COVER

Welcome to the NAYREC-2026

Abstract Book of NAYREC-2026

13th National Young Researchers Conference

(NAYREC-26)

May 21st, 2026

Faculty of Education, Tishk International University, Erbil,

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FOREWORD

This abstract book contains the proceedings of the National Annual Young Researchers' Conference (NAYREC 2025), organized at the Faculty of Education at Tishk International University by the Mathematics Education Department. As an annual academic gathering, NAYREC continues to serve as a dynamic platform for undergraduate and graduate students to present their research, share innovative ideas, and engage in scholarly dialogue across various fields of study.

NAYREC 2025 emphasizes interdisciplinary collaboration and showcases contributions in the areas of Pure and Applied Mathematics and Statistics, English Language and Literature, Education and Science Education Studies, Pure and Applied Physics, Biology and Biomedical Sciences, Computer and Data Science, Chemistry and Chemical Sciences, and Environmental Sciences. The conference is designed to nurture academic growth, encourage critical thinking, and support the development of future researchers.

This year's event has attracted a remarkable level of interest, with over 80 abstracts submitted from students representing more than seven departments and several regional and international universities. The scientific committee thoroughly reviewed each submission to ensure academic integrity, originality, and relevance.

NAYREC plays a vital role in promoting a culture of research among young scholars in the Kurdistan Region of Iraq and beyond. By providing a forum for students to present their final year work in a professional and supportive environment, the conference helps to strengthen academic confidence and foster meaningful collaboration among participants.

We sincerely thank all contributing authors, peer reviewers, session chairs, organizing committee members, and supporting staff for their dedication and commitment to the success of NAYREC 2025. Your efforts reflect the shared goal of advancing academic excellence and empowering the next generation of researchers.

We hope the research presented at NAYREC 2025 will serve as a catalyst for continued inquiry, innovation, and academic achievement.

On behalf of the organizing committee, it is our pleasure to welcome you to the 13th National Young Researchers Conference. This conference aims to bring together researchers, academics, and professionals to exchange ideas and present recent findings in science, education, and technology.

We hope this event provides a valuable platform for collaboration and academic discussion.

Sincerely,

Dr. Venera Ulker
Conference Chair

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PROGRAM

13th National Young Researchers Conference (NAYREC 2026)
Conference Program
May 21st, 2026

Date	Hour	Event
21/05/2026	**8:45-9:30**	Registration
	9:45-10:00	Welcoming Speech by the Host of the Conference, **Miss Jasmin Mahmood**
	10:00-10:05	National Anthem of Iraq and Kurdistan
	10:05-10:10	TIU Promotional Video
	10:10-10:15	Welcome Speech by **Assist. Prof. Dr. Idris Hadi**, Head of the Board of Trustees, TIU
	10:15-10:20	Welcome Speech by **Prof. Dr. Sultan T. Abu-Orabi**, The President, Tishk International University
	10:20-10:25	Welcoming Speech by Dean of the Faculty of Education, **Assist. Prof. Dr. Doğan Özdemir**
	10:25-10:55	Keynote Speaker Speech by **Dr. Pashew Majeed Nuri** entitled "Beyond the algorithm: Why the human educator is the most advanced technology in the classroom."
	10:55-11:00	Awarding Plaquette to the Keynote Speaker by Asst. Prof. Dr. Idris Hadi Salih.
	11:00-11:15	Coffee Break and Networking
	11:15-12:45	I. Concurrent Session
	13:00-14:00	Lunch Break
	14:00-15:30	II. Concurrent Session
	15:30-16:00	Coffee Break and Networking
	16:00-16:30	Closing and Certifying Ceremony- Conference Hall (302)

KEYNOTE SPEAKER

Keynote Speaker

Dr. Pashew M. Nuri

Translation Department, Cihan University – Sulaymaniyah, Kurdistan Region of Iraq

Synopsis

Beyond the Algorithm: Why the Human Educator Is the Most Advanced Technology in the Classroom

This keynote explores the impact of Artificial Intelligence (AI) on contemporary education, focusing on its growing use in teaching, learning, and assessment. It discusses both the opportunities AI offers—such as personalized learning and efficiency—and the challenges it creates, including academic integrity, overreliance on AI tools, data privacy concerns, and the potential decline of critical thinking skills.

Special attention is given to the Kurdistan Region, where AI is increasingly adopted but clear ethical and regulatory frameworks are still developing. The keynote emphasizes the urgent need for institutional guidelines and policy development to ensure responsible and transparent use of AI in education.

The presentation also highlights practical strategies for ethical AI integration, including AI literacy for educators and students, clear rules for academic use, and teaching approaches that promote creativity, critical thinking, and independent learning. It concludes by reaffirming the central role of the human educator as essential for ethical judgment, empathy, and meaningful learning that AI cannot replace.

ABSTRACTS

Comprehensive Review of the use of plants and their Active Compounds in the management and treatment of Rheumatoid ArthritiS

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ABSTRACT

Arthritis is a widespread musculoskeletal disease characterized by joint inflammation and gradual structural damage. Conventional treatments are often limited by long treatment periods and serious systemic side effects. Because of this, medicinal plants and plant-derived compounds have attracted attention as alternative or complementary therapies due to their anti-inflammatory, antioxidant, and immunomodulatory properties. This study reviewed recent research on extracts obtained from leaves, roots, bark, stems, and seeds for their anti-rheumatoid effects. Relevant peer-reviewed English articles published within the last decade were collected from PubMed, Google Scholar, and Scopus using keywords related to arthritis prevalence, symptoms, treatments, anti-inflammatory plants, biological activities, antioxidants, immunomodulation, and mechanisms of action. Findings showed that phytochemicals regulate arthritis through multiple pathways. Compounds such as curcumin and triptolide suppress pro-inflammatory cytokines, while plant extracts reduce oxidative stress, cartilage degradation, and cytokine production. Leaf and seed extracts also inhibit metalloproteinases and neutralize reactive oxygen species because of their strong antioxidant activity. Experimental evidence supports the therapeutic potential of plant-derived compounds in arthritis treatment. However, further clinical studies are necessary to confirm their safety, effectiveness, and appropriate dosage for long-term medical use. These findings highlight the growing importance of natural therapies in developing safer and more effective arthritis treatments.

Keywords: *Arthritis, Phytotherapy, Osteoarthritis, Rheumatoid Arthritis, Anti-inflammatory, Bioactive Compounds, Cartilage Degeneration, Cytokines.*

The Link between perfectionism and anxiety in high-achieving students

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ABSTRACT

This study examines the relationship between perfectionism and anxiety among high-achieving students at Tishk International University. It focuses on key aspects of perfectionism, including high personal students, fear of mistakes, and self- criticism, and how they relate to students' anxiety levels in academic settings. A mix methods approach was used, with data collected through a questionnaire for 48 students. The findings show that many students experience strong perfectionistic tendencies along with moderate to high levels of anxiety, especially before exams and during academic evaluation. The result indicate a positive relationship between maladaptive perfectionism and anxiety, suggesting that higher levels of self-criticism and fear of failure are associated with increased stress. The study highlights the need for educational support to help students manage perfectionism and reduce anxiety.

Keywords: *Perfectionism, Anxiety, High-achieving students, Academic stress, Self-criticism, Fear of failure, Maladaptive perfectionism, Educational support, University students, Academic evaluation.*

The Effect of Organic Fertilizers on the Growth and Physiological Performance of Eggplant (Solanum melongena)

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ABSTRACT

Organic fertilizers are sustainable alternatives or supplements to chemical fertilizers because they improve soil fertility, nutrient availability, and plant growth. This study investigated the effect of selected organic fertilizers on the early growth and physiological performance of eggplant (Solanum melongena) under open-field pot conditions in Erbil, Kurdistan Region of Iraq. Five treatments were used: control soil, sheep manure, pigeon manure, vegetable compost, and chemical fertilizer. The main measured parameters were germination percentage, plant height, and photosynthetic activity. The results showed that the highest germination percentage was recorded in the control treatment (96.7%), followed by chemical fertilizer (95.0%). Among the organic fertilizers, pigeon manure gave the highest germination percentage (88.3%), followed by sheep manure (86.7%) and vegetable compost (80.0%). Plant height results showed that pigeon manure and sheep manure were the most effective treatments for early vegetative growth. At week six, pigeon manure produced the tallest plants, with a mean height of 22.8 cm, followed by sheep manure at 21.6 cm. ANOVA showed a significant difference among treatments, F(4, 20) = 112.62, p lt; 0.001. Physiological measurements also showed that pigeon manure had the highest net photosynthesis rate. Therefore, pigeon manure was the best organic fertilizer for early eggplant growth.

Keywords: *Organic fertilizer; Eggplant; Solanum melongena; Pigeon manure; Sheep manure; Vegetable compost; Plant height; Germination percentage; Photosynthesis rate; Sustainable agriculture.*

Prognostic and Therapeutic Implications of microRNAs on HPV-associated diseases:A Systematic Review

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ABSTRACT

Human papillomavirus is strongly associated with several cancers, particularly cervical cancer and head and neck cancers. Recent studies have shown that microRNAs (miRNAs) play an important role in HPV-associated carcinogenesis by regulating cell proliferation, apoptosis, metastasis, and immune responses. This study aimed to review the prognostic and therapeutic implications of miRNAs in HPV-related diseases through a systematic review of scientific literature obtained from PubMed, Scopus,PRISMA, ScienceDirect, and Google Scholar. The findings showed that several oncogenic miRNAs were overexpressed, while tumor suppressor miRNAs were underexpressed in HPV-related cancers. These abnormal miRNA expression patterns were associated with disease progression, recurrence, metastasis, and resistance to treatment. The study concludes that miRNAs may serve as important prognostic biomarkers and promising therapeutic targets for HPV-related diseases; however, further experimental and clinical studies are required to confirm their practical application in medicine.

