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*e-mail: zhuldyzay.kubasheva@sdu.edu.kz

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Жанел Шайхы[1], Мейиржан Нұрланұлы[2], Самат Максутов[3]*
[1,2,3]SDU University, Каскелен, Казахстан
*e-mail: zhanel.shaikhy@sdu.edu.kz

ВЛИЯНИЕ ИСПОЛЬЗОВАНИЯ МЕТОДА ПЕРЕВЕРНУТОГО КЛАССА В СРЕДНЕЙ ШКОЛЕ

Аннотация. В течение многих лет система школьного образования представляла собой лекционно-разъяснительную форму преподавания, при которой ответственность учителя ограничивалась обязанностями информатора и оратора. Но по мере развития нашего общества менялись и цели и стандарты системы образования. Время требует включения активных методов обучения и творческих педагогических вмешательств в школьную систему, чтобы способствовать развитию когнитивных навыков и навыков мышления более высокого порядка,и тем самым защитить учеников от немотивированного, инертного поведения. В данной работе исследуется влияние перевернутой методики обучения на мотивацию учащихся старшей школы по математике. Основная цель этой статьи - продемонстрировать эффективность перевернутого класса в улучшении показателей академической успеваемости учащихся, связанных, в частности, с мотивацией. Мы провели статистический анализ после отбора для эксперимента выборки из 26 старшеклассников. Взяв пре-тест и посттест, состоящий из 33 вопросов, от участников эксперимента, и проанализировав данные с помощью t-критерия, мы обнаружили, что уровень мотивации у девятиклассников значительно повысился. Эта статья убедительно демонстрирует, что стратегии, используемые в перевернутом классе, оказывают положительное влияние на отношение и мотивацию учащихся к предмету.

Ключевые слова: перевернутый класс, методы, мотивация, видеолекция, анкетирование.

Введение

Актуальность исследования: методы обучения, используемые в прошлом, больше не эффективны и не соответствуют потребностям современных студентов, которые являются пассивными, немотивированными и не обладают навыками критического мышления. Учителям необходимо изменить свой подход, чтобы предоставить своим студентам адекватные ответы. Они должны быть в курсе самых последних методических новшеств и разработок. Эти инновационные методы готовят студентов к успешному решению задач реального мира, используя их знания и помогая им самостоятельно реагировать на меняющийся ритм общества, в отличие от традиционных методов. Один из таких активных методов - это метод перевёрнутого класса, который подробно описан ниже.

Перевёрнутый класс, часто называемый "инвертированным классом", представляет собой образовательную методологию смешанного обучения, сочетающую традиционные и онлайн методы обучения. Он состоит из двух частей: первая переворачивает традиционную технику преподавания и обучения, предоставляя учебный материал вне класса, чаще всего через видео и презентации, а вторая заполняет время в классе различными видами деятельности, такими как дебаты и групповая работа. Информационные и коммуникационные технологии (ИКТ) играют ключевую роль в первом процессе, так как теоретические подходы изучаются студентами через фильмы, картинки, компьютерную анимацию или иконографические материалы. Вторая часть соответствует времени в классе, когда решаются проблемы и выполняется практическая работа.

Этот подход включает три линии обучения:

(1) Индивидуальное обучение, которое адаптируется к различным ритмам обучения, так как содержание первой фазы можно изучать столько раз, сколько необходимо;

(2) Совместное обучение, которое осуществляется на протяжении второй фазы, в которой группы работают над достижением согласованных целей до тех пор, пока не будет достигнута желаемая цель;

(3) Обучение, основанное на решении проблем, также происходит во второй половине этого метода, когда то, что было изучено, применяется на практике в реальных ситуациях.

Мы содействуем развитию и улучшению образовательных подходов. Внедрение перевёрнутого класса в нашу обычную учебную среду представляет собой отличную возможность для роста. Технологические особенности современного общества требуют обновления и модернизации учебных практик в классах. В силу своей природы и длительной истории в образовании, особенно математика, требует новых педагогических действий для повышения академических показателей, связанных с самой темой, и улучшения отношения студентов. Для достижения этих целей в ходе обычных лекций по математике в этом исследовании был использован методический подход перевёрнутого обучения. Этот новый подход был разработан для решения новых задач, ресурсов и учебных инструментов, которые появились в результате технологического бума.

Две важные предпосылки в использовании перевёрнутого обучения, связанные с эффективностью учебной процедуры, - это характеристики студентов и их уровень образования, которые окажут наибольшее влияние на полученные результаты.

В связи с тем, что в нашей стране используются традиционные методы обучения, ученики средних школ страдают от низкой мотивации и желания получить новые знания. Поэтому мы стремимся развивать целеустремленность и мотивацию учащихся, предлагая активное обучение вместо традиционного. Мы считаем, что желание ученика учиться, стремление получить новые знания является основой в учении предмета, потому что чем выше мотивация - тем более продуктивным и эффективным будет понимание предмета.

Через перевёрнутое обучение мы стремимся внедрить различные интерактивные методы, которые повысят успеваемость студентов и их желание учиться.

Мы интегрировали больше практики, взаимодействия студентов, игр и других элементов активного обучения в повседневную практику предметов. В то же время, уменьшая время пассивного обучения и лекций до минимума, мы наблюдаем, как это влияет на отношение студентов к предмету. А именно, увеличилась ли их мотивация и желание изучать математику.

Для многих учеников математика кажется трудным и "загадочным" предметом в школьной программе. Но мы надеемся, что с помощью нашего эксперимента мы сможем доказать, что отношение школьников к такому сложному предмету может быть иным. Изменяя подход, способы предоставления информации и методы закрепления знаний, отказываясь от традиционной методики пассивных лекций, мы значительно увеличим уровень мотивации учащихся изучать математику.

В нашей статье мы подробно объясняем, что такое перевёрнутое обучение и как мы можем начать его использовать. Мы также раскроем, какие именно особенности этой методологии позволят нам изменить отношение студентов к предмету к лучшему.

Наше общество постоянно меняется, и стандарты образования и профессионального мира тоже повышаются. Традиционные методики обучения требуют срочной реформы и инновационных прорывов в наше время. Перевёрнутое обучение позволяет нашим студентам развивать критическое мышление и креативность, что, безусловно, скажется на их готовности к высшему образованию. Более того, в последующей карьере и в реальном мире эти навыки наверняка будут ценными и станут основой для успешного развития.

В нашу цифровую эпоху мы должны идти в ногу со временем. Активное использование информационно-коммуникационных технологий в образовании ещё предстоит впереди. Поэтому мы не должны бояться внедрять использование цифровых технологий в нашу систему образования. После проверки предварительной готовности и способности учащихся использовать гаджеты, компьютеры, ноутбуки и интернет в учебе, мы убедились, что внедрение ИКТ-технологий положительно сказывается на мотивации учеников.

Обучение в целом становится более доступным во всем мире благодаря технологической интеграции. Поэтому цель исследования - изменить способ получения знаний от ориентированного на учителя к ориентированному на студента.

Цель исследования: Изучение эффективности перевёрнутого обучения, как предложено в недавней литературе о влиянии в образовательных исследованиях. В сравнении с классическими и экспозиционными подходами к передаче знаний, в которых учитель односторонне воспроизводит информацию без поощрения обмена знаниями и взаимодействия со студентами, было обнаружено, что они менее эффективны.

Гипотеза исследования: В данном исследовании старшеклассники имеют более высокую мотивацию к изучению математики в системе перевёрнутого класса, чем в традиционной.

Цель исследования: Демонстрация эффективности перевёрнутого обучения в повышении уровня знаний по математике и мотивации среди учащихся старших классов.

Объект: Роль перевёрнутого обучения в улучшении мотивации школьников по математике.

Предмет: Процесс и методы внедрения перевёрнутого класса в программу математического обучения в средней школе.

Обзор литературы

Обучение как процесс

В настоящее время, на стадии развития общества, одной из наиболее актуальных задач является воспитание самостоятельных, свободных и критически мыслящих молодых людей. Следовательно, при организации учебного процесса в высших учебных заведениях важно интенсифицировать познавательную деятельность студентов, развивать навыки самостоятельного и критического мышления, а также стимулировать когнитивную активность студентов. Во время организации учебного процесса особенно важно развивать осознание того, что результаты их критического анализа ценны, необходимость эффективного выбора информации и идей, а также превращение их в форму практических действий.

Определение обучения

Процесс, через который люди проходят для приобретения новой информации и навыков и в конечном итоге влияют на свои отношения, решения и действия, называется процессом обучения. В ходе учебной деятельности осуществляются действия для достижения образовательных целей. Они могут быть выполнены индивидуально, хотя это происходит в культурном и социальном контексте, где люди интегрируют свои новые знания с предшествующими когнитивными структурами.

Обучение включает в себя не только посещение занятий. В зависимости от типа занятия и темы, запоминание и применение новой информации и навыков будут варьироваться от 10% до 30% во время занятия. Степень освоения материала сильно зависит от двух факторов: сохранения и поддержки управления. В то время как тактики сохранения и внеклассная поддержка управления рассматриваются в рамках учебной инициативы, полезность новой информации и навыков может быть намного выше, часто даже девяносто процентов или более.

Домашнее задание студентов в перевернутом классе

Студенты обычно смотрят учебные видеоролики вне классной комнаты, но участвуют в учебных занятиях с другими студентами в классе. Это позволяет студентам учиться в свое время и темпе вне классного времени, что позволяет лектору улучшить взаимодействие, сотрудничество и мышление высшего порядка студентов через отслеживание индивидуального обучения и выполнение заданий в целом.

Для разработки этой структуры использовались исследования о перевернутом классе в целом и о конкретных компонентах модели перевернутого обучения.

Перевернутое домашнее задание - это в основном видео- или мультимедийная информация, назначенная студентам. Если видео включает записанную лекцию, презентацию

с голосовым сопровождением или презентацию с изображением в изображении, то возможно создать общую структуру, основанную на целостном понимании учебного материала.

Изучив работу Илликвида и его коллег, мы обнаружили благоприятную связь между записанными видеолекциями и лекциями вне экрана в течение трех недель изучения математики. Несмотря на то что этот форматный подход к домашним заданиям прибылен, нам нужна была структура для видео- или мультимедийных домашних заданий, которая включала бы в себя полный образовательный треугольник - преподавателя, студентов и учебный материал. То, на что акцентирует образовательный треугольник, - это то, что преподавание не только о том, как работают учителя, а скорее о том, как они устанавливают отношения студента с изучаемым предметом. Однако треугольник позволяет нам думать более широко и расширить эту процедуру на домашнюю среду через использование мультимедийных технологий, которые традиционно являются средой для такого процесса в школе и классной комнате. Некоторый материал в видео помогает студентам готовиться к занятиям заранее. Учителей вовлекают с учениками на трех уровнях: лично, через использование видео или косвенно через выбор подходящего материала. Студенты, в свою очередь, либо просматривают материалы, либо каким-то образом участвуют в их изучении. Домашнее задание студентов в перевернутом классе обычно характеризуется использованием подкастов, подкастов и предварительного подкастинга.

Объяснительное видео, мультимедийная презентация или лекция часто рассматриваются как домашнее задание в перевернутом обучении.

