, which boosts student retention. Students' involvement in the learning process ensures better retention of the content. Students enjoy active learning, which makes it easier for them to remember evidence through more conscious effort.

- **Gives Support to the Educator**

The students being studied language, so it can be very challenging for the teacher to provide constant support. However, multimedia can help with repetition exercises and speaking practice. To keep students more engaged, teachers can help them improve their reading skills by using a variety of apps or reliable online resources. It provides teachers a great deal of time. Multimedia makes learning more enjoyable, affects the "teacher organised" teaching model, and significantly boosts student productivity in the classroom. A teacher's role is to facilitate learning and provide frameworks for students' performance. In this way, teachers are refraining from forcing knowledge into students' minds and forcing them to take in it passively.

Conclusion

The study's conclusion emphasises how multimedia can have a transformative effect on the growth of English language reading skills. Multimedia becomes an effective tool for improving reading comprehension, engagement, and overall skill through the smooth transition of text, images, audio, and interactive elements. Additionally, because multimedia is including and encouraging, it fosters a positive learning environment by drawing students' interests and satisfying a range of needs. The study highlights how interactive multimedia can foster critical thinking skills in along with reading comprehension as students interact with interactive elements that require analysis and decision-making.

Adopting innovative approaches is essential as education keeps changing, and multimedia develops as an outstanding example of advancement in literacy training. The study's conclusions support the intentional inclusion of multimedia elements to educational resources in order to create a comprehensive and dynamic learning environment that goes beyond the limits

imposed by traditional text-based methods. By doing this, teachers and students can both take advantage of multimedia's full potential to uncover the language's rich textile and create the foundation for a more successful and enjoyable journey towards English reading proficiency.

Reference:

Al-Seghayer, K. (2005). The effect of multimedia annotation modes on L2 vocabulary acquisition. Research in technology and second language education: Developments and directions, 3, 133-151.

Blanco, H. (2007). A case study of language learning in a multimedia Spanish class environment in an Upward Bound program (Doctoral dissertation, Ohio University).

Freitas, D., & Kouroupetroglou, G. (2008). Speech technologies for blind and low vision persons. Technology and Disability, 20(2), 135-156.

Hasselbring, T. S., & Glaser, C. H. W. (2000). Use of computer technology to help students with special needs. The future of children, 102-122.

Klesch, M., Morgan, D., & Klesch, F. (1997). Territory voices: A multimedia package to assist English as a second language acquisition by indigenous adults. Ngoonjook, (13), 88-116.

Vanderplank, R. (2016). Captioned media in foreign language learning and teaching: Subtitles for the deaf and hard-of-hearing as tools for language learning. Springer.

Victori, M., & Lockhart, W. (1995). Enhancing metacognition in self-directed language learning. System, 23(2), 223-234.

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EXPLORING THE CHRONOTYPE: IMPLICATIONS FOR HEALTH, WELL-BEING, AND DAILY FUNCTIONING: A THEMATIC ESSAY

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Abstract

Are you an early bird or a night owl? Unlocking your chronotype secret can be the key in boosting your energy and making the most of your day. The term chronotype was originally proposed in 1974, referring to "an organism's temporal organization" (Ehret, 1974). Chronotype of an individual refers to the specific entrainment and/or activity-rest preference of that individual in a given 24-hour day (Adan et al, 2012). By understanding your natural sleep-wake preferences, you can schedule your work, exercise, and relaxation for peak performance. The preference for morning or evening is largely influenced by genetic factors, but can also be influenced by environmental factors such as light exposure, meal timing and exercise habits etc., this present study is a thematic analysis on Exploring the Chronotype: Implications for Health, Well-being, and Daily Functioning. This study focuses on the importance of understanding chronotypes of people for its implication for health, well-being, and its role on daily functioning.

Keywords: *Chronotype, Circadian Rhythm, Sleep-wake Preference*

Introduction

In recent years, there has been notable interest in examining chronotypes, which refer to an individual's innate biological inclination influencing their sleep-wake cycles. The term chronotype, commonly known as an individual's "internal clock," dictates whether they lean towards being a morning person, thriving in the early hours, or a night person, achieving peak performance later in the day. Chronotype of an individual refers to the specific entrainment and/or activity-rest preference of that individual in a given 24-hour day (Adan et al, 2012). Recognizing the intricacies of chronotypes among people holds vital importance, given the pivotal transitions they experience in areas such as academics, careers, social engagements, and personal growth during their life stages.This thematic essay embarks on an exploration of chronotypes, delving into the complex dynamics between biological rhythms and external influences shaping their daily habits, efficiency, psychological well-being, and general health.

By examining relevant research articles, we explore the intricate interplay between biological rhythms and external factors shaping people' chronotypes and the consequences for their lives.