Keywords: *Human papillomavirus microRNAs HPV-associated cancers Prognostic biomarkers miRNA-based therapy*

A Comprehensive Review of Medicinal Plants in the Management and Treatment of Postmenupausal osteoporosis

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ABSTRACT

Postmenopausal osteoporosis (PMO) is a major metabolic bone disease characterized by decreased bone mineral density and increased risk of fractures due to estrogen deficiency after menopause. Current pharmacological therapies are accompanied by a number of adverse effects and limitations. Hence, there is an increasing interest in medicinal plants as alternative therapeutic approaches. The purpose of this review is to critically discuss the therapeutic potential of bioactive compounds derived from plants for the management of postmenopausal osteoporosis. Databases including PubMed, Scopus, Google Scholar and ScienceDirect were searched for relevant literature published from 2015 to 2026. The keywords on medicinal plants, bioactive compounds, experimental models and existing clinical studies on PMO were analysed and organized according to plant parts: roots, seeds, leaves, flowers, stems and bark. The results suggest that several plant-derived compounds including phytoestrogens, flavonoids, polyphenols, lignans and isoflavones have beneficial anti-osteoporotic effects by modulating bone remodelling, improving osteoblastic activity, inhibiting osteoclastic bone resorption, antioxidant activity and regulation of inflammatory pathways. Soybean isoflavones, green tea catechins, red clover and Pueraria lobata showed relatively strong evidence for improving bone metabolism and bone mineral density in postmenopausal women. More large-scale clinical studies are needed to verify long-term efficacy and safety.

Keywords:*Postmenopausal osteoporosis, Management, Treatment, Phytoestrogens, Bone Metabolism, Bone Mineral Density, Medicinal Plants, Bioactive Compounds*

Comprehensive review of the use of medicinal plant in management and treatment of migraine

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ABSTRACT

Migraine is one of the most common neurological disorders worldwide and greatly affects daily activities and quality of life. It is characterized by recurrent headaches accompanied by symptoms such as nausea, vomiting, photophobia, and phonophobia. Migraine pathophysiology involves neuroinflammation, oxidative stress, vascular dysfunction, abnormal neurotransmitter activity, and increased release of calcitonin gene-related peptide (CGRP), which plays a major role in pain transmission. Although conventional treatments are effective, they may cause long-term side effects and health risks. Therefore, medicinal plants are increasingly used as complementary and alternative therapies because of their natural origin, affordability, and therapeutic potential. This review evaluated the efficacy, safety, and mechanisms of medicinal plants and their phytochemical compounds in migraine management. Literature was collected from PubMed and Google Scholar, focusing on English-language studies published within the last ten years. Various plant parts, including rhizomes, roots, leaves, bark, seeds, and flowers, were analyzed. Bioactive compounds such as flavonoids, polyphenols, terpenoids, alkaloids, and saponins demonstrated anti-inflammatory, antioxidant, analgesic, and neuroprotective effects. These compounds may reduce CGRP release and oxidative stress, thereby alleviating migraine symptoms. Further clinical studies are needed to confirm their safety and effectiveness in humans.

Keywords: *medicinal plants, migraine, CGRP, phytochemicals, neurological disorders, alternative medicine*

Strategies to Overcome Current Challenges in the Application of CRISPR Technology for Autism Spectrum Disorder (ASD)

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ABSTRACT

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition that affects social communication, behavior, and cognitive function, with no curative treatments currently available. Although CRISPR technology has revolutionized the ability to model and edit disease-associated genes, translating these advances into safe and effective clinical applications for ASD remains a major challenge. This systematic review examines strategies proposed and tested to overcome the main limitations of CRISPR use in ASD. Literature published between 2015 and 2025 was analyzed using PubMed and Google Scholar. Major obstacles include genetic complexity, off-target effects, mosaicism, developmental timing, cell-type specificity, inefficient delivery across the blood–brain barrier, DNA damage from double-strand breaks, limited model translatability, and ethical concerns. Strategies to address these issues include base and prime editing, CRISPR activation (CRISPRa), CRISPR interference (CRISPRi), optimized AAV vectors, gold nanoparticle delivery, and human cerebral organoids. Preclinical studies show promising proof-of-concept results, but findings remain variable, and further long-term safety and efficacy data are required. This review highlights current advances and remaining gaps to support future development of CRISPR-based therapies as a potential treatment option for individuals with ASD and related neurodevelopmental disorders worldwide.

Keywords: *Autism spectrum disorder, Base editing, CRISPR, Gene therapy, Genome editing, Neurodevelopmental disorders, Prime editing.*

CRISPR-Cas9 in Alzheimer's Disease Models: Systematic Review of Therapeutic Promise, Delivery Challenges and Off-target Risks

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ABSTRACT

Alzheimer's disease (AD) is a neurodegenerative disorder and a major global health challenge. Current treatments mainly manage symptoms rather than modifying disease pathology. Therefore, developing a permanent disease-modifying therapy, likely based on gene therapy, is highly needed. Genome-editing approaches such as CRISPR-Cas9 have been used to target important AD-related genes, including APP, PSEN1, PSEN2, APOE, MAPT, and BACE1. This study systematically reviewed CRISPR-Cas9 genome-editing studies to evaluate their therapeutic potential in regulating amyloid-β production, tau progression, and neuronal activity. A systematic review of 48 original articles published between 2015 and 2025 was conducted following PRISMA guidelines. Results showed that CRISPR-Cas9 effectively reduced pathogenic protein accumulation through different methods. Traditional Cas9 nucleases successfully knocked out familial AD genes, while newer variants such as dCas9 repressors and base editors demonstrated improved safety profiles. dCas9-mediated silencing achieved significant gene repression without major genomic edits, chronic neuroinflammation, or brain-volume reduction in MRI analysis. However, challenges remain in delivering CRISPR components to the brain and ensuring long-term viral vector safety. Overall, CRISPR-based therapies show promise for Alzheimer's disease but require further optimization and long-term safety evaluation. Further preclinical and clinical studies are essential to confirm effectiveness, specificity, durability, and safety before widespread therapeutic application globally.

Keywords: *CRISPER – Cas9, Alzheimer's diseases, off target risk, therapeutic outcome, delivery challenges. genome editing.*

The Role of the miR-200 Family in the Molecular Pathogenesis of Gynecological Cancers: A Systematic Review

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ABSTRACT

Gynecological cancers are among the leading causes of morbidity and mortality in women worldwide. Despite advances in diagnosis and treatment, poor prognosis, metastasis, and therapeutic resistance remain major clinical challenges. The miR-200 family, including miR-200a, miR-200b, miR-200c, miR-141, and miR-429, plays important roles in epithelial–mesenchymal transition (EMT), tumor progression, metastasis, and treatment response. This systematic review evaluated the expression patterns, molecular targets, signaling pathways, and clinical significance of the miR-200 family in gynecological cancers. Articles were retrieved from PubMed, Scopus, and Google Scholar databases following PRISMA 2020 guidelines, including original English studies published between 2010 and 2025. A total of 146 studies were included in the final analysis. The findings demonstrated differential expression of miR-200 family members across ovarian, cervical, and endometrial cancers, with ovarian cancer representing the most extensively studied subtype. The miR-200 family was associated with EMT regulation, proliferation, apoptosis, angiogenesis, metastasis, stemness, immune modulation, and chemoresistance through targets including ZEB1, ZEB2, TUBB3, VEGFA, PD-L1, and PI3K/AKT signaling. Restoration of miR-200 expression reduced migration and invasion while enhancing chemosensitivity. Overall, the miR-200 family may serve as a promising diagnostic, prognostic, and therapeutic biomarker in gynecological cancers.

Keywords: *Cervical cancer; Endometrial cancer; Epithelial–mesenchymal transition (EMT); Gynecological cancers; Metastasis; miR-200 family; Molecular pathogenesis; Ovarian cancer.*

The Role of MALAT1 in the Progression and Therapeutic Resistances in Gastrointestinal Cancers: Systematic Review

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ABSTRACT

Gastrointestinal (GI) cancers are a major global health burden due to late diagnosis, limited biomarkers, high metastatic potential, and therapeutic resistance. The long non-coding RNA metastasis-associated lung adenocarcinoma transcript 1 (MALAT1) has emerged as a key regulator of tumor progression and cancer-related signaling pathways in GI malignancies. This systematic review evaluated MALAT1 expression patterns, molecular mechanisms, and clinical significance in GI cancers. A comprehensive search was conducted in PubMed, Google Scholar, and ScienceDirect for studies published between 2011 and 2025. After PRISMA-based screening, 164 studies including in vitro, in vivo, clinical, and genetic data were included. Results showed consistent overexpression of MALAT1 across colorectal, gastric, hepatocellular, pancreatic, and esophageal cancers. Mechanistically, MALAT1 promotes tumor progression through miRNA sponging, epigenetic regulation via the EZH2/PRC2 complex, and activation of PI3K/AKT, Wnt/β-catenin, epithelial–mesenchymal transition, apoptosis, and metastasis pathways. Elevated MALAT1 expression was associated with increased proliferation, invasion, angiogenesis, stemness, metastasis, poor prognosis, and resistance to oxaliplatin, cisplatin, 5-fluorouracil, sorafenib, and gemcitabine. Clinically, it correlated with advanced TNM stage and reduced overall survival. Overall, MALAT1 may serve as a promising diagnostic, prognostic, and therapeutic biomarker in GI cancers, although further clinical validation and standardized detection methods are required before clinical translation.