Было проведено множество исследований по различным аспектам перевернутого домашнего задания, но нет универсально признанной структуры, объединяющей эти качества. Ориентационные/мотивационные видеоролики теперь могут быть впервые отличены от лекций. Математические концепции и идеи объясняются, математические реалии обосновываются, а рабочие примеры математических проблем включаются в эти обучающие видеоролики. Преподаватели могут быть из различных источников, таких как Канцелярия Хана или образовательные программы на YouTube, или они могут быть комбинацией обоих. Существует множество примеров того, как видеолекция и сопровождающее приложение показывают, как решать алгебраическую задачу. Вторичная арифметика подвержена влиянию этой формы видео-мультимедийного контента. Возможно, это следствие изображений обучения математике и учебного процесса с целью понимания, а не простого запоминания данных и фактов" (Ричхарт, Черч и Моррисон, 2011). Для того чтобы развивать способность студентов к пониманию, важно для учителей отойти от практики "поверхностного обучения", которая предполагает механическое запоминание данных и фактов. С этого момента им придется обратить внимание на "глубокое обучение", которое предполагает создание понимания через "воображение и творческие действия" (Ричхарт, Черч и Моррисон, 2011). Традиционная парадигма, ориентированная на преподавателя, должна быть отвергнута, чтобы педагоги могли достичь этой цели, и должна быть установлена парадигма, ориентированная на учащегося. Среди предложенных Чиккерингом и Гамсоном (Chickering & Gamson, 1987) идеальных лучших практик в активном обучении следующие: В области педагогики термин "активное обучение" обозначает педагогические подходы, которые уделяют значительное внимание участию учащихся в учебном процессе и их использованию своего тела и ума в процессе обучения. (Принс, 2004). Согласно Национальному совету по активному обучению, педагогические практики активного обучения включают "образовательные мероприятия, вовлекающие учащихся в действия, а также заставляющие их размышлять о том, что они делают, чтобы помочь учащимся учиться." (Бонуэлл и Эйсон, 1991).

Мероприятия должны быть организованы таким образом, чтобы основные цели обучения, требующие полного и внимательного участия студентов, получили приоритет. (Принс, 2004).

Преимущества системы перевернутого класса

В перевернутых классах педагоги подготавливают онлайн-контент различными способами. Стрейер (Стрейер, 2007) предложил ряд проницательных наблюдений и рекомендаций для учителей, рассматривающих использование парадигмы перевернутого класса. Существует доказательство того, что переворот класса эффективнее, когда у студентов есть больше свободы в том, как они взаимодействуют с знаниями. Студенты в перевернутых классах более осознанны в своем обучении, чем те, кто учится в традиционных классах из-за структурных изменений. Студентам потребуется больше времени для осмысления своих учебных действий, чтобы установить основные связи с учебным материалом. Преподаватель должен включить раздел рефлексии в учебную структуру курса. Важно, чтобы преподаватель обращал внимание и консультировал по конкретным аспектам рефлексии студента. Этот обратный связанный цикл необходим для оценки результатов обучения и анализа процесса обучения студентов различных уровней. Учет индивидуальности каждого студента повысит эффективность обучения. В части разрешения студентам взаимодействовать с знаниями на основе их уникальных стилей обучения, перевернутый класс кажется более эффективным, чем обычные классы. Одним из преимуществ методики перевернутого обучения является то, что при использовании этого метода учителя используют различные методы представления информации: записанные лекции в аудитории, записанные лекции с озвучкой, презентации, видео с YouTube и других образовательных платформ и сайтов (Роэль, Редди и Шеннон, 2013). Исключив лекции из аудитории, студентам предоставляется больше возможностей для активного участия в учебных занятиях и взаимодействии. Стандартная оценка класса может не показать, как студенты продвигаются, пока не завершится курс (Чикеринг и Гамсон, 1987). Благодаря увеличенному контакту студента/преподавателя в перевернутом классе, учителя лучше понимают уровень понимания студентами содержания и учебного материала. Исключение лекций из аудитории также позволяет студентам больше взаимодействовать друг с другом и с преподавателем. Перевернутый класс также позволяет студентам, которые стесняются задавать вопросы во время лекции, обращаться за помощью к преподавателю во время индивидуальных сессий обратной связи. Перед подготовкой своих вопросов студенты могут "пересматривать" лекции множество раз.

Ограничения использования модели "перевернутого класса"

Модель перевернутого класса может быть неэффективной для всех курсов. Стрейер (Стрейер, 2007) провел исследование, сравнивая перевернутый класс с традиционным классом для вводного курса по статистике. По результатам исследования, студенты в перевернутом классе были менее удовлетворены стилем обучения, чем студенты в обычном классе. "Студентам было довольно сложно адаптироваться к новым образовательным условиям. Когда дело доходило до групповых проектов, несколько студентов неохотно включались в них, поскольку им было удобнее работать самостоятельно. Другие привыкли выполнять работу самостоятельно в выбранной ими среде. Тем временем дети в перевернутой модели проявляли больше креативности и командной работы в своем обучении по сравнению с студентами традиционного класса." Адаптация традиционных лекций к альтернативным медиа для публикации информации онлайн - одна из проблем концепции перевернутого класса. Еще одной проблемой для лекторов является внесение изменений в онлайн-лекции. Технология, используемая для создания лекции, может повлиять на степень адаптации, необходимой для изменения учебного материала. Это может быть столь же сложно, как перезапись всего видео или так же просто, как добавление слайдов к презентации PowerPoint для внесения изменений. Педагоги будут вынуждены изучать и использовать больше технологий презентации информации, поскольку они станут более интеллектуальными, быстрыми, лучшими и доступными (Пренски, 2010). Студенты должны нести большую ответственность за свой уникальный образ обучения в перевернутых классах и активном обучении. В своей учебной программе учителя должны четко определить требования к мотивации и саморуководству своих студентов. Также важно учитывать бюджетные ограничения государственных школ, преподавателей и студентов при обсуждении внедрения

концепции перевернутого класса. Эффективность этой концепции зависит от доступности компьютеров и интернета за пределами классной комнаты. В результате преподаватели должны быть осторожны при использовании этой стратегии, если они беспокоятся о том, смогут ли все студенты быстро и последовательно получать доступ к интернет-контенту.

Значимость мотивации

Уже существует растущее количество исследований, демонстрирующих, как эмоциональные связи преподавателей с учениками влияют на мотивацию детей и их академические достижения в школе (Джувонен, 2006; Уентзел, 2009). Учителя, которые эмоционально поддерживают своих учеников, имеют более сильное представление о способностях, связанных со школой, четкие позитивные социальные и академические цели, а также готовность участвовать в школьных мероприятиях.

На сегодняшний день исследования по данной проблеме показывают, что учителя, внедрившие перевернутое обучение в свою практику преподавания математики, достигли отличных показателей успеха среди учеников, особенно с точки зрения мотивации.

Какие способы влияют на мотивацию студентов в классе?

Согласно исследованиям Перри, мотивация студентов может быть затронута динамикой классной обстановки и взаимодействием между студентами, преподавателями и другими сотрудниками школы (PerrySmith, 2006). Они утверждают, что вовлеченность студентов в различные образовательные среды и взаимодействие с другими создают мотивацию. Различные виды учебных заданий, методики преподавания и взаимодействие между учителями и студентами, а также между студентами, оказывают влияние на мотивацию студентов (Stipek, В развитии мотивации к достижениям, 2002). Они также изучают исследования по некоторым темам, схожим с теми, о которых пишет Стайпек. Взгляды Стайпека на методы преподавания обычно принимаются, но авторы указывают на то, что поскольку классы являются динамичными и многомерными, один и тот же метод может иметь разные значения в других условиях. Ученые в области социокультурной мотивации пришли к подобным выводам о жидком, контекстно-зависимом характере мотивации (Hickey, 1997; Hickey & Granade, 2004; NolenHoeksema, Stice, Wade & Bohon, 2007). Согласно этим исследованиям, мотивация не является постоянной индивидуальной характеристикой, которая действует однородно в различных контекстах. Более того, классы – это постоянно меняющиеся структуры, зависящие от того, кто находится в них, и взаимного влияния профессоров, студентов и деятельности в помещении. Существует ряд предположений в теориях социокультурной мотивации, с которыми не согласны теоретики социокультурной мотивации, поскольку они сосредотачиваются на личности, а также на том, что методы, предполагаемо способствующие увеличению мотивации, будут работать одинаково в разных классах.

Методология

Инструментарий

В качестве инструментария для проектной работы был выбран опросник из исследования под названием "ШКАЛА МОТИВАЦИИ К УЧЕБЕ МАТЕМАТИКИ В НАЧАЛЬНОЙ ШКОЛЕ" (Эрсой и Оксуз, 2015), который содержит тридцать три вопроса и трехбалльную шкалу для их оценки. Кроме того, опросник состоял из двадцати девяти позитивных и четырех негативных вопросов. Эти негативные элементы, которыми являются 3, 5, 9 и 11 вопросы, представляют противоположное значение по отношению к позитивным. Например, первый вопрос:

-"Математика для меня легкий предмет" является антонимом к девятому вопросу;

-"Математика для меня трудный предмет".

Затем, во время перевода с английского на казахский язык сначала использовался переводчик Google, но смысл изменился и стал непонятным. Затем опросник был переведен

вручную с сохранением смысла и проверен четырьмя экспертами, имеющими опыт преподавания математики на казахском и английском языках. Наконец, авторы (Элейн Аллен и Кристофер Симан, 2007) отметили, что самое важное – содержать как минимум пять шкал, поэтому количество шкал было изменено с трех до пяти для получения более точных результатов.

Поскольку исследователи недостаточно знали о участниках, были составлены демографические данные, состоящие из семи пунктов. Цель заключалась в том, чтобы проверить, насколько студенты готовы к перевернутому классу. У них есть ли устройства, такие как ноутбуки, компьютеры, доступ в интернет, а также собственная комната для занятий.

Когда расписание было готово, его проверили пять экспертов, имеющих опыт преподавания математики на казахском и английском языках, и им разрешили использовать его. Это расписание содержало вопросы вроде "У вас есть свое собственное устройство?", "Какой тип устройства вы используете для выполнения домашнего задания?", "Удобно ли вам выполнять домашнее задание дома?" и т. д. Учитывая результаты расписания, было решено, что студенты могут выполнять задания, которые будут даны. У всех студентов был доступ в интернет дома, но не у всех были устройства с большим экраном. 20 студентов имели смартфоны и ноутбуки или компьютеры, в то время как у других были только смартфоны.

Участники

В эксперименте участвовали 26 учеников 9-го класса студентов Школы интеллекта Назарбаева, где ученики были разделены на два разных класса: 9A и 9E. Более того, эксперимент продолжался три недели в четвертом семестре учебного года 2021-2022. Восемнадцать из них были мальчики, а остальные ученики были девочками. Кроме того, 73% участников были в возрасте пятнадцати лет, в то время как другие пять и два ученика были в возрасте четырнадцати и шестнадцати лет соответственно.

Таблица 1. Демографические данные

Возраст	Мальчики	Девочки	Общее
14	4	1	5
15	12	7	19
16	2	0	2
Общее	18	8	26

Экспериментальная часть

Период обучения продолжался три недели, и ученики изучали математику три раза в неделю. Каждое занятие состояло из парной урок, продолжительностью 40 минут. Исследование проводилось с участием учеников 9-го класса, изучающих одну из великих областей математики - "Тригонометрические функции". Тема была разделена на 18 подтем, и каждая из них включала в себя различные формулы с различными типами задач. Ученики изучали две подтемы за одно занятие, чтобы изучить всю тему за три недели. Каждое занятие включало три раздела: просмотр видеоуроков вне класса, проверку знаний и интерактивные учебные мероприятия в классе.