Methodology

This thematic essay was analyzing various research articles written and published by number of researchers on the selected variable i.e. chronotype. The researcher gone through number of articles available in Google Scholar, Shodhganga, Eric etc.,

Biological Basis of Chronotype

The preference for morning or evening is largely influenced by both genetic and environmental factors. The biological basis of chronotype involves several key mechanisms to deal with. The foremost aspect is Circadian rhythm; The body's internal clock, overseen by the suprachiasmatic nucleus (SCN) located in the hypothalamus, orchestrates circadian rhythms. These rhythms, spanning approximately 24 hours, impact diverse physiological and behavioral functions, such as sleep-wake cycles. Study took by Roenneberg et al. (2012) highlights the genetic underpinnings of chronotypes, emphasizing the role of specific clock genes in regulating circadian rhythms. Genetic variances can impact the operation of circadian genes, potentially shaping an individual's chronotype. People may inherit their chronotype tendencies, predisposing them to either morningness or eveningness. This biological basis influences their sleep-wake cycles and preferences for activity timing.

Environmental Influences and Lifestyle Choices

Environmental influences and lifestyle choices play a significant role in shifting an individual's chronotype over time. Factors such as exposure to light, social commitments, work schedules, and personal habits can all contribute to changes in sleep-wake patterns and preferences. Studies, such as the work of Adan et al. (2012), underscore the impact of environmental cues and lifestyle factors on shaping people' chronotypes.

For example, prolonged exposure to artificial light, particularly in the evening, can disrupt the body's natural circadian rhythms, leading to a delayed sleep onset and a shift towards a later chronotype. Kantermann et.al (2015) on their study examined the impact of eveningness chronotype and evening light exposure on eating time, particularly among rotating shift workers and found potentially worsening circadian misalignment among the taken samples.

Similarly, irregular sleep schedules, such as staying up late on weekends or during periods of heightened stress, can further exacerbate this shift by altering the timing of melatonin secretion and the functioning of circadian genes. Melatonin levels typically rise in the evening, signaling the body to prepare for sleep, and decline in the morning. Variations in the timing of melatonin secretion can contribute to differences in chronotype.

Social obligations, academic schedules, and technological habits can disrupt natural sleep patterns, leading to chronotype misalignment. Excessive screen time before bedtime, irregular sleep schedules, and exposure to artificial light at night contribute to shifts in chronotype preferences among people.

Additionally, lifestyle factors like diet, exercise, and stress management can impact sleep quality and overall circadian regulation, further influencing chronotype preferences. Overall, the interplay between environmental influences and lifestyle choices can significantly shape an individual's chronotype, highlighting the importance of maintaining healthy sleep habits and managing external factors to promote optimal sleep-wake patterns.

Chronotype Misalignment and Health Consequences

Chronotype misalignment, where an individual's internal biological clock is out of sync with their social or environmental demands, can have significant health consequences. The consequences of chronotype misalignment on people' health and well-being are well-documented. According to research by Wong et al. (2015), eveningness chronotype is associated with higher rates of depression, anxiety, and substance abuse among people. Research has linked chronotype misalignment with an increased risk of mental health issues such as depression, anxiety, and bipolar disorder. Hidalgo et.al (2009) identified the association between evening typology and depressive symptoms in healthy samples by a cross sectional study. Irregular eating patterns and late-night eating, often associated with evening chronotypes, can disrupt metabolism and lead to weight gain and insulin resistance. Study carried out by Deanna et.al (2012) brings a better understanding of the role of the circadian system in weight regulation provide important implications for combating the obesity epidemic facing the human population nowadays. Overall, chronotype misalignment can significantly impair an individual's quality of life, leading to chronic fatigue, decreased productivity, and difficulties in maintaining social and occupational functioning.

Chronotype, Academic Performance and Career Success

Play of chronotype in academic performance and career success has been recognized as an essential factor influencing individuals' productivity, engagement, and overall well-being. Individuals with a chronotype aligned with their academic schedules (e.g., morning-oriented students attending morning classes) tend to perform better academically. Roeser et al (2012) investigates the relationship between chronotype, sleep disturbances, and academic achievement in adolescents and highlights the importance of addressing sleep problems in improving academic performance among students with different chronotypes.

Students with evening chronotypes may struggle to attend early morning classes or participate actively in academic activities scheduled during their non-preferred times. This can lead to higher rates of absenteeism, reduced engagement, and decreased academic achievement. Giannotti et.al (2002) stressed the importance of considering individual differences in sleep-wake patterns in educational settings. Addressing the diversity in the sleep wake cycle educational implications for student can improve concentration, alertness, and cognitive function during peak hours which may lead to more effective studying and higher grades. Chronotype influences job performance by affecting individuals' energy levels, cognitive abilities, and interpersonal skills during working hours. The ability to adapt to the demands of a particular job or career path can be influenced by chronotype. Individuals with a chronotype aligned with their work schedules may find it easier to adjust to job requirements, meet deadlines, and maintain consistent performance levels. Didikoglu (2022) discovered that individuals with an evening chronotype face challenges in terms of occupational, educational, and health outcomes as they age, primarily due to their susceptibility to disturbances in circadian rhythms and sleep patterns. Individuals who can work during their peak hours of alertness and productivity are more likely to feel satisfied with their jobs and experience greater career success over time.