Keywords: *Biomarker; Gastrointestinal cancers; long non-coding RNA; MALAT1; Progression; therapeutics resistance*

Decoding the Roles of Long Non-Coding RNAs in Colorectal Cancer Progression and Therapeutic Evasion

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ABSTRACT

Colorectal cancer (CRC) is one of the leading causes of cancer-related death worldwide. Long non-coding RNAs (lncRNAs), RNA transcripts longer than 200 nucleotides without protein-coding ability, have emerged as important regulators of CRC progression. This systematic review aimed to investigate the roles of lncRNAs in CRC progression, therapeutic evasion, and their potential as diagnostic and prognostic biomarkers. A systematic review was conducted according to PRISMA guidelines using PubMed, Scopus, and Google Scholar databases. Original research articles published between 2015 and 2025 were included. A total of 36 studies met the inclusion criteria, and 39 lncRNAs associated with CRC were identified. Among them, 26 lncRNAs were upregulated and acted as oncogenes, promoting proliferation, invasion, metastasis, epithelial-to-mesenchymal transition (EMT), and chemoresistance. In contrast, 13 lncRNAs, including MEG3, GAS5, and TUSC7, were downregulated and functioned as tumor suppressors by inhibiting tumor growth and inducing apoptosis. The ceRNA mechanism and signaling pathways such as Wnt/β-catenin, PI3K/AKT/mTOR, and p53 were the most frequently involved molecular mechanisms identified in the included studies. Overall, the findings demonstrate that lncRNAs play a central role in colorectal cancer progression and therapeutic evasion, highlighting their potential as promising diagnostic biomarkers and therapeutic targets for future clinical applications.

Keywords: *Long non-coding RNA; Colorectal cancer; Tumor progression; Oncogene; Tumor suppressor; ceRNA; Metastasis; EMT; Systematic review; Biomarker.*

Pathogenesis and diagnostic implications of microRNAs in HPV-associated diseases

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ABSTRACT

Human papilloma virus (HPV) is one of the most common sexually transmitted viruses worldwide and is strongly associated with several malignancies,particularly cervical cancer. Persistent infection with high-risk HPV genotypes, especially HPV-16 and HPV-18, contributes to carcinogenesis through the activity of viral oncoprotiens E6 and E7 ,which alter host cellular regulatory pathways. Recently,microRNAs, small non-coding RNAs involved in post-transcriptional gene regulation, have emerged as important regulators in HPV-associated pathogenesis and as potential diagnostic biomarkers. Relevant studies were collected from PubMed, Scopus, ScienceDirect, and Google Scholar databases. English-language studies investigating miRNAs in HPV-associated lesions and cancers with confirmed HPV status were included, while duplicates, abstracts, and case reports were excluded. The reviewed studies showed that oncogenic miRNAs such as miR-92a were upregulated, whereas tumor suppressor miRNAs including miR-145, miR-34, miR-218, miR-214, and miR-29a were downregulated in HPV-associated cancers and precancerous lesions. In addition, miR-124-2 and FAM19A4 demonstrated potential as diagnostic and prognostic biomarkers, while circulating miRNAs showed promise as minimally invasive biomarkers. In conclusion, miRNAs play an important role in HPV-associated diseases and may serve as promising biomarkers for diagnosis and prognosis. However, further large-scale studies are needed to confirm their clinical utility.

Keywords: *Human papillomavirus ,microRNAs,HPV pathogenesis,Diagnostic biomarkers, Cervical cancer*

In Silico Pharmacokinetic and ADMET Profiling of Bioactive in Matricaria chamomilla for Pharmacological Application

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ABSTRACT

Matricaria chamomilla is a well known medicinal plant with a rich diversity of bioactive compounds with significant pharmacological potential. However, despite its long history of use and reported biological activities, systematic evaluation on its pharmacokinetic behavior and safety profiles is lacking. The present study is designed to explore the in silico pharmacokinetic and ADMET (Absorption, Distribution, Metabolism, Excretion and Toxicity) profiles of major bioactive compounds of M. chamomilla to identify promising drug-like candidates. Data were collected and reviewed thoroughly from scientific databases and analyzed computationally using different tools like SwissADME and pkCSM. Results showed that M. chamomilla contains a broad range of phytochemicals such as flavonoids, terpenoids, coumarins and phenolic acids, many of which have favorable drug-likeness characteristics. However, some compounds presented problems like variation in absorption, metabolic stability, possible toxicity and bioavailability. In silico predictions identified the compounds with the best pharmacokinetic profiles and therefore most suitable for further drug development. This study provides a comprehensive computational evaluation of the pharmacokinetics and safety profiles of M. chamomilla bioactives. The results provide a useful basis for further experimental validation and support the potential development of safe and effective plant-based therapeutic agents.

Keywords: *Absorption, Distribution, Metabolism, Excretion, Toxicity,In silico, Docking, Flavonoid, Matricaria chamomilla*

Factors Influencing Students' Motivation Toward Learning Biology

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ABSTRACT

Motivation plays a crucial role in impacting students' performance, involvement, and interest in studying biology. Factors like teacher impact, learning setting, and curriculum material are key elements that influence students' drive to learn. This research investigates the elements that impact students' drive to learn biology in undergraduate biology programs. The research employs a quantitative descriptive approach. Data is collected through administering a structured survey via Google Forms to students in the biology department. 87 students took part in the research. The information collected is examined using descriptive statistical methods with the help of Microsoft Excel and SPSS. Results demonstrate that teachers' role in improving student motivation is significant, particularly in terms of encouragement in teaching activities and the provision of clarification. The study recommends using more student-centered teaching methods, strengthening laboratory and collaborative learning activities, and increasing the real-life application of biology concepts to improve students' motivation toward learning biology. Furthermore, students indicate that the biology curriculum is relevant to their future careers, and that the relevance of biology to daily life was average. Therefore, the study illustrates that three variables, namely teacher influence, learning environment and relevance of curriculum significantly influence students' motivation to learn biology.

Keywords: *Motivation, Biology, Learning, Teacher's Role, Curriculum*

Pathogens on Tomatoes: Macroscopic and Microscopic Identification of Human Opportunistic Microorganisms from Erbil markets

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ABSTRACT

Tomatoes are among the most widely consumed vegetables in Erbil city, Kurdistan Region of Iraq, and are frequently eaten raw, making them a potential vehicle for human opportunistic microorganisms. Open-air markets expose tomatoes to significant contamination risks through repeated handling, poor sanitation, dust, insects, and contaminated water. This study aimed to isolate, culture, and identify the opportunistic microorganisms present on the surface of tomatoes sold in open-air markets in Erbil using macroscopic and microscopic identification methods. A total of 15 ripe tomato samples were randomly collected from different market vendors and transported under cool conditions (4–8°C) to the laboratory within two hours. The surface of each tomato was washed with sterile distilled water and the wash liquid was subjected to serial dilutions (10^{-1}–10^{-6}). Samples were inoculated onto five culture media: Nutrient Agar (ISO), MacConkey Agar, Potato Dextrose Agar (PDA), Brain Heart Infusion Agar (BHI), and Sabouraud Dextrose Agar (SDA), then incubated at 37°C for bacteria and 25–30°C for fungi. Colonies were counted, morphologically described, and examined microscopically. Five microbial species were successfully isolated and identified: Klebsiellapneumoniae (33.33%), Candidaspp. (26.67%), Staphylococcusepidermidis (20.00%), Bacillusspp. (13.33%),and Pseudomonasaeruginosa (6.67%). The dominance of Gram-negative organisms, particularly Klebsiella pneumoniae, suggests contamination linked to poor post-harvest hygiene and fecal sources. The presence of Staphylococcus epidermidis and Candida spp. reflects direct contamination through repeated manual handling. These findings confirm that tomatoes from Erbil open markets harbour polymicrobial communities and pose a potential health risk, particularly for vulnerable groups such as the elderly, young children, and immunocompromised individuals. Improved food safety measures, vendor training, and consumer awareness are strongly recommended to reduce the risk of foodborne infections in the Kurdistan Region.

Keywords: *Tomato, Pathogen, microorganisms, MacConkey Agar, Nutrient Agar, Klebsiella pneumoniae, Candida spp., Staphylococcus, vegetables.*

MicroRNAs in Sjögren's Syndrome: Emerging Regulators of Autoimmunity and Glandular Dysfunction: Systematic Review

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ABSTRACT

Sjögren's syndrome is a chronic systemic autoimmune disease that mainly affects the salivary and lacrimal glands, causing dry mouth, dry eyes, and possible systemic complications. Because diagnosis can be delayed and the molecular basis of the disease remains incompletely understood, non-invasive biomarkers are urgently needed. This systematic review examined the role of microRNAs in immune dysregulation and glandular dysfunction in Sjögren's syndrome. Thirty human studies published between 2016 and 2025 were reviewed and synthesized according to sample type, expression pattern, diagnostic value, and related immune pathways. The findings showed widespread microRNA dysregulation in salivary gland tissue, blood, saliva, tears, and immune cell subsets. These changes were mainly linked to type I interferon signalling, B-cell activation, inflammatory cytokine regulation, calcium homeostasis, endoplasmic reticulum stress, and epithelial dysfunction. Several salivary and serum microRNA panels showed promising diagnostic value. Overall, microRNAs appear to be important regulators and potential biomarkers of Sjögren's syndrome, but larger standardized studies are needed before clinical application.

Keywords: *MicroRNAs; Sjögren's syndrome; autoimmunity; glandular dysfunction; biomarker; systematic review*

Undergraduates' Perception of the Impact of Stress on Academic Performance

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ABSTRACT

This study investigates the academic stress and motivation of undergraduate students. It examines the key sources of academic stress and its effects on the motivation and academic success of students. Specifically, the paper explores the academic stress of Tishk International University undergraduate students by means of a quantitative analytical approach. It depicts stress to beregarded as a physiological and psychological response that occurs when people feel that their academic or personal responsibilities exceed their ability to manage them. When students feel overloaded by their responsibilities, expectations, or outside demands from their families or institutions, they experience stress in academic contexts. The data is collected through administering a structured questionnaire through Google Forms to the students of Faculty of Education. 101 students participate in the research and their responses is examined using a statical approach through cleansing by Microsoft Excel and SPSS. Results demonstrate that a considerable number of students experienced moderate to severe academic stress due to exams, assignments, and time management, which may influence their academic achievement. Therefore, academic stress is identified as a critical issue faced by university students.