Видеоурок

Основная цель первой части заключается в предоставлении студентам базовых данных по теме для самостоятельного изучения, и их задача - хорошо подготовиться к разделу учебного материала. В большинстве случаев учителя используют методики, которые предоставляют

ценную информацию для учеников, что облегчает процесс обучения. Многочисленные исследования показали, что технические знания могут улучшить процесс обучения (Means, Toyama, Murphy, Bakia & Jones, 2010; Schmid, Bernard, Borokhovski, Tamim, Abrami, Surkes, Wade & Woods, 2014), особенно эффективность видео очень высока. Кроме того, видеоуроки имеют отличные возможности обучать студентов наилучшим образом, например, студенты, которым трудно понять содержание урока, могут просматривать видео несколько раз, они могут повторять материал в любое время и в любом месте (Hwang, Lai & Wang, 2015; Lew, 2016). Кроме того, большинство студентов не хотят читать книги или другие источники из Интернета дома, потому что чтение чего-то длительное время скучно для них (White, 2015). Поэтому использование интересных видеообъяснений дает возможность изучать учебный материал, смотря и быстрее, чем читая книги, видео включает в себя и содержание урока, и примеры с пошаговым решением, чтобы изучать материал практически (Xiu, Moore, Thompson & French, 2018; Hwang, Lai & Wang, 2015).

Часть материала состояла из терминологии, определений и формул, которые должны были использоваться в практической части, в то время как вторая секция показывала различные проблемы и методы их решения. Следовательно, примеры в видео были взяты из их собственной книги, которую они изучают, чтобы показать им похожие задачи и их решения. Видеоматериалы были подготовлены с использованием приложений, таких как Webex Meeting для съемки видеоэкрана, Paint в качестве белой доски и Scissors для взятия формул, задач из книг. Кроме того, учителя должны иметь графические планшеты, которые они могут использовать для демонстрации каждого шага решения. Длительность первых двух видео составляла приблизительно 12-15 минут, но это было слишком много для студентов, и количество студентов, просмотревших видеоурок, было небольшим. Это привело к тому, что студенты не готовились к занятиям и не могли ответить на базовые вопросы на проверочной части. Несколько анализов показывают, что менее 50% студентов склонны смотреть видео длиной более 9 минут. Кроме того, было показано, что студенты очень стремятся к видеоуроку, когда длительность видео меньше 6 минут (Guo, Kim & Rubin, 2014). Поэтому после 2 видео длина видео сократилась с 12-15 минут до 5-6 минут, чтобы увеличить посещаемость студентов и участие в учебной работе. Большая часть дополнительной информации была удалена из содержания видео, и количество подобных примеров с решением сократилось. Эффективность коротких видео сразу принесла результаты, это было очевидно во время урока, когда студенты начали задавать вопросы.

Проверка знаний

В первом разделе студенты изучают новые темы, но могут возникнуть проблемы с пониманием некоторых сложных моментов. Поэтому задача учителя - проверить примененные знания студентов и определить возможные недопонимания перед началом выдачи заданий. Самый быстрый способ проверить понимание студентами, чтобы эффективно использовать время урока, - это провести онлайн-тесты. Более того, многочисленные исследования показали, что прохождение тестов улучшает вовлеченность студентов в учебный процесс, мотивацию к выполнению заданий и социальные отношения, что способствует созданию хорошей атмосферы в классе (Wang, Øfsdal & Mørch-Storstein, 2018; Wu, Wang, Børresen & Tidemann, 2011). Таким образом, одной из первых онлайн-платформ, включивших систему образования, стал Kahoot!, который содержит множество интересных функций, таких как установка ограничения времени на каждый вопрос, немедленное показ результатов, начисление баллов не только за правильный ответ и время, затраченное на ответ, но также может включать различные типы вопросов и соревнования, вовлекающие всех студентов (Malone, 1981).

В начале каждого урока студенты проверяются с помощью Kahoot!, который состоит из пяти-семи основных вопросов, касающихся темы, включающей все части объяснения и формулы. Это занимает всего 3-5 минут урока, в зависимости от сложности вопросов и времени на ответ на каждый вопрос. Вопросы были разных типов и варьировались от простых

до сложных. Как правило, трем студентам, набравшим высокие результаты, давались шоколадки в качестве награды. Когда студенты получают награды за свои достижения, они решают задания разными способами и не чувствуют контроля со стороны учителя, что оказывает огромное влияние на процесс обучения (Amabile & Gitomer, 1984; Condry, 1977; Ryan & Grolnick, 1986). Более того, это влияет на поведение студентов, которое вызывает интерес к уроку, заданиям с повышающимся уровнем сложности и рискам при решении более сложных задач (Adelman & Taylor, 1990; Amabile & Gitomer, 1984; Spaulding, 1992). Кроме того, исследователи могли понять, где студенты не понимают материал или где могут возникнуть проблемы в ходе урока, проведя тестирование. Поэтому учителя анализируют результаты теста и принимают решения относительно уровня обучения студентов.

Если большинство участников не справились с мини-экзаменом, это показывает, что есть ошибки в объяснении материала или вопросы, отличающиеся от примеров из учебника. Более того, некоторые студенты могут не понимать некоторые части темы из-за стиля обучения, и учитель должен работать с этими студентами после выдачи заданий всему классу.

Практическая часть

Задача учителей в классе - достичь успеха студентов по определенной теме. Существует множество факторов, которые могут на это повлиять, такие как отношения учителей с учениками, методы, используемые в классе, тип работы и различные виды заданий и способы их решения. Поэтому перед началом урока учитель должен спланировать урок, чтобы быть уверенным, что все его части хорошо распланированы. Как только понимание учеников новой темы оценено, учитель должен знать, как помочь им улучшить это знание. Существует несколько методов, которые могут повлиять на участие студентов в уроке, улучшить критические навыки учеников. Первый метод, который развивает когнитивные навыки обучающихся и учит их предоставлять некоторые факты о своем решении, - это задавать открытые вопросы, такие как «Что вы думаете о применении этого знания в реальной жизни? Можете ли вы показать три разных способа решения этого упражнения?» (Lee, Kinzie & Whittaker, 2012). Эти виды вопросов позволяют выразить мнение детей, продемонстрировать новые идеи и развивать коммуникативные навыки. Кроме того, использование интерактивных методов, которые показывают взаимоотношения между учителем и учеником, учеником и учеником, помогает обмениваться мнениями и идеями по обсуждаемому вопросу, вовлекаться в урок и улучшать коммуникативные и аналитические навыки (Khanin, 2013). В большинстве случаев это включает брейнсторминг, обсуждение конкретных тем и интересные факты, которые повышают интерес учащихся. Кроме того, некоторые сложные математические задачи решаются, подняв учеников со стульев и показывая решения шаг за шагом. Дополнительно, в большинстве случаев учитель задает некоторые вопросы, чтобы вместе с учеником найти ответы и показать путь, который поможет достичь результата. Этот тип поддержки положительно влияет на процесс обучения студентов, понимание концепции темы четко и дает подробное представление о том, как решать подобные проблемы (Bean & Stevens, 2002; Saye & Brush, 2002; Simons & Klein, 2007).

Одной из самых важных частей обратного класса является разнообразие заданий и способ их выдачи. Сложность задач играет огромную роль в обучении студентов. Она влияет на их участие в уроках, уровень мотивации и желание добиться успеха (Хом и Максвелл, 1983). Если задача заставляет учеников думать и решать ее, они должны использовать несколько методов, что увеличивает интерес учеников к нахождению решения и дает возможность понять тему проще. Уровень интереса падает, если задача слишком сложна или слишком проста и требует только одной формулы. Более того, если дети считают, что данное задание легко решить, они проявляют больший интерес к его решению, чем студенты, которые думают, что задача слишком сложная для них (Хом и Максвелл, 1983). Поэтому лучше давать задания с повышающимся уровнем сложности от легкого к сложному, и учитель должен показать, что дети могут легко решать проблемы. Кроме того, предоставленные задачи должны отличаться друг от друга, потому что если проблемы похожи и для их решения студенты должны

использовать одинаковый метод, прогресс обучающихся остается на одном уровне, и вместо того чтобы учиться дифференциации или создавать свой собственный способ решения, их мыслительные способности ослабевают.

Сбор данных

В данном исследовании собирались и оценивались количественные данные, включая работы до и после теста. Кроме того, администрация школы согласилась провести исследование и предоставила нам разрешение на его проведение.

Перед проведением опроса респондентам было объяснено, что он будет анонимным и что никто, кроме участников исследовательской группы, не будет иметь доступа к данным, это также было указано в бумагах опроса. Исследования показали, что в зависимости от того, осознают ли респонденты, что их ответы анонимны, на одни и те же вопросы они обычно дают разные ответы (Олсон, Стандер и Меррилл, 2004). Кроме того, респонденты были выбраны случайным образом, так как Трохим утверждает, что простая случайная выборка является здравой стратегией для экстраполяции результатов исследования на всю популяцию (Трохим, Кабрера, Мильштейн, Галлахер и Лейшоу, 2006).

Как уже упоминалось, в исследование было вовлечено 26 студентов, но в предварительном тесте участвовали двадцать двое из них, а в последующем тесте - двадцать пять. В итоге общее количество участников, которые приняли участие в обоих опросах, составило двадцать одного человека. Трое мальчиков и две девочки, 008, 023, 024, 025, 026, которые не участвовали в одном из опросов, не были включены в статистический анализ.

Все четыре опроса были проведены в начале урока и занимали приблизительно пятнадцать минут. Кроме того, участникам было необходимо подписать свои листы предварительного и последующего теста одним и тем же кодом, поскольку данное исследование проводилось в течение продолжительного времени. Использование SGIC позволило им написать собственный уникальный символ. Обычно SGIC основан на ответах участников на ряд личных вопросов (Одетт, Хэммонд и Рочестер, 2019). Например, некоторые исследователи (Юрек, Вейси и Хэвенс, 2008) использовали четыре вопроса SGIC. Первая буква имени матери респондента, количество старших братьев, месяц рождения и первая буква собственного второго имени были запрошены. Если, например, они сказали, что имя их матери - Белла (B), у них два старших брата (02), они родились в сентябре (09), и их второе имя - Кевин (K), то их идентифицирующий код был бы B0209K. Поэтому для респондентов были подготовлены три вопроса SGIC. Первый вопрос просил записать последние две цифры их номера телефона, второй - записать первую букву второго имени, а третий - написать количество братьев и сестер. Следовательно, коды респондентов были такими, как 84R3, 56N4, 22D1 и т. д. Согласно идентифицирующей информации, каждому участнику был присвоен идентификационный номер от одного до двадцати шести. Все данные, тридцать три элемента предварительного и последующего теста двадцати шести респондентов, были внесены вручную в Excel. Кроме того, было восемнадцать мужчин и восемь девушек, которые были помечены 1 и 0, соответственно. Это помогает при анализе данных в Jypiter notebook и Pycharm.

Как уже упоминалось, в опросе были отрицательные вопросы, с использованием метода шесть минус значение, эти элементы были преобразованы в положительный формат и использовались для определения итогового результата. В ходе этой процедуры возникали проблемы, такие как неотвеченные вопросы и пустые ячейки. В предварительном тесте было две пустые ячейки, а в последующем тесте — одна. Они оставались шестью даже после преобразования в положительный формат.

Что касается положительных элементов, были также неотвеченные вопросы, и все они были заполнены средним значением соответствующего столбца. Например, если участник 017 не ответил на первый вопрос, эта ячейка была заполнена средним значением ответов других участников на этот вопрос. Однако таких ячеек было не так много, всего семь.

Анализ данных

При анализе данных мы использовали базовую статистику, такую как среднее значение (M), стандартное отклонение (SD) и парный t-тест. Для их определения использовались программы, такие как Pycharm и Jupyter Notebook. Среднее значение и стандартное отклонение возраста составили соответственно 14,88 и 0,515. Это означает, что возраст участников варьируется от 14 до 16 лет, однако участников в возрасте 16 лет меньше. При расчете статистики с помощью Jupyter Notebook был обнаружен 1 выброс, с идентификационным номером 021.