Interventions and Strategies for Chronotype Optimization

Various interventions and strategies have been proposed to optimize chronotype alignment and promote better sleep habits of people. Disturbances in circadian rhythms lead to sleep disruption and affect both quality of life and overall functioning.Cognitive Behavioral therapy for insomnia (CBT-I), as studied by Espie et al. (2014), has shown efficacy in treating sleep disorders and improving chronotype consistency.Faulkner (2019) suggest a need for

additional refinement and testing of light-based interventions aimed at enhancing sleep quality in psychiatric disordersincludes better assessment and specification of sleep-related issues. Additionally, lifestyle modifications, such as maintaining a regular sleep schedule, minimizing screen exposure before bedtime, and creating a conducive sleep environment, can help people to synchronize their internal clocks with external demands.Providing education about the impact of chronotype on health and well-being can encourage individuals to prioritize sleep and seek support when needed.It's important to consult with healthcare professionals or sleep specialists for personalized guidance and support in managing sleep-related issues.

Conclusion

In summary, the chronotype of individuals serves as a fundamental determinant in influencing their health, well-being, and everyday functioning. A comprehensive grasp of the biological foundations, environmental impacts, and resultant health implications stemming from chronotype preferences is essential in tackling the distinct challenges encountered by individuals across various demographics. Through the implementation of tailored interventions and lifestyle adjustments, we possess the capability to foster an optimal alignment of chronotypes, thus empowering individuals to experience an enriched quality of life and attain greater success in their future endeavors. This holistic approach underscores the significance of recognizing and addressing the diverse needs arising from individual chronotypes, paving the way for enhanced health outcomes and overall societal well-being.

References

- *Adan, A., Archer, S. N., Hidalgo, M. P., Di Milia, L., Natale, V., & Randler, C. (2012). Circadian typology: a comprehensive review. Chronobiology international, 29(9), 1153-1175.*
- *Arble, D. M., Bass, J., Laposky, A. D., Vitaterna, M. H., & Turek, F. W. (2009). Circadian timing of food intake contributes to weight gain. Obesity, 17(11), 2100-2102.*
- *Didikoglu, A., Walker, B., Maharani, A., Pendleton, N., Canal, M. M., Payton, A., ... & Brown, T. (2022). Associations between chronotype and employment status in a longitudinal study of an elderly population. Chronobiology International, 39(8), 1118-1131.*
- *Ehret, C.F. (1974). "The sense of time: evidence for its molecular basis in the eukaryotic gene-action system." Advances in biological and medical physics, 15, 47-77.*
- *Espie, C. A., Kyle, S. D., Hames, P., Gardani, M., Fleming, L., & Cape, J. (2014). The Sleep Condition Indicator: a clinical screening tool to evaluate insomnia disorder. BMJ open, 4(3).*
- *Faulkner, S. M., Bee, P. E., Meyer, N., Dijk, D. J., & Drake, R. J. (2019). Light therapies to improve sleep in intrinsic circadian rhythm sleep disorders and neuro-psychiatric illness: A systematic review and meta-analysis. Sleep medicine reviews, 46, 108-123.*

- *Giannotti, F., Cortesi, F., Sebastiani, T., & Ottaviano, S. (2002). Circadian preference, sleep and daytime behaviour in adolescence. Journal of sleep research, 11(3), 191-199.*
- *Hidalgo, M. P., Caumo, W., Posser, M., Coccaro, S. B., Camozzato, A. L., & Chaves, M. L. F. (2009). Relationship between depressive mood and chronotype in healthy subjects. Psychiatry and clinical neurosciences, 63(3), 283-290.*
- *Kantermann T, Sung H, Burgess HJ. Comparing the Morningness-Eveningness Questionnaire and Munich ChronoType Questionnaire to the Dim Light Melatonin Onset. Journal of Biological Rhythms. 2015;30(5):449-453. doi:10.1177/0748730415597520*
- *Roenneberg, T. (2012). What is chronotype?. Sleep and biological rhythms, 10, 75-76.*
- *Roeser, K., Obergfell, F., Meule, A., Vögele, C., Schlarb, A. A., & Kübler, A. (2012). Of larks and hearts—morningness/eveningness, heart rate variability and cardiovascular stress response at different times of day. Physiology & behavior, 106(2), 151-157.*

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