Keywords: *Stress, Stress Symptoms, Coping Strategies, Academic Achievement, University Students.*

The effective of the Internship Program on Preparing Prospective Science Teachers

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ABSTRACT

This study investigated how the internship program gets future science teachers ready for the real world. The objective was to evaluate how the things students learn during their internship help them become teachers. Wanted to know if it effectively assists them learn how to teach manage a classroom and understand how to teach. A descriptive research method was used and gave students a survey to fill out. A total of 50 students were surveyed who had already finished their internship program to answer the questions. The survey included questions regarding that asked about things like how they could teach if they felt confident when teaching how they planned their lessons and how they interacted with their students in the classroom. The internship program is what the focus was on at to see if it makes a difference, for student teachers. The data they collected was looked at in a way and also in a way that used find out more. What they found out was that the internship program really helped people who wanted to be science teachers. The people in the program said they got better at teaching they felt more sure of themselves when they were in charge of a classroom. They understood what it is really like to work in a school. The internship also helped people use what they learned in school in life so the internship program helped people who wanted to be science teachers and the results showed that the internship program had a significant positive impact, on the preparation of prospective science teachers The study is about teacher education and actual teaching practice. It found out that these initiatives are really important for people who want to become teachers. These programs give them hands-on experience. Help them develop their skills. The study suggests improving these programs. Passive voice can do this by making them longer having mentors to guide the students all the time and evaluating them in a structured way. This will help the students become teachers. The study involved a sample of 50 participants who completed a structured survey. In conclusion, hands-on learning through internships is essential for developing competent science teachers important and These initiatives play a big role, in it.

Keywords: *Teaching Practice - Instructional Practice - Teaching Skills Development – Student Teachers - School Setting*

Fingerprint Lock Door System using Arduino

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ABSTRACT

The concept and development of an Arduino Uno microcontroller-based fingerprint door lock device are described in this thesis. The system uses a controlled electronic door lock mechanism to provide secure entrance to the facility and a fingerprint sensor module to identify people. An Arduino Uno, a fingerprint sensor module, a relay module, a solenoid door lock, and an adapter make up the hardware of this system. An Arduino program will be used as the computer interface to connect the fingerprint sensor. The usability, security, and functioning of the system were tested. The results demonstrate that the system can successfully identify permitted accessors and permit them entry while preventing illegitimate access.

Keywords: *Arduino Uno, Fingerprint Sensor, Biometric Authentication, Access Control System, Electronic Door Lock, Embedded Security System.*

The Impact of Teachers' Digital Competence on Classroom Management at the Secondary Education level

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ABSTRACT

This study examines the relationship between teachers' digital competence and classroom management in technology-rich educational environments. As Information and Communication Technology (ICT) becomes increasingly integrated into education, teachers are expected to use digital tools effectively to support teaching, learning, assessment, and classroom organization. However, many educators continue to face challenges in managing classrooms while maintaining authority and creating positive learning environments. The study explores how teachers' digital competence influences their classroom management practices and identifies the challenges associated with integrating ICT into education. It also investigates the impact of ICT on teachers' authority, student engagement, and socio-emotional learning. The research focuses on primary, secondary, and vocational education teachers and draws on frameworks such as the European Digital Competence Framework for Educators. Previous studies highlight the importance of classroom management in improving student achievement, yet limited research has explored its connection with digital competence. Findings from this study are expected to provide a deeper understanding of how ICT can support effective classroom management while minimizing disruptions. The study also aims to contribute to professional development strategies that help teachers improve their digital competence and adapt to modern educational environments.

Keywords: *Digital competence, classroom management, Information and Communication Technology (ICT), teachers, digital learning, educational technology, learning environment, teacher authority, student engagement,*

Development of an Interactive Digital Planning Copy Book for Educators

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ABSTRACT

We are now in the age of technology and computers. Many hard works have changed to be easier than in the past, and also, like, a reduction of time and different features and new ideas to develop many processes of daily life have changed to a digital system age of the new computer technology digital system, and also, in general, many places of education and teaching of work are still using paper and handwriting for that process. Sometimes problems happen between educators and the administration of the school and education system of the process, like wasting time and losing the plan copybook and sharing problems. So in the age of technology and computers, this is not compatible, and it's too difficult for both sides. So my plan for a solution for that case is to make a digital system of websites and prepare a function and feature of an education system of lesson plans for educators and administration of schools recording information about educators and specialties and information about educators and schools of Kurdistan, for example, a unit, subject, page, period, evaluation, lesson, stage, time, and objective with the name of the school, academic year, date, and classes.

Keywords: *Digital Lesson Plan System, Education Management System, Web-Based Application, Educational Technology, School Administration, and Digital Record Keeping.*

Design and Development of a Web-Based Student Information Management System

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ABSTRACT

Managing student information using traditional paper-based methods can be slow, difficult, and sometimes inaccurate. This research focuses on the design and development of a Web-Based Student Information Management System (SIMS) to help schools manage student data more efficiently. The system allows administrators, teachers, and students to access academic information through a simple and secure web platform. It includes features such as student registration, attendance tracking, marks management, schedules, and subject management. Students can easily check their marks and attendance online, while teachers and administrators can manage records quickly and accurately. The main goal of this project is to reduce paperwork, save time, and improve the organization of student information using modern web technologies. The proposed system aims to make academic management easier and more effective for both students and staff.

Keywords: *Web-Based System, Student Information Management System ,Student Records, Attendance Management, Marks Management, Academic Management, Database System, School Management,Web Application.*

Design and Development of a Digital Platform for Facilitating Access to Skilled Workers and Experts

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ABSTRACT

In the current era technology is expanding significantly, but most citizens or homeowners to find a skilled worker in electricity or water and sewage or any home service, they must rely on asking acquaintances, relatives and friends or old advertisements, which causes them to face challenges, for example wasting time, lack of trust, or fraud. Our project focuses on allowing citizens to directly find workers or home service experts. The goal of this project is for users to reach the largest number of skilled workers. With this, the homeowner can see the profiles of skilled workers in home service fields. Here, the user can search for the needed worker and make a finding decision in a transparent and faster way. We built this platform using Agile methodology to develop the website. We also used Laravel and PHP frameworks for the back-end logic and we use Tailwind CSS and Livewire for the front-end design. The system includes a live search feature and a rating system, which allows the customer to leave a review and rate the quality of the work after completion, helping to establish greater trust between both parties. The project shows that using technology will provide more job opportunities.

Keywords: *Home services, Skilled workers, Service platform, Agile methodology, Rating system, Job opportunities.*

Investigating Teachers' and Students' Attitudes Toward Virtual Reality in Science Education: A Survey Study.

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ABSTRACT

This study examines the use of virtual reality (VR) in science education and its impact on students' learning, engagement, and understanding of complex concepts. The research is based on a review of previous studies published between 2015 and 2025, as well as data collected through a questionnaire distributed to students and teachers. A total of 102 responses were analyzed to explore participants' familiarity with VR, their experience using it in education, and their opinions about its effectiveness. The findings show that although most participants are familiar with VR technology, the majority have not used it in educational settings. However, many respondents believe that VR can make science lessons more interesting and engaging. The results also indicate that VR has the potential to help students understand difficult scientific concepts, although some participants remain uncertain due to limited practical experience. Overall, the study highlights that VR is a promising tool in science education, but its implementation is still limited. The research suggests that increasing access to VR and providing proper guidance for its use can improve learning outcomes and enhance students' educational experience in science subjects.

Keywords: *Virtual Reality (VR)Science EducationLearning OutcomesStudent EngagementTechnology in Education Immersive Learning Educational TechnologyScienceLearningTeachingMethodsStudentMotivationInteractive LearningDigitalLearningClassroomTechnologyConcept Underst*

Development Of an Intelligent Chatbot-Based Support System for University Students

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ABSTRACT

The experience of transitioning from secondary to university education poses significant challenges to first-year university students. It is characterized by unfamiliarity with the structure and regulations of the university and the learning environment. A significant percentage of first-year university students face challenges in accessing accurate information and navigating through university regulations. It poses an added layer of stress and confusion to the first-year university experience. It was suggested that an intelligent chatbot would provide immediate and continuous assistance to first-year university students. It has the capability to answer frequently asked queries and provide information regarding regulations and issues of interest to first-year university students. It has the added advantage of reducing the workload of the staff and enhancing the student experience. It operates within the domain of university information and specifically targets first-year university students of TIU. It ensures that the information provided to the first-year university students of TIU is accurate and relevant. It was suggested that the chatbot would function as an ideal tool to enhance the student experience and reduce confusion.

Keywords: *Intelligent Chatbot, First-Year University Students ,University Regulations,*

The perceived benefits and challenges of using ChatGPT in academic writing among university students

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ABSTRACT

This study explores university students' perceptions of the benefits and challenges of using ChatGPT for academic writing. The rapid development of artificial intelligence tools has led to the widespread use of ChatGPT among students for various academic tasks, such as idea generation, language improvement, and writing development. The study employs a quantitative research design using a questionnaire distributed to 55 university students from different academic levels and fields of study. Data were analyzed using descriptive statistics, particularly percentages. The results show that students frequently use ChatGPT to generate ideas, save time, and improve writing quality. It is also widely used for editing, drafting, and language support. However, several challenges were identified, including over-reliance, concerns about accuracy, and potential negative effects on critical thinking and academic integrity. Overall, students demonstrated a generally neutral to positive attitude towards ChatGPT, viewing it as a useful academic tool when used appropriately. The study concludes that ChatGPT has both benefits and limitations in academic writing. Therefore, it is important for students to use it responsibly to support learning while maintaining academic integrity and independent thinking.