Таблица 2. Таблица количественного анализа

	Результаты до тестирования	Результаты после тестирования
Количество	20	20
Среднее значение	113.15	118.00
Стандартное отклонение	14.32	13.70

После оценки среднее значение результатов тестов значительно выросло с 113,15 до 118,00, а стандартные отклонения предварительного и последующего тестов составили соответственно 14,32 и 13,70.

Из-за способа построения опросника баллы между 33 и 59 указывали на "очень низкий уровень мотивации", между 60 и 86 – на "низкий уровень мотивации", между 87 и 111 - на "средний уровень мотивации", а между 112 и 138 - на "высокий уровень мотивации", наконец, между 139 и 165 - на "очень высокий уровень мотивации". Кроме того, было выявлено, что у 14 студентов мотивация возросла, в то время как у других - уменьшилась. Эффективность инвертированного класса была проанализирована с помощью t-теста, уровень значимости которого был принят равным 0,05. Таким образом, после оценки t-теста значение p составило 0,047, что означает надежность на уровне 95,3%. В результате, на основании значения p мы значимо можем отклонить нулевую гипотезу и принять альтернативные гипотезы, что подтверждает эффективность инвертированного класса в средней школе.

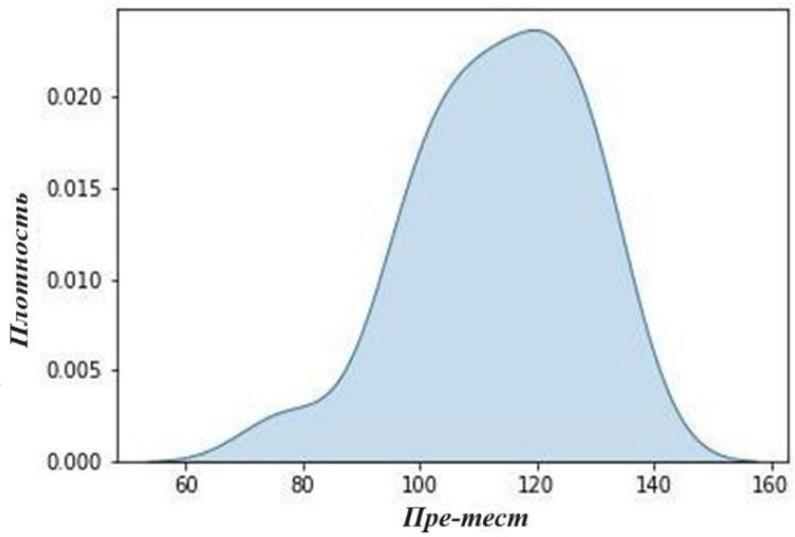

Рисунок 1 - Результаты до тестирования

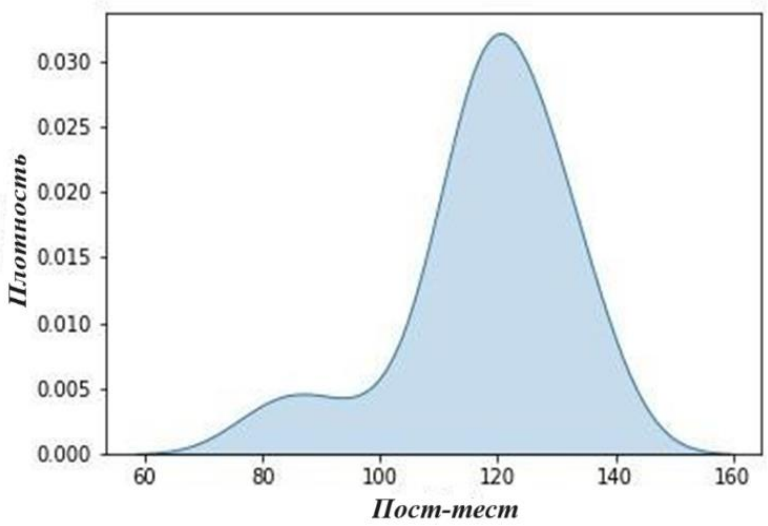

Рисунок 2. Результаты после тестирования

Обсуждение

Исследования показали, что несмотря на множество преимуществ инвертированного класса для обучения математике, учителя могут столкнуться с препятствиями. Первая сложность заключается в изменении стиля обучения и обучения математике. В инвертированном классе могут возникнуть проблемы, поскольку студенты могут приходить на занятия, не просмотрев видеоматериалы и не имея базовых знаний по теме. Еще одним вызовом является создание материалов, специфичных для предмета. По этой причине учителя должны иметь хорошо подготовленные материалы, такие как презентации PowerPoint, видеолекции и хорошие заметки, которые будут использоваться в практической части. Кроме того, учителя могут предоставлять видеоматериалы из онлайн-порталов, таких как YouTube, Khan Academy, TeacherTube и т. д., но не все материалы на этих платформах могут использоваться в качестве домашнего задания, потому что многие из них не содержат того, что учитель хочет объяснить или обучить студентов. В этом случае каждый учитель должен подготовить свои собственные видео, презентации и задания, что может занять время и быть неудобным процессом. Что касается длительности видеолекций, мы обнаружили, что они могут быть в диапазоне от 10 до 20 минут. В зависимости от аудитории подходящая длительность видеолекции может быть короче или длиннее. Некоторые исследователи рекомендуют длительность видео менее 15 минут или 10 минут. Чтобы помочь студентам улучшить свое понимание математики, видео должны включать прямые вопросы, задания с объяснениями и примеры из реальной жизни.

Результаты исследования вызывают сомнения, поскольку в нем были проанализированы опросы всего лишь двадцати шести участников, исследование продолжалось всего три недели. Кроме того, исследователи не были хорошо обученными учителями математики без профессионального опыта.

Заключение

Основная цель исследования заключалась в изучении и понимании эффективности инвертированного класса в средней школе. После трехнедельного опыта, проведенного в Школе интеллекта имени Назарбаева, мы можем уверенно сказать, что инвертированный класс является приемлемым методом обучения математике. Как показано на графиках, мотивация студентов увеличилась всего за три недели обучения. Студенты смогли повысить свои навыки самостоятельного обучения, подготавливаясь к уроку в модели инвертированного класса. В результате этого опыта студенты осознали, что изучение новых вещей возможно даже без помощи учителя. Это привело к тому, что студентам оставалось больше времени на практические занятия, проектное обучение и интересные задания.

Студенты, не привыкшие к самостоятельному обучению, могут испытывать трудности и нуждаются в некотором времени для адаптации к новому методу.

Несмотря на то, что этот педагогический метод нов и еще не был внедрен в нашей стране, инвертированное обучение оказывает такой эффект, как увеличение навыков самостоятельного обучения студентов и продление стиля преподавания, ориентированного на студента, на уроке по сравнению с традиционным методом, если используется инвертированный класс. В качестве подтверждения действенности наших утверждений результаты показали, что инвертированный класс оказал значительное влияние на студентов средней школы по математике.

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Жанел Шайхы[1], Мейиржан Нұрланұлы[2], Самат Максутов[3]
[1,2,3]SDU University, Қаскелең, Казақстан
*e-mail: zhanel.shaikhy@sdu.edu.kz

ОРТА МЕКТЕПТЕ ҰШҚЫ САБАҚ ӘДІСІН ҚОЛДАНУДЫҢ ӘСЕРІ

Аңдатпа. Көптеген жылдар бойы мектептегі білім беру жүйесі мұғалімнің оқытушы ретінде дәріс беру әдісімен ғана шектелетін еді. Бірақ біздің қоғамымыздың дамуымен білім беру жүйесінің мақсаттары мен талаптаары да өзгере бастады. Уақыттың талап етуімен білім

бері жүйесіне жоғары деңгейдегі танымдық дағдылар мен ойлау дағдыларын дамытуға ықпал ететін және сол арқылы оқушыларды поссивті қозғалмайтын, мінезқұлықтан қорғайтын оқытудың белсенді әдістері мен иннавацияллық педагогикалық араласулары енгізілмек. Бұл жұмыста мектептегі білім беру жүйесінде оқытудың төнкерілген әдісін енгізудің орта мектепте математиканы оқитын оқушылардың мотивациясына әсері талданады. Біз 26 орта мектеп оқушыларынан іріктеу эксперименті үшін іріктеуден кейін статистикалық талдау жүргіздік. Экспериментке қатысушылардан 33 сұрақтан тұратын алдын-ала тест пен пост-тестті алып, t-критерий арқылы деректерді талдағаннан кейін біз тоғызыншы сынып оқушыларының мотивация деңгейі едәуір жоғарылағанын анықтадық. Бұл мақалада төңкерілгнен сыныпта қолданылатын стратегиялар оқушылардың пәнге деген көзқарасы мен уәжіне оң әсер ететіндігін айқын көрсетеді.

Түйін сөздер: төңкерілген оқыту, әдістер, мотивация, бейне дәріс, сауалнама.

Zhanel Shaikhi[1], *Meiirzhan Nurlanuly* [2], *Samat Maxutov*[3]
[1,2,3]SDU University, Kaskelen, Kazakhstan
*e-mail: zhanel.shaikhy@sdu.edu.kz

IMPACT OF USING THE FLIED CLASSROOM METHOD IN A SECONDARY SCHOOL

Abstract. For many years, the school education system represented a lecture-explanatory method of teaching and learning, where the teacher had the role of only an informer and lecturer. But with the development of our society, the goals and requirements of the education system began to change. Time requires the inclusion in the education system of active learning methods, and innovative pedagogical interventions to contribute to the development of cognitive and higher-order thinking skills, and thereby protect students from passive, unmotivated behavior. This paper analyses the impact of the implementation of a flipped teaching methodology in the school education system on the motivation of students studying mathematics in high school. The main purpose of the article is to confirm the effectiveness of the flipped classroom in improving the academic indicators of students related to their attitude - motivation in particular. Having chosen for the experiment a group of 26 high school students, we conducted the statistical analysis. Taking the pretest and post-test consistent with 33 questions from the participants of the experiment, using the analysis of the t-test, we revealed a significant increase in the level of motivation among 9th-grade students. This article clearly shows that the techniques used in the flipped classroom have a beneficial effect on students' attitudes and motivation towards the subject.

Keywords: flipped classroom, methods, motivation, video lecture, questionnaire.

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Alfira Makhmutova[1]
[1]New Uzbekistan University, Tashkent, Uzbekistan
*e-mail: alfira2002@gmail.com

GENDER ENROLLMENT PATTERNS IN A UNIVERSITY IN KAZAKHSTAN: A 2020-2024 ANALYSIS OF STEM AND NON-STEM DISCIPLINES

Abstract. This study explores gender enrollment patterns in STEM and non-STEM disciplines at a university in Kazakhstan from 2020 to 2024, examining evolving gender dynamics in higher education. Using longitudinal data on enrollment, gender ratios, and Unified National Test (UNT) scores, the analysis reveals persistent gender disparities. Female enrollment in STEM fields remained stable at approximately 34% throughout the study period, contrasting with higher but gradually declining female participation in non-STEM fields, which decreased from 74.8% in 2020 to 68.9% in 2024. Despite statistical significance in changes across both STEM and non-STEM fields, the practical significance of these shifts is minimal, highlighting the challenges of addressing gender imbalances in STEM. Factors such as cultural norms, limited female role models, and curriculum biases are discussed as contributors to the disparity. This research emphasizes the need for targeted interventions and inclusive policies to foster greater female participation and retention in STEM disciplines. The findings also underscore the economic and societal relevance of equitable education, offering actionable insights for policymakers and educators to promote gender equity in Kazakhstan's higher education system. Ultimately, this study contributes to the broader discourse on gender dynamics in education, particularly in the context of Central Asia.

Keywords: gender disparities, gender equity, enrollment trends, STEM education, higher education.

Introduction

This study considers the evolving gender dynamics in higher education within a specific Kazakhstani university. By examining enrollment trends in STEM (Science, Technology, Engineering, and Mathematics) and non-STEM disciplines over the period from 2020 to 2024, the research sheds light on critical issues of representation. The findings go beyond academic interest, offering valuable insights that could shape educational policies, institutional strategies, and societal attitudes towards gender equity in one of Central Asia's key educational institutions.

Kazakhstan's focus on educational reform and technological innovation provides a compelling backdrop for exploring gender disparities in university enrollments. While women comprise 53% of researchers overall, they represent less than 45% in STEM fields (Tsakalerou, 2022). As the country seeks to diversify its economy and improve its standing in global innovation indices, addressing gender imbalances in higher education—particularly in STEM disciplines—becomes essential. This study is timely and relevant, not only identifying current trends but also contributing to the development of inclusive educational and career opportunities. By doing so, it aims to help ensure that Kazakhstan's future workforce reflects the diverse talents of its population.

Gender disparities in education are a well-documented global phenomenon, yet the case of Kazakhstan introduces unique regional and cultural dimensions. While women dominate in public education and higher education institutions (Kredina et al., 2023), there is gender inequality in postgraduate education, with more women than men pursuing advanced degrees (Satpayeva & Nygymetov, 2023). Factors such as cultural norms, curriculum biases, and limited female role models in STEM careers contribute to this imbalance. Conversely, many non-STEM disciplines have either achieved gender parity or, in some cases, seen higher female participation. By examining these trends at the university level, this study provides a focused view that mirrors broader national and regional dynamics.

The primary objective of this study is to conduct a detailed longitudinal analysis of gender enrollment trends from 2020 to 2024 in STEM and non-STEM disciplines at a Kazakhstani university. Its contributions are wide-ranging, offering empirical insights by documenting enrollment patterns and providing a robust foundation for future research on gender dynamics in higher education. The findings also present actionable strategies for policymakers to address gender disparities within the Kazakhstani context and guide universities in designing inclusive educational approaches that align with local cultural and academic settings. Additionally, the study emphasizes the economic relevance of equitable education by highlighting how gender imbalances may impact Kazakhstan's competitiveness in key industries, reinforcing the broader significance of fostering gender equity in higher education.

Literature Review

Overview of Existing Studies on Gender Disparities in Education

Numerous studies have highlighted the persistent gender disparities within educational settings. For instance, Jacobs (1996) examined the historical trends in gender differences in college enrollment, noting that women have increasingly outnumbered men in higher education overall. However, this trend does not uniformly apply across all disciplines. Despite women's increased participation in higher education, they remain underrepresented in prestigious STEM fields, particularly engineering and computer science (Bystydzienski, 2020; Mullen & Baker, 2015). This gender gap persists due to various factors, including hostile academic climates, exclusionary practices, and subtle discrimination in hiring and promotion (Bystydzienski, 2020). Gender segregation in fields of study persists across different types of universities, with women underrepresented in prestigious fields like engineering and computer science (Jacobs, 1996; Liu, 2024). Cultural stereotypes about these fields, such as social isolation and male-orientation, act as gatekeepers, deterring girls from pursuing these careers (Cheryan et al., 2015). The underrepresentation of women in engineering and computing is significant, as diversity in the workforce contributes to creativity, productivity, and innovation (Corbett, 2015). Conversely, fields traditionally dominated by women, such as education and nursing, continue to see higher female enrollments (Sax, 2001). These studies underscore the complex nature of gender dynamics in education, influenced by cultural, social, and institutional factors.

Focus on Trends in STEM and Non-STEM Enrollments

Recent research has highlighted trends in STEM and non-STEM enrollments and persistence. Predictive analytics using middle school math software interactions can distinguish future STEM majors with 66% accuracy (Pedro et al., 2014). Factors influencing STEM retention include financial aid, demographics, and academic performance, with concerns about the underrepresentation of women and minorities (Whalen & Shelley, 2010). Cross-country analysis reveals that R&D expenditures positively impact STEM enrollments, while population density and expected years of schooling have negative effects (Bruno & Faggini, 2021). For on-campus students, noncognitive factors like academic self-efficacy and degree aspiration positively affect STEM persistence, while academic performance is crucial for both STEM and non-STEM retention (Gansemer-Topf et al., 2017).

Beede et al. (2011) reported that while women's participation in STEM has grown, the rate of increase has not kept pace with that in non-STEM fields, leading to a widening gender gap in STEM disciplines. Hill, Corbett, and St. Rose (2010) further explored why this gap exists, pointing to factors like lack of early encouragement, societal stereotypes, and the chilly climate in some STEM departments. On the other hand, research by Ceci, Williams, and Barnett (2009) suggests that in some non-STEM areas like humanities, women's enrollment has reached or exceeded parity with men. This discrepancy illustrates not just a field-specific gender divide but also the variability in growth rates between different educational sectors.

Gaps in the Current Literature That the Study Aims to Address

While much research has been dedicated to understanding gender enrollment trends, there are notable gaps that the current study aims to address. Firstly, there is a lack of longitudinal data that specifically compares the growth rates of male and female enrollments across both STEM and non-STEM

fields over recent decades. Secondly, many studies focus on either STEM or non-STEM exclusively without a comparative analysis that could shed light on why disparities might occur differently in these areas. Lastly, the interaction between gender and other demographic variables like ethnicity or socioeconomic status in enrollment trends is often underexplored. The research question, "Are there significant differences in the growth rates of male and female enrollments in STEM and Non-STEM fields from 2020 to 2024?", seeks to bridge these gaps by providing a comprehensive analysis of these trends, potentially offering insights into policy and educational strategies to mitigate gender disparities in higher education.

Methodology

Data Sources and Preparation

Table 1. Annual Enrollment and UNT Metrics (2020-2024)

Year	Total enrollment	Female enrollment	Male enrollment	STEM enrollment	non-STEM enrollment	Average UNT scores
2020	2081	1171	910	959	1122	94
2021	2239	1259	980	960	1279	104
2022	2388	1403	985	947	1441	102
2023	2504	1336	1168	955	1549	104
2024	2351	1417	934	579	1772	107

The datasets used in this study were sourced from enrollment records of a university in Kazakhstan, covering the academic years from 2020 to 2024. These records include data on total enrollments, gender, Unified National Test (UNT) scores, and the departments students enrolled in. The STEM specializations include fields such as Computer Science, Information Systems, Mathematics, and Statistics, while Non-STEM specializations encompass disciplines such as language and math education, law, economics, and international relations.

The data was organized to examine the trends in gender-specific enrollments and academic preparedness, as reflected by the UNT scores, across both STEM and Non-STEM fields. The data preparation process involved categorizing students into their respective fields (STEM or Non-STEM) and computing average UNT scores for each year. This data is summarized in Table 1: Annual Enrollment and UNT Metrics (2020-2024), which presents the total, female, male, STEM, and Non-STEM enrollment counts, as well as the average UNT scores for each year.

For visual representation, Figure 1 illustrates the total enrollment statistics and dynamics by gender, while Figure 2 highlights the trends in STEM and Non-STEM enrollments alongside the average UNT scores over the study period. These visual aids help in understanding the underlying patterns of gender disparity and academic achievement within the university's enrollment landscape.

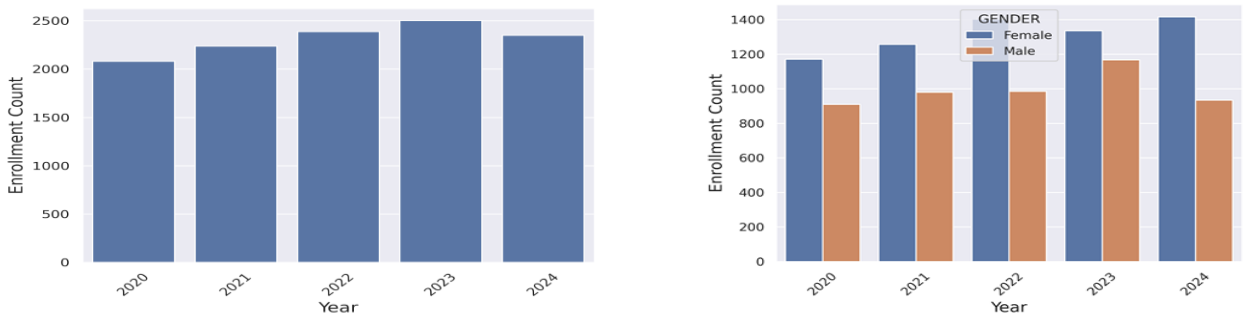


Figure 1- Total enrollment statistics and enrollment dynamics according to gender

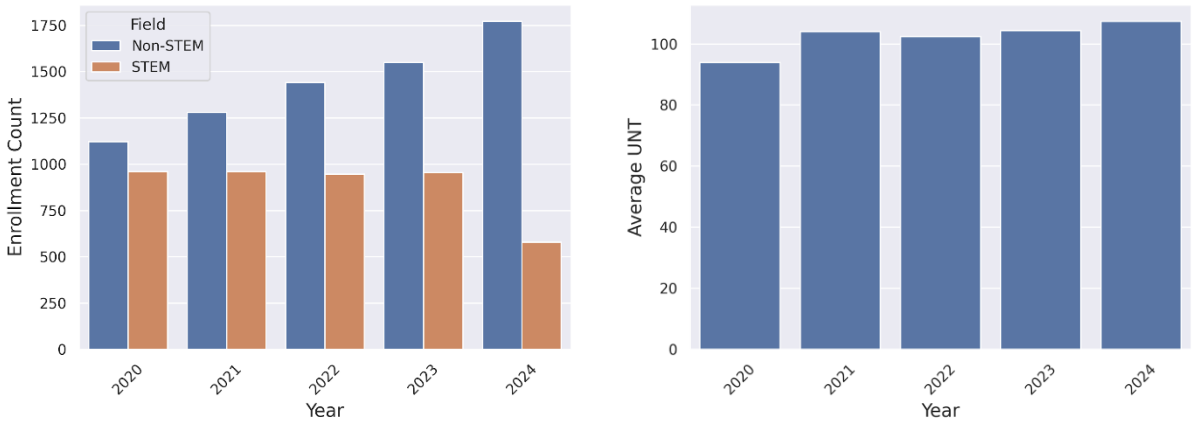


Figure 2- STEM and non-STEM enrollment dynamics and average UNT scores

Statistical Analysis

To test whether there was a statistically significant change in the female and male enrollment ratios in STEM and non-STEM fields over the years, we first conducted normality tests using the Shapiro-Wilk test for both female and male ratios in each field. This test checks whether the distributions of the ratios follow a normal distribution. The results showed that both the female and male ratios in STEM and non-STEM fields followed normal distributions (p-values for both female and male ratios in both fields were above 0.05, indicating normality). After confirming normality, we proceeded with paired t-tests to compare the means of the female and male enrollment ratios across the five years. The paired t-test was chosen because it is suitable for comparing two related samples, in this case, the female and male ratios over the same years. A p-value threshold of 0.05 was used to determine statistical significance.