Keywords: *ChatGPT, Academic Writing, Artificial Intelligence, University Students, Higher Education, Student Perceptions, Benefits and Challenges, Educational Technology.*

A Mobile-Based Smart Glasses Speech-to-Text System for Deaf Users in the Kurdish Sorani Language

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ABSTRACT

Hearing impairment significantly affects real-time communication, particularly in spoken-language environments where immediate interaction is required. Speech-to-text technologies offer an effective assistive solution by converting spoken language into readable text; however, most existing systems primarily support high-resource languages. Kurdish, especially the Sorani dialect, remains underrepresented in such technologies due to limited linguistic resources and datasets. This paper presents a smart-glasses-inspired assistive system designed to provide real-time speech-to-text captions in Sorani Kurdish for deaf and hard-of-hearing users. The system leverages a pre-trained automatic speech recognition model available through Hugging Face and integrates it into a mobile application that simulates smart glasses output while also maintaining transcription history. Rather than focusing on model training, this work emphasizes system design, practical deployment, and accessibility for a low-resource language context. The proposed approach demonstrates the feasibility of using existing multilingual speech recognition models to support inclusive assistive technologies and serves as a foundation for future wearable implementations.

Keywords: *Speech-to-Text, Assistive Technology, Smart Glasses, Kurdish Language, Low-Resource Languages, Automatic Speech Recognition*

Design and Development of an Interactive Web-Based Learning Platform for University Students

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ABSTRACT

This study presents the design and implementation of a web-based academic collaboration platform aimed at improving student engagement, interaction, and learning experiences in higher education. Existing university learning systems often suffer from limited interactivity, poor usability, and insufficient communication between students and instructors, negatively affecting students' understanding of course materials. To address these challenges, the proposed platform provides discussion forums, direct messaging, and multimedia content sharing within a structured and user-friendly environment. The system was developed using HTML, CSS, JavaScript, PHP, and MySQL within a three-tier architecture supporting students, instructors, and administrators through role-based access. The implemented platform includes course-based forums, instructor validation of shared information, and multimedia communication through text, image, video, and audio sharing, Initial development and functional testing demonstrated that the platform provides an organized and interactive learning environment that supports continuous communication and collaborative problem-solving. The proposed platform contributes to educational technology by supporting collaborative and multimedia-enhanced learning environments in higher education.

Keywords: *Collaborative learning, Web-based platform, Educational technology, Student interaction, Discussion forum, Multimedia communication, Higher education, E-learning systems.*

An AI-Enhanced Unified University Management System (UUMS) for Academic and Administrative Integration in Multilingual Environments

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ABSTRACT

The rapid advancement of information and communication technologies has increased the adoption of digital systems in higher education institutions. However, many universities still rely on multiple disconnected systems to manage academic and administrative activities, resulting in data inconsistency, increased workload, limited accessibility, and poor user experience, especially in multilingual environments.This project proposes an AI-Enhanced Unified University Management System (UUMS) that integrates academic and administrative services into a single cross-platform platform. The system supports multilingual functionality and hierarchical role-based access control for multiple user roles. The proposed system is developed using a hybrid modular architecture consisting of a Flutter frontend, Laravel RESTful backend, MySQL database, and a Python-based AI service integrated with the Claude API. The system also includes a context-aware AI assistant capable of providing intelligent responses based on user-specific academic data such as schedules, attendance, and grades. To ensure security and privacy, the AI service operates through backend-controlled data filtering without direct database access. The project adopts Design Science Research (DSR) and Agile development methodologies to support system design, implementation, and evaluation.

Keywords: *University Management System (UUMS), Cross-Platform Application, Role-Based Access Control (RBAC), Academic and Administrative Integration, =AI Chatbot, Design Science Research (DSR)*

Enhancing Learning English for Kurdish Kids to an Interactive Mobile Application

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ABSTRACT

English is a global language essential for communication, education, and technology, yet many Kurdish children face challenges in learning it due to the lack of child-centered and culturally appropriate resources. This project aims to design and develop an interactive mobile application to support English language learning for Kurdish children. The application teaches basic vocabulary and simple sentences using visual illustrations, audio pronunciation, and interactive activities, with bilingual support in Kurdish and English, quizzes, and level-based content are included to enhance engagement and motivation. Designed with a child-friendly interface, the application aims to improve vocabulary, pronunciation, and basic sentences. The results indicate that interactive mobile applications can effectively support early English learning among Kurdish children, highlighting the importance of multimedia and age-appropriate content in language acquisition.

Keywords: *English language learning, mobile application, Kurdish children, interactive learning, bilingual education, vocabulary learning, pronunciation, multimedia learning.*

Enhancing English Vocabulary through Mobile Apps

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ABSTRACT

The use of mobile applications in teaching and learning English vocabulary among foreign language learners (EFL) has made a big difference in the classroom. This paper reviews and evaluates the preceding research on the impact and use of mobile applications on English vocabulary learning and teaching. The aim of this study is to find out the advantages, disadvantages and effects of mobile applications on language learning. In general, scientific research conducted and published between 2000 and 2024 from reliable electronic sources such as Google Scholar, JSTOR, ProQuest, Science Direct were selected using a collection of keywords such as EFL, ELT, mobile applications, MALL. Through analyzing these studies the study revealed that majority of students have positive attitude towards the use of mobile applications in vocabulary learning as most of the participants agree that mobile apps can be very helpful for vocabulary learners. However, some students still prefer traditional learning methods. Despite the enthusiasm of many participants to use mobile apps to learn English vocabulary,. As a result, mobile applications are effective tools for learning vocabulary, but they need to be combined with traditional teaching methods to achieve better learning outcomes.

Keywords: *EFL, ELT, Mobile applications, MALL, Vocabulary learning*

Designing an Engaging and Motivating Classroom at Mam Khlan School

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ABSTRACT

This study is about classroom decoration and its effect on students' learning and motivation in Mam Khlan School. Many rural schools do not have enough materials and support compared to schools in cities. Because of this, classrooms are often simple and do not include things like posters, pictures, colors, or English learning materials. The current project aims to see how classroom decoration can help students learn English better and improve their motivation inside the classroom. It also explains how visual materials and a positive classroom environment can help students focus and take part in the lesson. This study used a quantitative method. Mam Khlan school was visited first, and observations were made. Then, some improvements were made, such as repairing desks, painting parts of the classroom, adding curtains, posters, pictures, and English words on the walls. After that, students' behavior and reaction were observed. The results show that classroom decoration has a positive effect on students. Students became more motivated, more comfortable, and more active during the lesson. They also looked happier in a clean and colorful classroom. The study concludes that even simple and low-cost decoration can improve learning, especially in schools that do not have many resources.

Keywords: *Classroom Decoration, Student Motivation, Engagement, Positive, Classroom Environment*

The Correlation Between Perceived Neglect and Students' Academic Performance in EFL Classes at University Level

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ABSTRACT

This research examines how neglecting students at the university level can contribute to their low academic performance. There are various reasons behind low academic achievement, and this research focuses on the factors related to neglect at the university level. This study adopted a quantitative method by implementing a survey to collect data from 68 university EFL students. The survey was sent to students through a Microsoft Forms link, and the collected data were analyzed using SPSS. The survey results show that there is little or no neglect in teacher–student relationships, which means there is a positive relationship that creates a supportive environment where students feel valued. Students also try to develop themselves to achieve their academic goals. Moreover, the responses show that students have moderate social support, which indicates an area that still needs improvement. Students' motivation also shows a high level, which means they have positive beliefs about their academic abilities and development. Even when students do not perform well in exams, quizzes, or projects, they still have high motivation to perform better in the future. This study found that lower levels of neglect have a positive impact on students' learning processes and that a supportive environment is a key factor in successful academic achievement.

Keywords: *Correlation, English as Foreign Language, motivation, Low-performance student, Neglect*

Improving Vocabulary Skills of Grade 7 Students at Zanko Public School in Erbil

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ABSTRACT

Vocabulary is essential as it serves as the basis for productive communication, understanding of text, and academic and career success. A rich vocabulary positively impacts listening, speaking, reading, and writing abilities and encourages individuals to communicate with clarity, comprehend complex information, and become competent in their daily interactions. In line with this, the current project focuses on vocabulary acquisition among Grade 7 students at Zanko Public School in Erbil. To support students' vocabulary development, 10 vocabulary topics were prepared for classroom instruction. This project is experimental in nature, which is an integral part of quantitative research involving the use of pre-test and post-test before and after the teaching practice to determine their existing vocabulary knowledge and the impact of the teaching practice. Student test results in the pre-test and post-test were analyzed and interpreted to discover the supposed impact of the teaching practice.

Keywords: *Vocabulary acquisition, Grade 7 students, teaching practice, pre-test, post-test*

Exploring Cultural Dimensions in ELT Teacher Assessment in Kurdistan: A Study Through Hofstede's Model

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ABSTRACT

Humans' behavior, preferences, life style, choice of profession, what is considered as success and failure substantially depend on what culture they come from. In education the students' cultural background is an important variable to consider to make decisions about teaching methods and type of assessment – its design, format, application, evaluation, etc. This study attempted to find out to what extent the educational assessment programs are aligned with Kurdish student's culture. To do so, data were collected quantitively as well as qualitatively: the Hofstede's Cultural Dimension Model (HCDM) was used to develop research tools and data analysis. The course files available on English Language Teaching department for 2024-2025 fall and spring terms were analyzed and 10 lecturers were interviewed. The results showed that there is weak alignment between the student's cultural background and applied assessment for some dimensions and strong for others. This research findings believed to be helpful for lectures, policy makers, assessor, decision makers in education.

Keywords: *Hofstede's Cultural Dimension Model (HCDM), Culture, Educational Assessment, Kurdistan*

Kurdish University Students' Perceptions of Using ChatGPT for Academic Assignments

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ABSTRACT

This study explored Kurdish university students' perceptions of using ChatGPT for academic assignments at Tishk International University. The study aimed to understand why students use ChatGPT, how it affects their academic performance, and what challenges they face while using it. A quantitative research method was used, and the data were collected through an online questionnaire. A total of 70 undergraduate students from different departments participated in the study. The findings showed that most students use ChatGPT for homework, assignments, projects, and understanding difficult topics. The results also revealed that students generally have positive opinions about ChatGPT. Many students believed that ChatGPT helps them improve their grammar, vocabulary, writing skills, and confidence in learning. In addition, students reported that ChatGPT helps them complete assignments faster and reduces stress related to deadlines. However, the study also found some challenges. Some students believed that too much use of ChatGPT may reduce critical thinking and increase plagiarism in academic work. The results showed a positive relationship between the use of ChatGPT and students' academic achievement. Overall, the study concluded that ChatGPT can be a useful educational tool when students use it carefully and ethically.