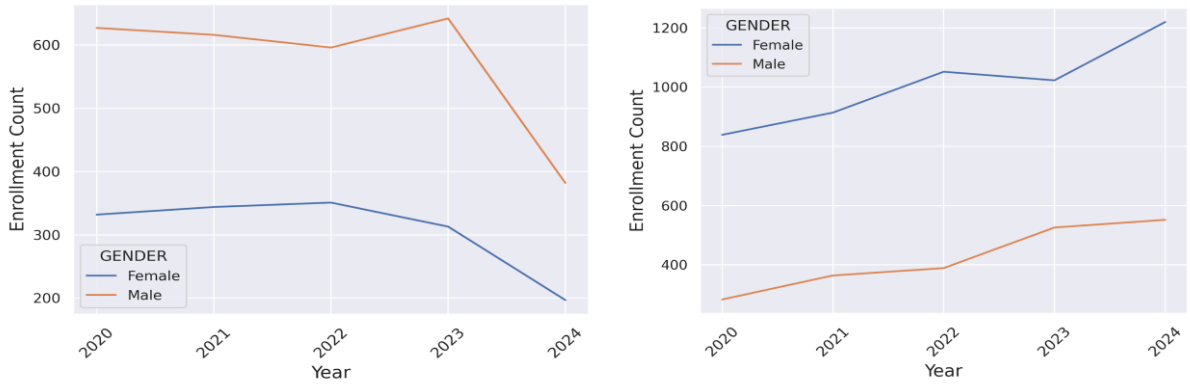
Additionally, we analyzed trends in female enrollment rates in STEM and non-STEM fields. In STEM fields, the female ratio remained relatively stable over the years, while in non-STEM fields, the female ratio showed a steady decline. The observed changes, while statistically significant, appeared to have minimal practical significance, particularly in STEM, where the female enrollment ratio showed only small fluctuations despite statistical significance. In non-STEM fields, although the female enrollment ratio decreased over time, the magnitude of change was modest, underscoring the distinction between statistical significance and practical significance.

The analysis also focused on the comparison of gender distributions between STEM and non-STEM fields, specifically in 2024. This was done through descriptive statistics and comparisons of the female and male enrollment ratios across the two disciplines. These comparisons highlighted the significant gender disparities in STEM versus non-STEM fields, with female enrollment in STEM remaining at approximately 34%, while female enrollment in non-STEM fields was much higher, although it decreased over time.

Findings

Figure 3(A) presents the trends in STEM enrollment by gender from 2020 to 2024. Over this period, male enrollment consistently outnumbered female enrollment. The data shows a relatively steady trend for male students, with the highest number of male enrollments in 2023 (642), while female enrollments saw a gradual decline from 2020 to 2024, with a significant drop in 2024 (197). The decreasing trend for female students in STEM disciplines raises concerns about potential attrition and the need for interventions to retain female students in these fields. In contrast, Figure 3(B) highlights the trends in non-STEM enrollment by gender over the same period. Female enrollments in non-STEM specialties have steadily increased, reaching 1220 in 2024, showing a positive growth trajectory. Meanwhile, male enrollments also grew, but at a slower pace compared to female enrollments, peaking at 552 in 2024. The rising number of female enrollments in non-STEM fields suggests an increasing shift toward these disciplines, highlighting the evolving landscape of gender

dynamics in higher education. Together, these figures underscore the contrasting enrollment patterns in STEM and non-STEM fields, with a notable gender imbalance in STEM that warrants further investigation.



(A) STEM enrollments (B) Non-STEM enrollments

Figure 3- Female vs male enrollment in STEM and non-STEM specialties (2020-2024), respectively.

Table 2 presents the ratios of female and male student enrollments in STEM and non-STEM specialties. The Shapiro-Wilk test results showed that both the female and male enrollment ratios in STEM fields followed normal distributions, as evidenced by the high p-values (0.9818 for both ratios). Subsequently, a paired t-test was conducted to evaluate whether there was a statistically significant difference between the female and male enrollment ratios over the years. The t-test results revealed a highly significant difference, with a t-statistic of -20.49 and a p-value of 3.35e-05, which is well below the 0.05 threshold. This indicates that the female and male enrollment ratios in STEM fields have changed significantly over the years. Specifically, the data suggests a trend where the male enrollment ratio has been consistently higher than the female ratio, and this difference has remained statistically significant throughout the study period.

Table 2. Female vs male enrollment ratios for STEM and non-STEM specialties (2020-2024).

Year	STEM		non-STEM	
	Female ratio	Male ratio	Female ratio	Male ratio
2020	34.6%	65.4%	74.8%	25.2%
2021	35.8%	54.2%	71.5%	28.5%
2022	37.1%	62.9%	73.0%	27.0%
2023	32.8%	67.3%	66.0%	34.0%
2024	34.0%	66.0%	68.9%	31.1%

The table presenting the female and male enrollment ratios for Non-STEM fields from 2020 to 2024 shows that the female ratio has fluctuated over the years, starting at 0.747 in 2020, dipping to 0.660 in 2023, and then recovering slightly to 0.688 in 2024. The male ratio, conversely, has shown a corresponding inverse trend, with a decrease in the female ratio resulting in an increase in the male ratio. The Shapiro-Wilk test results indicate that both the female and male ratios follow normal

distributions, with p-values of 0.896, suggesting no deviation from normality. A paired t-test was then conducted to assess whether the changes in the ratios over the years were statistically significant. The test yielded a t-statistic of 13.50 and a p-value of 0.00017, indicating a highly significant difference between the female and male ratios in non-STEM fields over the years.

Table 2 compares female enrollment ratios in STEM and non-STEM fields from 2020 to 2024. In STEM fields, the female enrollment ratio consistently hovers around 34%, with minor fluctuations between 32.8% in 2023 and 37.1% in 2022. In contrast, the female enrollment ratio in non-STEM fields is significantly higher, starting at 74.8% in 2020 and gradually declining to 68.9% by 2024. Over time, the female ratio in non-STEM fields shows a noticeable decrease, while the ratio in STEM remains relatively unchanged. The male enrollment ratio in STEM fields has remained higher than the female ratio, whereas in Non-STEM fields, the male enrollment ratio has increased from 25.2% in 2020 to 31.1% in 2024.

Discussion

The comparison of female enrollment rates in STEM versus non-STEM fields reveals a stark contrast in gender representation. While female enrollment in STEM remains stable at around 34% across the five years, the female enrollment ratio in non-STEM fields is significantly higher, starting at 74.8% in 2020 and gradually declining over time to 68.9% in 2024. This decline in non-STEM female enrollment suggests a shifting trend in women's participation in non-technical fields, although it remains markedly higher than in STEM disciplines. On the other hand, the stability in the female ratio in STEM reflects a persistent gender gap in technical disciplines, with minimal improvement in female representation despite fluctuations in the data. These trends highlight the ongoing challenges in achieving gender equity in STEM education, where women continue to be underrepresented compared to non-STEM fields. Further efforts may be necessary to address the gender imbalance in STEM and support greater female participation in these areas.

Although the paired t-test indicates a statistically significant difference in the female and male enrollment ratios in STEM fields over the years (with a p-value well below the 0.05 threshold), the practical significance of this result appears minimal. The observed changes in the female ratio from 0.345 in 2020 to 0.340 in 2024 are relatively small, suggesting that the gender gap in STEM enrollments has remained fairly consistent over the study period. Despite the statistical significance, the magnitude of the difference is minor, and the trends do not indicate a substantial shift in the gender balance. This highlights the distinction between statistical significance and practical significance, where even small differences can be statistically significant in a paired t-test, but the actual change in the enrollment ratios may not be meaningful in real-world terms. Therefore, while the result is significant from a statistical perspective, the practical implications for addressing gender disparities in STEM may require more pronounced shifts.

Similarly, although the paired t-test suggests a statistically significant difference in the female and male enrollment ratios in non-STEM fields (p-value = 0.00017), the observed changes in the ratios appear relatively modest in practical terms. The female ratio decreased from 0.747 in 2020 to 0.688 in 2024, while the male ratio increased correspondingly from 0.252 to 0.312. These changes, while statistically significant, do not represent large shifts in the gender distribution of non-STEM enrollments. The result underscores the importance of distinguishing between statistical significance and practical significance. While small differences over time can lead to significant test outcomes, the overall trends in enrollment ratios remain relatively stable, with no substantial reversal or dramatic change in gender representation. This suggests that, despite the statistical evidence, the actual gender dynamics in non-STEM fields have not changed drastically in recent years.

Conclusion

In conclusion, this study provides valuable insights into the gender dynamics of university enrollments in Kazakhstan, particularly in STEM and non-STEM disciplines, over the period from 2020 to 2025. The findings underscore persistent gender disparities, with female representation in STEM remaining relatively stable around 34%, while non-STEM fields show a gradual decline in

female enrollment ratios. Despite statistically significant changes in both STEM and non-STEM enrollments, the practical significance of these shifts appears minimal. This highlights the importance of distinguishing between statistical significance and real-world impact. The results suggest that while gender imbalances in STEM persist, attention to targeted interventions and continued efforts are necessary to address the underrepresentation of women in these critical fields. Moreover, the findings encourage a broader discussion on the changing trends in non-STEM fields and the evolving landscape of gender roles in higher education. Ultimately, the study calls for greater focus on creating inclusive educational environments that foster greater participation and retention of women in STEM disciplines, alongside addressing the complex dynamics in non-STEM fields.

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Альфира Махмутова[1]
[1] New Uzbekistan University, Ташкент, Өзбекстан
*e-mail: alfira2002@gmail.com

ҚАЗАҚСТАН УНИВЕРСИТЕТІНЕ ТҮСУДІҢ ГЕНДЕРЛІК ЗАҢДЫЛЫҚТАРЫ: 2020-2024 ЖЫЛДАРДАҒЫ STEM ЖӘНЕ STEM ЕМЕС ПӘНДЕРДІ ТАЛДАУ

Аңдатпа. Бұл зерттеу Жоғары білім динамикасындағы өзгерістерді анықтай отырып, 2020-2024 жылдар аралығындағы Қазақстан университеттерінің бірінде STEM-білімге және STEM емес-пәндерге қабылдау үлгілеріндегі гендерлік диспропорцияларды зерттеуге арналған. Қабылдау, гендерлік қатынастар және Ұлттық бірыңғай тестілеу (ҰБТ) ұпайлары туралы мәліметтерге негізделген талдау гендерлік теңгерімсіздіктің сақталуын көрсетеді. STEM пәндеріндегі әйелдердің үлесі зерттеу кезеңінде шамамен 34% деңгейінде Тұрақты болып қалды, ал STEM емес пәндерге әйелдердің қатысуы бастапқыда жоғары болды, 2020 жылы 74,8%-дан 2024 жылы 68,9%-ға дейін төмендеді. Қабылдау үрдістеріндегі статистикалық маңызды өзгерістерге қарамастан, олардың практикалық маңызы шектеулі, бұл STEM-де гендерлік теңдікке қол жеткізу мәселесін шешудің қиындығын көрсетеді. Теңгерімсіздікке ықпал ететін факторлардың ішінде мәдени нормалар, әйелдердің рөлдік модельдерінің болмауы және оқу бағдарламаларының ерекшеліктері ерекшеленеді. Зерттеу гендерлік теңдікті ілгерілету және әйелдердің STEM пәндеріне қатысуын арттыру үшін мақсатты араласулар мен инклюзивті саясаттардың қажеттілігін көрсетеді. Нәтижелер саясаткерлер мен білім беру мекемелеріне практикалық нұсқаулар ұсына отырып, экономикалық даму мен әлеуметтік прогреске кеңірек әсер етеді.

Түйін сөздер: гендерлік теңсіздік, гендерлік теңдік, қабылдау үрдістері, STEM-білім, жоғары білім.

Альфира Махмутова[1]
[1] New Uzbekistan University, Ташкент, Узбекистан
*e-mail: alfira2002@gmail.com

ГЕНДЕРНЫЕ ЗАКОНОМЕРНОСТИ ЗАЧИСЛЕНИЯ В УНИВЕРСИТЕТЕ КАЗАХСТАНА: АНАЛИЗ STEM И НЕ-STEM ДИСЦИПЛИН ЗА 2020-2024 ГОДЫ

Абстракт. Данное исследование посвящено изучению гендерных диспропорций в паттернах зачисления на STEM-образование и не-STEM-дисциплины в одном из университетов Казахстана за период с 2020 по 2024 год, выявляя изменения в динамике высшего образования. Анализ, основанный на данных о зачислении, гендерных соотношениях и баллах Единого национального тестирования (ЕНТ), показывает сохраняющийся гендерный дисбаланс. Доля женщин в STEM-дисциплинах оставалась стабильной на уровне около 34% в течение всего периода исследования, в то время как участие женщин в не-STEM-дисциплинах, изначально более высокое, снизилось с 74,8% в 2020 году до 68,9% в 2024 году. Несмотря на статистически значимые изменения в тенденциях зачисления, их практическое значение ограничено, что подчеркивает сложность решения проблемы достижения гендерного

равенства в STEM. Среди факторов, способствующих дисбалансу, выделяются культурные нормы, недостаток женских ролевых моделей и особенности учебных программ. Исследование подчеркивает необходимость целевых интервенций и инклюзивных политик для продвижения гендерного равенства и увеличения участия женщин в STEM-дисциплинах. Результаты имеют более широкие последствия для экономического развития и социального прогресса, предлагая практические рекомендации для политиков и образовательных учреждений.

Ключевые слова: гендерные диспропорции, гендерное равенство, тенденции зачисления, STEM-образование, высшее образование.

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Alina Fazilova[1], Aizhan Kayip[2]*
[1,2]SDU University, Kaskelen, Kazakhstan
[*]e-mail: alina.fazilova@sdu.edu.kz

EFL TEACHERS' ATTITUDES TOWARDS THE USE OF AI GENERATED LESSON PLANS IN KAZAKHSTAN

Abstract. Prolific advancements in the sphere of Artificial Intelligence in Education and Artificial Intelligence, in general, beg the questions of how these technologies could be implemented in the English as a Foreign Language sphere and what English as a Foreign Language teachers' attitudes towards Artificial Intelligence-generated lesson plans are. In this research paper, the attitudes of Kazakhstani secondary school English as a Foreign Language teachers towards the use of Artificial Intelligence-generated lesson plans have been explored. Through analyzing responses from an online survey, the study identifies several prominent themes that reflect the overall attitudes of teachers towards Artificial Intelligence-generated lesson planning. The study employed qualitative research design and involved 27 participants. Their attitudes were collected via an open-ended questionnaire and analyzed with thematic analysis. The results indicate that AI-generated lesson plans can have a positive impact on student learning outcomes, with the guidance and adjustments made by teachers. However, concerns about automation bias and the lack of personalization in the plans are also identified. The benefits of lesson planning generated by Artificial Intelligence include efficiency, customization, and innovative ideas, while drawbacks include inflexibility in unanticipated situations and a lack of specificity in students' needs. The study concludes that teachers express overall positive attitudes towards the use of Artificial Intelligence-generated lesson plans. According to the results, English as a Foreign Language teachers believe that they offer a range of benefits for teachers and can potentially enhance student learning outcomes when used in conjunction with teacher modifications and adjustments.

Key words: English as a Foreign Language, Artificial Intelligence, Lesson plans, Attitudes, Kazakhstan, Teachers.

Introduction

Digitalization and technological innovations in education in Kazakhstan

After the COVID-19 pandemic, many educational institutions have increased the implementation of technologies and innovations in their teaching and learning policies. Following the stages of the governmental program "Digital Kazakhstan" that was first launched in 2006, the process of digitalization is gradually gaining momentum, providing more money from the budget for education and technological equipment in schools, colleges, and universities (Dinis Sousa et al., 2020). Apart from using and enhancing distance learning tools and utilities, more contemporary and advanced technologies such as Artificial Intelligence (AI) and Machine Learning (ML) have been used to facilitate the process of education. Our Republic's education was set to expand and develop multilingually (Kazakh, Russian, English), technologically, and culturally (Poslanie Prezidenta Respubliki Kazakhstan N. Nazarbaeva, 2012).

Although many developed countries are attempting to discover new ways of AI utilization in different educational contexts, its ways of utilization appear to be obscure for many Kazakhstani educational institutions. Some educational institutions and teachers are not even aware of the existence of such tools, which can be a non-obvious barrier to the process of digitalization. The capabilities and primary purpose of any AI are to analyze large amounts of data, categorize, label them, recognize patterns, and learn. After digesting the information, it is accordingly able to make

predictions and create human-like text (Generative Pre-Trained Transformer) based on the same data that it previously consumed. The relevance of digitalization has increased with the emergence of a more advanced and ubiquitously accessible AI - OpenAI ChatGPT (Generative Pre-Trained Transformer). The number of tasks this AI is able to perform ranges from creative text writing: essays, lesson plans, and poems, to recognizing mistakes in the programming codes. However, it is important to notice that the data on which this model was trained is up to 2021, which limits its knowledge of the events after the year 2021 (OpenAI, 2023).

ChatGPT and its relevance in education

According to Halaweh (2023), ChatGPT developed by OpenAI has the potential to revolutionize the education sector in several ways.

Firstly, if the lesson objectives are clearly defined, ChatGPT can provide personalized writing guidance to students based on their individual needs and progress. This can significantly enhance the teaching process. Additionally, ChatGPT's ability to automatically grade essays by identifying key features can save considerable time that would have been required for manual grading. Since ChatGPT is a generative model, it can also be used to develop bilingual systems, making it a valuable tool for language translation.

Furthermore, the conversational agent based on ChatGPT can serve as a virtual tutor, which provides written responses, for those seeking to learn English as a second language. This platform can enable students to ask questions and receive correct and reliable responses from ChatGPT. Lastly, ChatGPT's ability to analyze, evaluate large amounts of text, and provide students with the new undiscovered information on a desired topic, can enhance students' researching skills and provide new ideas.

Overall, ChatGPT has immense potential to transform the education sector and facilitate the learning process for students in numerous ways. Although the capabilities of ChatGPT are astounding and can be creatively used in a variety of contexts, questions about its practical and ethical implementation caused mixed feelings among pedagogical and academic communities as a question of originality and plagiarism arose. As students who can resort to the usage of ChatGPT may not critically and thoughtfully analyze the feedback given by the AI, and simply copy the generated information without referencing the source.

We aim to investigate the attitudes of Kazakhstani secondary school EFL teachers about the utilization of AI in lesson planning, and most importantly, their willingness to implement this technology in their teaching practices.

The following research question of this investigation is hereby stated:

- What is the overall attitude of secondary school EFL teachers towards the use of AI-generated lesson plans in their teaching practices?

Lesson plans are considered to be important roadmaps that guide the teacher throughout the lesson and help with: 1) anticipation of the possible lesson problems; 2) defining a set of certain lesson objectives; 3) consideration of students' interests, background knowledge; 4) providing a direction for a substitute teacher. They provide a clear set of actions, so an educator doesn't get lost before, during, and after the lesson (Farell, 2002). Despite the proven benefits lesson plans pose, the perception of the necessity of lesson planning in schools differs from the way it is perceived in higher education. State schools require teachers to provide lesson plans for every lesson they conduct as part of the course curriculum and Ministry of Education requirements.

This study sheds light on the attitudes of EFL teachers towards the use of AI-generated lesson plans, which is an emerging area of research. As the use of AI in education becomes more widespread, it is important to understand the perceptions and attitudes of teachers towards this technology. The study is particularly relevant in the context of Kazakhstan, where the government has made significant investments in technology in education (education funding from the government in 2019 was a record 19% of the national budget and 3.62% of the GDP) (International Trade Administration, 2022). Understanding teachers' attitudes towards the use of AI-generated lesson plans can help inform policy decisions and improve the implementation of technology in education in Kazakhstan. Our study can

help inform educators, stakeholders, policymakers, and authorities who want to professionally develop EFL teaching and teaching in Kazakhstan and other countries. By understanding the attitudes and perceptions of teachers towards the use of AI-generated lesson plans, it is possible to design training programs that meet the needs and preferences of teachers, and that help them effectively incorporate this technology into their teaching practice.

The Potential of AI in Education

Artificial intelligence (AI) has become increasingly prevalent in various sectors of education such as engineering, information technology, mathematics, foreign language, business, history, and more (Zhang & Aslan, 2021). AI has the potential to transform the way education is delivered, from personalized learning experiences to intelligent tutoring systems. One application of AI in education is the development of AI-generated lesson plans. AI-generated lesson plans have the potential to streamline the lesson planning process, improve the quality and consistency of lesson plans, and allow teachers to focus on other aspects of teaching.

However, the factors such as job dissatisfaction, lack of recognition, poor remuneration, and loss of autonomy lead to the tremendous issue concerning teacher and even educational field applicants` shortage in the educational system which is now highly discussed among educational stakeholders, economists, and the government itself. As such, Edwards and Cheok (2018) cited the statistics to illustrate how far the problem goes. In addition, the project developers could come up with a possible solution to this problem. One of the statistics that is represented in this article shows that 46% of teachers in the United States are under the category of a teacher who “moves and leaves” during the period that lasts for 5 years, and 17% out of which are those who totally stopped teaching. Moreover, over the period between 2008 and 2013 the number of teachers who attend teacher preparation programs dwindled by over 30%. Curiously, the severity of the state is growing because of the increasing number of primary and secondary school students by 0.4% from 1999 to 2011, and an approximate growth by 5,2% from 2011 through 2023. Grave implications, including non-accessibility for primary school education for most people, emanate beneath this problem. Hence, Edwards and Cheok (2018) noted that “novel ways of delivering formal instruction are needed, thereby the growing focus on the use of Artificial Intelligence in Education (AIED)” (p. 14).

When it comes to the AIED as a possible solution for the absenteeism of teachers as instructors and guides in the educational path, Edwards and Cheok (2018) have already created a robot powered by AI by the name “Sato” capturing the three dimensions of the learning such as “cognitive, psychomotor, and affective domains” (p. 15). Sato has already shown its capabilities in lesson planning, also in synthesizing the recorded voices and appropriately replying to questions, and implementing different approaches. All of these Sato can do by considering and using all data about students and considering classroom proxemic (the study of spatial factors in social relationships) and being a “good” robot-teacher in all parameters. Therefore, the usage of AIED in substituting the real teachers, and fulfilling vacant places is a de-facto possible thing, according to the authors.