Keywords: *ChatGPT, Artificial Intelligence, Academic Assignments, Kurdish University Students, Higher Education, Academic Performance, Student Perceptions, English Language Teaching, Educational Technology*

A Cross-Cultural Study of the Comprehension of Conversational Implicatures among Kurdish and Turkish EFL Learners

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ABSTRACT

The ability to understand conversational implicatures is a crucial component of effective communication. This study investigated the Kurdish and Turkish EFL learners' ability to decode conversational implicatures. To do so, data were collected using quantitative research design through a Multiple-Choice Discourse Completion Test (MDCT). A sample of 78 participants (41 Kurdish and 37 Turkish learners) participated in the study. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Interestingly, the results showed that both groups performed at a similar level with no statistical differences. Regarding gender, in both groups female learners performed better in the comprehension of implicatures, yet the difference was also not significant. Lastly, in regard to the implicature type, both groups performed better in the comprehension of context-independent implicatures.

Keywords: *Pragmatics, Implicature, communication, Turkish learners, Kurdish Learners*

GenAI Tools for Notetaking in Language Education: Undergraduates' Attitudes and Lived Experiences

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ABSTRACT

Generative AI (GenAI) integration into education has received enormous attention from stakeholders in education. GenAI tools have become popular in use for various academic purposes. One of the aspects of education that has been affected by this advancement is note-taking and note-organization during lectures. The effects of AI-supported note-taking tools have a mixture of outcomes. They may help students understand lessons better and organize their notes more easily, or they could pose challenges. The study aimed to explore students' opinions and lived experiences about AI-supported note-taking tools following a differentiated framework. The research used a mixed-methods design, including surveys and interviews for data collection. Twenty-four university students from the English department participated in the study. The results show that students generally hold a positive perception of the complementary pair, using the structured framework and GenAI for their studies, reporting that the intervention helps them take and organize notes better, simplify complex content, and prepare for exams. The results also reveal challenges posed, including the burden of long AI output and distraction when multitasking during lectures. The use of GenAI in language education requires careful planning and guidance to optimize the process.

Keywords: *GenAI, note-taking, framework, language education, perception*

Reading Habits, Reading Interest, And Reading Comprehension Among Undergraduate Students

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ABSTRACT

This study examines reading habits, reading interest and reading comprehension among undergraduate students. It also investigates the main factors that affect students reading behavior, such as technology use, academic workload and social influences. A quantitative research method was used in this study. Data were collected through a questionnaire from undergraduate students of different departments, academic years. The data were analyzed using descriptive statistics to identify general patterns in students reading habits and attitudes. The results show that most students have moderate reading habits and spend a small amount of time reading outside their academic studies. Students prefer digital materials such as social media posts and online articles more that printed book. The findings also show that students generally have positive interest in reading, but their reading is often related to academic requirements rather than personal enjoyment. In addition, the study finds that technology and academic workload have a strong effect on students reading habits by reducing the time spent on reading for pleasure. In conclusion, reading habits, reading interest and reading comprehension are closely connected among undergraduate students. Improving motivation for reading and reducing distractions from technology may help students develop better reading skills and improve their academic performance.

Keywords: *Reading Habits, Reading Interest, Reading comprehension, Undergraduate students*

Words That Come Alive: A Fun and Interactive Vocabulary Notebook for Young Learners

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ABSTRACT

This capstone project aims to design an interactive supporting notebook for the Sunrise Grade 4 English textbook used in the Kurdistan Region of Iraq, where English is taught as a foreign language. The notebook provides extra practice because the textbook does not include enough activities to strengthen vocabulary learning, spelling, and writing the target words. The project is need-based and product-oriented, and it focuses on producing a practical material that follows the same units, topics, and words of Sunrise Grade 4. The notebook will include vocabulary frames and spelling frames, word tracing, copying practice, word-completion tasks, matching, labeling, gap-filling with target vocabulary, picture-based vocabulary tasks, word maps, and unit review pages. These activities help learners notice new words, practice correct spelling, repeat vocabulary, and write words accurately. The notebook is also intended to support teachers in classroom instruction and help parents guide practice at home through clear, simple instructions. To increase motivation and engagement, the notebook may include interactive features such as QR codes linked to pronunciation support or audio practice. Overall, this project aims to make vocabulary learning more enjoyable, increase more practice opportunities, and help Grade 4 learners build stronger vocabulary knowledge through repeated spelling and word-writing activities.

Keywords: *interactive notebook, EFL young learners, vocabulary development, spelling practice, primary education.*

Evaluating What We Expect: Mapping Cognitive Demand in ELT Course Assessments

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ABSTRACT

This study examines the cognitive demands embedded in assessment practices within the English Language Teaching (ELT) Department at Tishk International University, Erbil. By analyzing selected assessment tools and aligning them with course learning outcomes, the study explores what students are truly expected to learn and demonstrate throughout the learning process. Data were collected from projects, quizzes, presentations, assignments, and other formative assessment tools used during the 2023–2026 academic years, excluding midterm and final examinations. The study employs three educational frameworks: Bloom's Taxonomy, Webb's Depth of Knowledge (DOK), and SOLO Taxonomy to evaluate levels of cognitive complexity, depth of thinking, and quality of understanding. Following a review of the related literature, specialized AI prompts were engineered to identify indicators of cognitive development within assessment tasks. Samples of assessment tools and course learning outcomes were then analyzed using ChatGPT and Gemini to examine whether the assessments genuinely reflected the intended learning outcomes and expected cognitive levels. The study highlights patterns of alignment and mismatch between learning outcomes and assessment practices, contributing to discussions on assessment design, constructive alignment, and AI-assisted evaluation in higher education.

Keywords: *LT Assessment, Cognitive Demand, Constructive Alignment, ChatGPT and Gemini,Bloom's Taxonomy and Webb's DOK*

Undergraduate EFL Learners' Attitudes Toward Podcast-Based Listening Practice: A Survey Study

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ABSTRACT

This study investigated undergraduate EFL learners' attitudes toward podcast-based listening practice at Tishk International University. The research aimed to examine students' perceptions of the usefulness of podcasts for improving English listening skills, motivation, confidence, and the barriers they experience while using podcasts for listening practice. A quantitative survey design was employed in the study. The participants consisted of 265 undergraduate students from different departments and academic years. Data were collected through a structured Likert-scale questionnaire covering four main dimensions: perceived usefulness, motivation and enjoyment, anxiety and confidence, and barriers to podcast use. The findings revealed that most students had positive attitudes toward podcast-based listening practice. The participants reported that podcasts helped improve listening comprehension, vocabulary, pronunciation, and exposure to authentic English. Students also appreciated the flexibility of podcasts, especially the ability to pause, replay, and choose topics based on their interests. Furthermore, podcast use appeared to increase learner motivation and confidence while reducing listening anxiety. However, some barriers were identified, including difficult accents, fast speech, and internet-related problems. Overall, the study concludes that podcasts can be an effective supplementary tool for supporting listening development and independent learning among undergraduate EFL learners.

Keywords: *podcasts, EFL learners, listening practice, listening anxiety, learner attitudes, extensive listening*

University Students' Perceptions of Using Chat GPT for Academic Vocabulary Development

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ABSTRACT

This study invistigates the perceptions of university students toward the use of ChatGPT in developing their academic vocabulary and the process of their learning. The study's goal is to examine how ChatGPT is helpful to students for learning new academic words and also improve their academic expressions, and use those vocabularies in their writing correctly. The type of the study or research is quantitative research design and the data are collected thorough questionnaire to 51 university students in all different departments and universities. To analyze those data statistical analysis are used and by using percentage through Microsoft EXcel and SPSS. The results of the study shows that most of those who participated have positive perceptions about using ChatGPT for learning process and academic vocabulary. Most of the students are for ChatGPT and see it as a helpful tool for learning new vocabulary very effectively and also supportable tool for their writing situations and some students mentioned that they frequently use ChatGPT for thier academic purposes. The study at finally shows that truth most students can rely on ChatGPT and can use in a very large scale because it can be very helpful tool and supportive for learning new vocabulary process

Keywords: *ChatGPT, Academic Vocabulary, University Students, Language Learning, Artificial Intelligence in Education*

A Practical Guide to Daily Communication in Erbil: English -Sorani Kurdish for Enhancing Tourist Experiences

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ABSTRACT

This capstone project aims to design a practical English–Sorani Kurdish communication booklet to help tourists during their visits to Erbil. Many tourists face language barriers when communicating with local people, which can cause misunderstandings and reduce their travel satisfaction. The project follows a qualitative, needs-based, and product-oriented design. Data were collected through reviewing related literature, observing real-life communication situations, and identifying tourists' common language needs. Based on these findings, frequently used daily expressions were selected and communicatively translated into Sorani Kurdish. The final product is a simple and easy-to-use booklet with practical sections, including greetings, directions, transportation, hotels, restaurants, shopping, and emergencies. QR codes were also added to provide map access and location-based information, making the booklet more helpful for tourists. Research suggests that effective bilingual phrasebooks should be clear, simple, and context-based. Therefore, this booklet is expected to increase tourists' confidence, reduce misunderstandings, and help them travel more comfortably in Erbil. This project also contributes to English Language Teaching by showing how language can be used in real-life situations and by highlighting the value of practical language materials in tourism and intercultural communication.

Keywords: *English–Sorani Kurdish booklet, bilingual phrasebook, English Language Teaching*

Bilingual Storybook for Kurdish Children: Promoting Social and Emotional Learning through Artificial Intelligence and Storytelling

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ABSTRACT

This capstone project aims to design a bilingual storybook for Kurdish children to promote Social and Emotional Learning (SEL) through storytelling and Generative Artificial Intelligence (GenAI). The project responds to the limited availability of Kurdish children's storybooks that directly address SEL competences. The storybook targets children aged 5–10 and includes short stories written in simple, meaningful language with culturally appropriate situations familiar to Kurdish children's daily lives. GenAI tools were used throughout the project, including ChatGPT, Google Gemini, and Google AI Studio. After the AI-generated outputs were produced, the stories, translations, and images were reviewed and edited to improve language accuracy, cultural relevance, age suitability, clarity, and connection to the five CASEL SEL competencies. The project shows that bilingual storytelling can support children's emotional and social development by helping them understand their feelings, build positive relationships, and make better decisions. It also demonstrates that generative AI can be a useful educational tool when combined with careful human review and cultural adaptation. The final product can be used by teachers in classrooms and by parents at home to support Kurdish children's language development and social-emotional growth.

Keywords: *SEL, children's literature, bilingual storybook, generative AI, storytelling*

English Learning Podcast: Enhancing Language Learning Through AI and Multimedia Platforms

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ABSTRACT

This capstone project explores the use of artificial intelligence (AI) and multimedia platforms to develop beginner-level English learning materials for Kurdish EFL learners. The project responds to the need for accessible, culturally relevant, and engaging English learning resources that suit A1-level learners. To address this need, the project designed and produced a twelve-episode English learning podcast series focusing on basic communication skills. AI tools such as ChatGPT, DeepSeek, Qwen, and Google AI Studio were used to support scriptwriting, while ElevenLabs was used for audio production and CapCut Pro for video editing and final episode packaging. The episodes were prepared for distribution through YouTube, TikTok, and Instagram to make the content more accessible to learners across different platforms. The project shows that AI-assisted content production can support teachers and independent creators in producing language learning materials more efficiently, provided that the AI-generated content is carefully reviewed and edited by humans for accuracy, simplicity, cultural relevance, and pedagogical quality. Overall, the project demonstrates the potential of combining AI, podcast-based learning, and social media platforms to create practical and engaging English learning resources for Kurdish beginner learners.

Keywords: *Artificial intelligence, English learning podcast, A1 learners, Kurdish EFL learners, multimedia learning*

Exploring the Landscape of Undergraduate Research in the Kurdistan Region of Iraq: Goals, Challenges, and Opportunities for Improvement

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ABSTRACT

This research project aims to explore the significance and impact of undergraduate research in Kurdistan Region of Iraq (KRI). It focuses on identifying the academic and professional benefits students gain, the challenges they face and ways to improve research opportunities. A quantitative method is used supported by a review of relevant literature. A survey, comprising 35 questions equally divided into 7 themes, is used to collect data from subjects who have completed their undergraduate studies in both public and private universities in the KRI. The results have shown that the strongest benefit of undergraduate research has been in the areas of personal development and academic skills, while the lowest benefit has been in areas of career path and professional opportunities. Furthermore, across all 35 questions, "University provided good support for research" has scored the lowest, indicating lack of institutional support for research. The study concludes that while undergraduate research in the KRI offers academic and personal values, students still need skills development, institutional support, and further preparation to fully benefit from undergraduate research.

Keywords: *Undergraduate Research, Institutional Support, Skills Development, Higher Education Policy*

The Impact of Watching English Movies in Language Improving EFL Student's Language Learning

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ABSTRACT

English has become a global language and a key tool for communication in education, technology, and international interactions. Therefore, the inclusion of various teaching materials, the use of new teaching methods, and the integration of technology is resorted to making the process of learning more effective, faster and motivating the EFL learners. This study investigated the opinions and preferences of Kurdish EFL learners regarding the use of movies, as an authentic material, in English language learning and improvement. To do so, a quantitative method, using a questionnaire, was used to collect data. The participants of the study comprised of 70 (21 male and 49 female) Kurdish EFL learners. The collected data were statistically analyzed using Statistical Package for Social Science (SPSS). The results showed that the overwhelming majority of the learners have a positive attitude towards watching English movies and believe that it helps them to learn and improve their English language. However, no statistical significance was found in the opinions of learners regarding the usefulness of English movies in certain skills, yet listening skills and vocabulary were ranked highest followed by pronunciation and speaking skills and motivation and engagement. The study, based on the findings, suggested certain pedagogical implications.

Keywords: *Authenticity, Movies, Language Improvement*

Learning by Doing: Developing an Interactive English Notebook for Young Learners

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ABSTRACT

The capstone project focuses on the design of a hands-on English Notebook specifically for elementary level learners. To develop the interest of young learners in developing their knowledge of English in a fun manner; this capstone project will combine both practical English language skills and physical movement with various types of hands-on activities. This supplemental educational tool will be used to help enhance and develop the oral communication skills, reading comprehension skills, and writing skills of third grade students at public schools. Using task-based learning and active learning strategies, this project encourages students to use all parts of their bodies and minds when learning. The notebook is separated into 4 units that contain pre-task, main task, and post-task. Overall, this Capstone project showed that the students had positive reactions to the hands-on nature of the activities. Many learners expressed enjoyment because the notebook allowed them to learn in a different manner that involved more than just mental and listening skills. They did provide some constructive feedback as well regarding specific features and activities that would improve learning. Therefore, this capstone project supports the idea that utilizing interactive and hands-on learning materials is beneficial to increasing student participation.

Keywords: *English, Notebook, Students, Physical, Interactive*

Determinants of Academic Burnout Among University Students in Erbil: Well-being and Social Factors

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ABSTRACT

Academic burnout is becoming one of the key issues with today's college students. Due to increased academic expectations and increasing stress and pressures to perform socially. This study looks into the determinants of academic burnout for undergraduate students in Erbil, Iraq through two areas of focus. Data collection took place at Tishk International University and Catholic University in Erbil. This involved students from the departments of computer science, nursing, pharmacy, and English Language Teaching. Using a quantitative methodology, an online survey was administered to 116 students. Four aspects of burnout were assessed in this study personal, study related, colleague related, and teacher related. Results indicate that several students reported experiencing higher degrees of burnout to the point of being moderately to highly burnout out. Students experienced high degrees of burnout in relation to their workload, emotional exhaustion and studying. Study related burnout out was shown to be the most common type, which negatively impacted students' ability to concentrate and overall wellbeing. Teacher related burnout occurred at lower levels than others. Thus, it can be stated that academic pressure and heavy workload are the primary reasons for burnout amongst university students.

Keywords: *Burnout, Students, Personal, Study, Teacher, Colleague*

Building Future with Zina

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ABSTRACT

This booklet was created to present the English Language Teaching Department at Tishk International University. It shows the courses, student experiences, and future opportunities for graduates. This project reflects my learning journey and my goal to become a successful teacher in the future, for designing this booklet, the researchers used Canva. Most of the information were collected from different websites, but the researchers also changed and improved some parts to ensure clarity and simplicity of the language. The researchers also asked several former and current students for more information about their experience studying in the ELT Department at Tishk International University . This project can help the university to encourage students to choose Tishk International University, increase the university's income because more students may apply and make the university and ELT department more popular and improve its reputation.

Keywords: *University, student , project, information, ELT Department and booklet*

The Role of Bibliotherapy in Supporting Trauma Healing Among University Students

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ABSTRACT

This mixed-methods study explores the role of bibliotherapy in supporting trauma healing and emotional well-being among university students at Salahaddin University. The research combined quantitative and qualitative approaches, using 206 survey responses and 10 in-depth interviews to better understand students' emotional experiences and their use of literature as a coping strategy. The findings show that many students experience different forms of emotional distress, stress, and anxiety related to academic, social, and personal pressures. Despite these challenges, students frequently turn to reading, poetry, storytelling, podcasts, and other forms of media to find comfort, relaxation, and emotional support. The study also highlights a noticeable cultural preference for realistic memoirs and Kurdish poetry, which students described as more relatable and emotionally meaningful than fictional works. In addition, digital media and podcasts were increasingly viewed as modern therapeutic tools that provide accessibility and emotional connection. Overall, the research suggests that bibliotherapy is a practical, affordable, and sustainable method for encouraging emotional healing, self-expression, and personal growth among students. Therefore, the study recommends that universities integrate guided bibliotherapy programs into student mental health services to promote well-being and emotional resilience.

Keywords: *Bibliotherapy, Trauma, Wellbeing, Students, Mentalhealth, Resilience, Poetry, Digitalmedia, Research.*

From Misconception to Mastery: Teacher Perceptions of Fraction Difficulties and the Role of Narrative-Based Teaching Strategies.

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ABSTRACT

Fractions are one of the core but often tricky areas of primary mathematics. This research used a mixed-methods approach to explore primary students' common fraction misconceptions and the potential of story-based interventions. Using a questionnaire, distributed to 67 mathematics teachers in Erbil, Iraq, the study examined the students' misconceptions in fractions and factors influencing them, as well as their instructional practices. The results indicate that whole number bias, procedural error, and vocabulary problems are important obstacles to understanding fractions. To correct these misconceptions, it is suggested that the use of stories would help provide meaning to fraction concepts, alleviate cognitive demand, and improve engagement. Experimental studies in the future are needed to assess storytelling interventions compared to the traditional format of instruction.

Keywords: *Fractions, misconceptions, primary mathematics, storytelling, instructional interventions, whole number bias*

Mathematical Modeling of Disease Spread Using the SIR Differential Equation Model

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ABSTRACT

The spread of epidemics within highly interconnected communities like university campuses constitutes a special case that needs special attention in modeling and predicting disease dynamics. In this paper, we propose and use a mathematical SIR model to simulate and predict the behavior of an infectious disease amongst 300 university students. This paper aims to fill the existing knowledge gap in epidemic modeling for this unique population. Using survey data from the participants, information on the frequency of contacts, mode of exposure, and disease recovery time was obtained. These pieces of data enabled us to derive crucial parameters for our SIR model, including the infection rate (β) and recovery rate (γ). Our system of ODEs was then solved numerically via both Euler's and the fourth-order Runge-Kutta method. In addition to our proposed SIR model, SI and SIS models have also been studied to provide more comprehensive understanding on how different diseases with various immunity properties can be modeled.

Keywords: *Mathematical modeling, infectious diseases, SIR model, differential equations, Euler's method, Runge-Kutta method, epidemiology, Transmission rate, Recovery rate, Epidemic dynamics.*

A Review on the Influence of Positive Teacher Feedback on Students' Motivation in Mathematics Courses

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ABSTRACT

Positive feedback from teachers can boost students' interest and joy in learning mathematics, while fostering their self-confidence and positive attitudes toward mathematics. This paper aims to investigate the influence of positive feedback on the motivation levels of students in math classes using a qualitative literature analysis. The method to be used in this research paper involves qualitative literature analysis of studies on the influence of positive teacher feedback on motivation in mathematics education. Studies selected for analysis were those that were published between 2015 and 2025. Thematic analysis was used to analysed the data. The findings of the study indicate that students' motivation, self-efficacy, self-confidence, and involvement in mathematics classes depend on the positive feedback from teachers. Additionally, positive teacher feedback on the students' progress encourages their engagement in class discussions, increases interest in mathematics lessons, and enables them to address complex mathematical problems. It can be expected that this study would provide useful data to educators and math teachers about the importance of positive feedback methods in the context of teaching mathematics. This research highlights the necessity for further research on positive feedback among teachers in diverse cultures.

Keywords: *Students Motivation, Positive feedback, Mathematics Course, Teachers*

Investigating AI as a Scaffold for Enhancing Conceptual Understanding in Mathematics Learning

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ABSTRACT

Many students find mathematics difficult because they often focus on memorizing steps instead of understanding ideas. At the same time, Artificial Intelligence (AI) is becoming an important tool in education and can support students in new ways. This presentation explores how AI can act as a scaffold to improve students' conceptual understanding in mathematics. It first explains common problems in mathematics learning, such as math anxiety, lack of individual support and learning without deep understanding. It then explains the idea of scaffolding based on Lev Vygotsky's theory of the Zone of Proximal Development, which means giving students step-by-step support until they can learn independently. The presentation shows how AI tools can give simple explanation, hints and feedback while students solve mathematical problems. These tools can help students understand concepts instead of only getting answers. Examples are included to show how AI supports learning in algebra and other topics. Finally, the presentation discusses benefits and challenges of using AI in education. It emphasizes that AI supports teachers and students not replace them and it should be used in a responsible and careful way. Overall, it highlights the importance of meaningful mathematics learning.

Keywords: *Artificial Intelligence, Mathematics Education, Scaffolding, Conceptual Understanding, Learning Support, Adaptive Learning*

Error-Correcting Codes: Using Algebra to Detect and Fix Mistakes in Digital Data

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ABSTRACT

In today's digital world, noise and interference can easily flip binary bits, causing corrupted files and communication failures. This presentation explores Error-Correcting Codes (ECC) as a mathematical solution to protect data integrity. By using Abstract Algebra, specifically the finite field Z_2 and modular arithmetic, we present how data can be structured to automatically fix errors instead of just finding them. The presentation looks at three main methods: The Parity Bit for simple error detection. Repetition Codes using redundancy and majority logic to fix basic bit-flips. Hamming (7,4) Code as a smart algebraic way to fix errors efficiently using intersecting parity circles. Showing how ECC is used in QR codes, satellites, and digital storage, this research proves that abstract mathematics is the invisible engine making our daily digital communication safe and reliable.

Keywords: *Error-Correction, Abstract Algebra, Hamming Code, Data Integrity, Finite Fields.*

How Check Digits Catch Mistakes ISBNs, Barcodes, and ID Numbers

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ABSTRACT

This presentation explains how check digits help detect mistakes in identification numbers such as ISBNs, barcodes, credit card numbers, and passports. A check digit is an extra number added to the end of a code to verify that the number has been entered correctly. The system uses modular arithmetic, also called remainder math, to test whether the code is valid. The presentation focuses on how check digits detect common human errors, including typing the wrong number or swapping digits accidentally. An ISBN-10 example is used to demonstrate the mathematical process behind check digits and how a small mistake changes the final result. The study also highlights the importance of check digits in daily life, especially in libraries, stores, banking systems, and identification documents. The purpose of this presentation is to show how a simple mathematical idea can improve accuracy, reliability, and data security in modern technology. By connecting mathematics with real-world applications, the presentation helps audiences understand the practical value of modular arithmetic in everyday systems

Keywords: *Check Digits - ISBN - Barcodes - Error Detection -Credit Cards*

The Caesar Cipher and Examples, with visual aid

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ABSTRACT

This presentation explores the educational significance of the Caesar Cipher and its role as an introduction to cryptography. Although the cipher is too simple to provide modern security, it remains an effective tool for teaching fundamental mathematical and cryptographic concepts. The presentation explains how the Caesar Cipher demonstrates ideas such as modular arithmetic, cyclic groups, and symmetric key encryption through a clear and visual process. By connecting mathematical operations with message encryption and decryption, the cipher helps learners develop an intuitive understanding of how secure communication systems function.

Keywords: *Caesar Cipher, Encryption, Decryption, Modular Arithmetic's*

Using Modular Arithmetic to Predict Time, Weekdays, and Repeating Schedules

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ABSTRACT

This presentation explains how modular arithmetic is used to predict time, weekdays, and repeating schedules. Modular arithmetic is a branch of mathematics that studies repeating cycles and remainders, which is why it is also called "clock arithmetic." The presentation shows how clocks and calendars follow repeating patterns and how we can use mod 12 for time calculations and mod 7 for weekday calculations. It also includes examples of predicting future time and future weekdays using simple modular arithmetic operations. In addition, the presentation explains real-life applications such as schedules, transportation systems, programming, and technology. Overall, the project demonstrates how mathematics can be applied in daily life in a practical and useful way.

Keywords: *Modular arithmetic, modulo, time prediction, weekday prediction, repeating schedules, mathematical patterns, problem-solving.*

A Literature Review: Low-Cost Instructional Activities to Improve Students' Engagement in Physics Education

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ABSTRACT

This research aimed to examine how low-cost activities can help students understand physics concepts and become more active in class. This study looks at how simple and inexpensive materials can make physics classes more interesting and engaging. The research used a qualitative method by reviewing 12 academic articles published between 2016 and 2026. The study settings included different countries. The reviewed papers were analysed thematically. The findings showed that low-cost activities help improve student performance and understanding of difficult physics topics such as motion, force, and electricity. Materials such as balloons, plastic bottles, and aluminum cans were used in simple experiments to increase curiosity and student participation. The study also found that these activities help students improve their critical thinking and problem-solving skills. In conclusion, low-cost activities are useful because they connect physics theory with practical learning. The study recommends adding more hands-on activities to the school curriculum and combining them with digital technology to make learning more effective.

Keywords: *Low-cost Activities, Student Engagement, Hands-on Learning, Resource-limited Classrooms.*

A Literature Review: Mass Transfer in Binary Systems via Stellar Wind

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ABSTRACT

The quantity of mass transfer from the donor star to its companion, which acts as the accretor, and the formation of an accretion disc in binary star systems have a direct influence on many astrophysical events that occur. There have been many research studies on binary stars involving mass transfer and accretion in such binaries, all of which are limited to certain systems with specific binary parameters. In this work, we use three-dimensional smoothed particle hydrodynamics (3D SPH) simulations to explore the impact of binary mass ratio and wind speed on the fraction of mass transferred to the accreting companion and the structure of accretion discs developed through the mass transfer. We examine all possible cases of binary mass ratios from 0.25 to 4.00, as well as different conditions of wind speed in the vicinity of the accretor to determine the mass accretion fraction and accretion disc configuration. We adhere to thermally driven winds for all models in this work, with sound speed being the main parameter, in which transonic stellar winds expand in the binary medium. We find that slow winds lead to wind Roche lobe overflow (WRLOF) with accretion fractions close to unity, through moderate speed winds to fast winds with accretion fractions of thousandths. Our results agree very well with the Bondi-Hoyle (BHL) estimates for mass accretion in the case of fast winds, whilst the mass accretion fraction is smaller than that of BHL's for slow winds. We also find that the accretion disc size is subject to the wind speed and binary mass ratio. Our results show that the size of the accretion discs may extend beyond the radius of the Roche sphere, especially for the cases of more massive accretors. The accretion disc radius is smaller than the accretion radius for all cases of slow, moderate, and fast winds. This wind model, along with these results, would allow us to estimate the rate of mass accretion and the structure of accretion discs in any type of stellar binaries, which in turn determine the evolutionary path of such systems.

Keywords: *Mass transfer, binary star system, Stellar Wind*

A Systematic Review of Fatigue and Functional Stability in CU based SMAS

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ABSTRACT

Alloy toughness and damping capacity improve through precipitates that pin grain boundaries. Heat treatment also plays a major role in controlling alloy properties. Solution treatment followed by quenching preserves the metastable β-phase and promotes martensite formation, while aging stabilizes martensite and enhances corrosion resistance. Cooling media and rates, such as salt-water quenching versus air cooling, strongly influence martensite fraction and recovery behavior. For example, salt-water up-quenching in the Cu-Zn-Al system increased SME yield to 94%. This work presents a comprehensive review of the combined effects of alloying additions and heat treatment on the mechanical and functional properties of Cu-based SMAs. The study is based on a careful analysis of peer-reviewed literature and a comparative evaluation of different alloy systems. It identifies consistent trends, such as grain refinement improving fatigue life, while also addressing contradictions related to phase stability. The review provides a clearer understanding of the relationship between composition, processing, and performance, helping to establish manufacturing principles for improving the efficiency and reliability of Cu-based shape memory alloys

Keywords: *Cu-based Shape Memory Alloys, Martensitic Transformation, Functional Fatigue, Microalloying, Heat Treatment, Grain Refinement.*