Promises of AI in foreign language teaching

In the following study, Pokrivcakova (2019) illustrated the potential benefits of AI integration in various spheres of foreign language teaching. The main root and the backbone of all AI-powered tools is CALL (computer-assisted language learning), which has developed in recent years into ICALL (Intelligent CALL) with the advances in technologies and the rise in student-technology interactions. Natural language processing (NLP) is one of the main components of ICALL development. It focuses on enabling AI to process, interpret, and generate human-like texts. The applications of AI used in foreign language education consist of:

a) **Differentiated learning materials.** Materials that were specifically designed with the consideration of personalized learning adapt their content according to the individual needs of each student. This way all the materials are not generalized to the common masses, but rather customized and adapted to each learner.

b) **Machine translation.** Machine Translation (MT) is the process of translating text from one language to another with the use of computer software. It relies on artificial intelligence algorithms that analyze and interpret the meaning of the message, then generate a corresponding translation of it. Examples: Google Translator, Context Reverso, Foreign Word.
c) **AI-assisted writing tools.** With the help of AI, these tools analyze, detect, and correct any contextual and grammatical errors they find in the process of writing. These programs can help students improve their writing skills and elevate the whole process with instant feedback and suggestions. One of the most prominent examples: Grammarly, ProWritingAid, White Smoke.
d) **Chatbots.** Chatbots are computer programs designed to simulate conversations with humans, usually through messaging. They are based on machine learning (ML) and natural language processing (NLP). They are usually but not limited to being used in customer service to provide quick and automated feedback or interactions. They can also be used in EFL learning as an alternative to live conversations with real humans. Examples: ChatGPT, Mitsuku, LivePerson.
e) **Language learning apps powered by AI.** Except for the implementation of AI and ML in text generation, speech recognition, and writing improvement, many online language learning applications integrate these features to ease and gamify foreign language learning.

So, with the rapid development of the technological sphere, many AI-powered tools get integrated into education and foreign language learning specifically, which makes this process more adaptive and individual for everyone, saving a lot of time not only for teachers but also for the learners. They have opened up new opportunities for personalized learning.

To exemplify AI tools like IBM's Teacher Advisor mechanism are designed to help teachers create personalized lesson plans for students with varying skill levels in the same class (Castro & New, 2016). By analyzing Common Core education standards and student specs, this tool can develop effective lesson plans that cater to each student's individual needs. As a result, traditional and static lesson plans can be replaced with personalized ones, making teaching more effective. IBM's Teacher Advisor has been available to third-grade math teachers since 2016, and it has been expanded to cover other subject areas and grade levels. This tool can also be used by EFL teachers to produce time-saving lesson plans, which will allow them to focus more on improving the quality of the lesson itself. This study also examines another AI tool, Duolingo, a learning software program that uses AI to examine customers' activity and progression to create personalized lesson plans. Duolingo structures lesson plans differently for different users, and it uses the most effective strategies to help users learn. The authors point out that AI tools can be very useful in education for developing personalized lesson plans, identifying at-risk students, and improving curriculum validity. Teachers can save time by using these tools and focus more on improving the quality of their teaching.

So, with the rapid development of the technological sphere, many AI-powered tools get integrated into education and foreign language learning specifically, which makes this process more adaptive and individual for everyone, saving a lot of time not only for teachers but also for the learners. They have opened up new opportunities for personalized learning.

Overcoming Educational Disparities During the Pandemic with AI-Powered Tools

In the Japanese study that was conducted by Kang (2021) two AI-assisted educational tools were created with the purpose of giving automated feedback to students, highlighting their strengths and weaknesses while reviewing their overall comprehension. It was proven to be very effective as the group of students who studied with the help of these tools managed to finish the math course almost twice faster than the traditional group. They had a better understanding of the material and higher overall performance. However, the author also noticed that the sudden changes and implementation of IT tools have a number of drawbacks such as 1) high cost, 2) lack of motivation, and 3) educational disparity caused by the digital divide.

In Kang's study, the author examines the impact of the COVID-19 pandemic on education and how schools and universities have had to adapt to remote and online learning. One of the key

challenges highlighted in the study is the need for technological infrastructure and innovation to support remote learning, particularly in disadvantaged areas where students may not have access to reliable internet or technology, which creates huge problems for quality education.

Kang's study provides valuable insights into the challenges and opportunities that have arisen as a result of the pandemic and highlights the need for innovation and investment in technological infrastructure to support remote learning. By incorporating AI-powered education tools into remote learning strategies, schools, and universities, and alleviating teachers' load can help ensure that students receive the best possible education, regardless of their circumstances.

Overall, this research article is an important resource for educators, policymakers, and anyone interested in the future of education. It highlights the need for innovation and adaptation in the face of unprecedented challenges and emphasizes the role that AI can play in providing students with a quality education.

Main challenges and concerns about AI in education

Another study, conducted by Vincent-Lancrin and Van der Vlies (2020) reviews the overall usage and integration of AI into the educational sphere. One potential application of AI in education that the authors touch on is the generation of AI-generated lesson plans. This could potentially offer several conveniences, such as saving time for teachers, providing consistency in content delivery, and adapting lesson plans to individual student needs. However, the authors caution that there are several challenges that need to be addressed before AI-generated lesson plans can be implemented effectively and ethically.

The authors also include a discussion of the ethical and social implications of AI in education and provide recommendations for policymakers, educators, and developers on how to ensure the responsible and ethical use of AI in education.

One of the key challenges discussed in the study is the potential for bias in AI-generated lesson plans. If the algorithms used to generate lesson plans are not properly designed or trained, they could perpetuate existing biases in the education system. Another challenge is the need for transparency and accountability, as teachers and students need to understand how AI-generated lesson plans are created and how they are being used.

Supporting and extending the topic of ethical issues in AIED (Artificial Intelligence in Education), Holmes et al. (2022) review the attitudes of 17 leading researchers in this sphere. They argue that there have been no deep studies and investigations of ethical concerns in AIED. Almost all participants agreed that the ethical considerations may be neglected and are not paid enough attention in the field of AIED. According to the study, these researchers consider data ownership and control, limitation of data, bias, transparency, and intelligibility of decisions the most important ethical issues in AIED. A lot of these factors could potentially affect both teaching and learning processes for educators and students by "shaping what the education will look like for the next generation of students" (p. 511). This also raises the question of switching to education fully provided by machine tutors and complete teacher replacement.

The more recent concerns were raised by the former board member of OpenAI Elon Musk who has signed an open letter calling for the suspension of ChatGPT development as it claims ChatGPT and similar types of AI Chatbots pose high risks not only for its users and developers but to the humanity in general. They develop at a rapid speed and cannot be fully controlled by the developers (Vallance, March 30, 2023). Even more recent concerns about the integrity of users' data, and a high increase in cases of cheating and plagiarism have caused the ban of ChatGPT in Italy and some higher education institutions (Browne, April 4, 2023; Intelligent, 2023).

In spite of that, some measures opposed to plagiarism are already being taken. The recent report of the plagiarism checking program Turnitin informed that they are currently working on a feature that will allow the identification of AI-generated text (Shea, 2023).

All of these concerns beg the question of establishing a set of ethical and moral regulations that will control the fair use of AI in every sphere of human life, ensure transparency of the AI algorithms, and provide enough training for the educators and researchers who want to work with AI.

While AI-generated lesson plans could offer several conveniences, it is important to ensure that they are designed and implemented in a way that is fair, transparent, and accountable. By addressing these challenges, AI-generated lesson plans could potentially offer a valuable tool for educators in delivering high-quality and personalized education to students.

Exploring Teachers' Attitudes Toward AI-generated lesson plans

However, the use of AI-generated lesson plans in secondary schools is a relatively new area of research, especially in Kazakhstan, and there is a limited understanding of secondary school EFL teachers' attitudes toward this technology. In a study conducted by Nazaretsky et al. (2021), the attitudes of science teachers toward AI-based educational technologies were studied. The main attitudes of teachers appeared to be mixed, and their willingness to use AI-based educational technologies was affected by their attitudes. They consider AIED as a very innovative and valuable tool, however, they question their competence in implementing and adjusting this technology to their teaching. In spite of taking into account the results of this study, the overall attitudes of EFL teachers towards AI-generated lesson plans may differ.

The possible reasons for that may be the low development of technologies in Kazakhstan, lack of research on the topic, fear of technologies (fear of replacement), lack of specialists in the field, unawareness of this kind of technology, and overall concerns of educators about the trustworthiness of AI. Although all of these reasons are our own speculations about the possible attitudes EFL teachers in Kazakhstan might hold, the actual attitudes stay ambiguous to us.

Exploring the Gaps in Kazakhstan: EFL Teachers' Attitudes Toward AI-Generated Lesson Plans

Artificial intelligence has become the most attractive matter to examine for Kazakhstani researchers only starting from 2018 after being indicated in the 1st President of the Republic of Kazakhstan Nursultan Nazarbaev`s message in terms of strategic goals concerning artificial intelligence systems (M. N. Kalimoldayev et al., 2018). The rapid development of AI and its implementation in education is distinctively seen in the developed part of the world. However, when it comes to Kazakhstan, the practice of using AI in lesson planning is a complete novelty. We have not found even a single study that focuses on lesson planning involving AI in EFL teaching or lesson planning with the assistance of AI tools in our region, which reveals a significant gap in this area of research in Kazakhstan. However, our lack of findings could be limited by the fact that there is limited access to some academic journals and repositories of academic works, which we do not possess. Therefore, it could possibly result in failure to find more relevant works.

Based on the literature review, it can be concluded that AI-generated lesson planning has the potential to revolutionize the way teachers plan and deliver their lessons. The use of AI algorithms can help teachers save time and effort in creating lesson plans, while also allowing for greater personalization and differentiation in instruction. Additionally, AI-generated lesson plans can adapt to students' individual learning needs and provide feedback to teachers on the effectiveness of their lessons. However, the literature also highlights several limitations and challenges in the implementation of AI-generated lesson planning. These include concerns about the accuracy and reliability of AI algorithms, the need for teacher training and support in using AI technology, and the potential for AI-generated lesson plans to perpetuate biases and inequalities. We are determined to conduct research on this topic and find out the attitudes of Kazakhstani secondary school EFL teachers toward the use of AI-generated lesson plans.

Methods and materials

Type of research

This research employs a qualitative research design to answer the research question. The question aims to explore the overall attitudes of secondary school EFL teachers towards the use of AI-generated lesson plans in their teaching practices. Given the exploratory nature of this question, a qualitative design is employed (Creswell & Creswell, 2017). This approach enables the researchers

to gather and analyze qualitative data in a systematic and integrated way, allowing for a more nuanced understanding of the research question at hand.

Sample

This study's sampling method is chosen to be non-probability snowball sampling as the most convenient way to enlist participants for researchers (Acharya et al., 2012). Some of the participants are suggested by some of the teachers whom researchers are acquainted with. The participants are enlisted in accordance with the only criterion of being a heterogeneous group of secondary school EFL teachers. As for the number of teachers, this research asked 27 secondary school EFL teachers currently working (or having had experience of working) in Kazakhstan secondary schools to contribute to our study by filling in the questionnaire. All the participants had to fill in the online questionnaire that did not require their personal presence. The researchers ensured the anonymity and confidentiality of the participants' responses by not collecting any identifying information, such as names or email addresses. Before starting the questionnaire, the participants were informed about the purpose and scope of the research, as well as their rights as research participants. They were also informed that their participation was voluntary, and that they could withdraw at any time without penalty. Due to some limitations and problems (a small sample of the desired population), our data collection process faced, the criteria for participation in our study were expanded. Senior TFL students who had previously had their educational practice at secondary schools as EFL teachers were invited to fill in the questionnaire.

Data Collection

The data collection process is conducted by using a questionnaire consisting of open-ended questions. The questionnaire includes the informed consent form where they can get familiar with the explicit description of the study, participant's rights, potential risks, duration of the questionnaire, and contact information. Informed consent is compulsory for every participant to read and agree to proceed with the questions. The questionnaire is originally created by the researchers according to the research question and consists of 2 main parts:

1) General information about participants - demographic info such as age (options in years: 18-24, 25-34, 35-44, 45-54, 55 and above); teaching experience (options in years: 0-2, 3-5, 6-10, 11-15, more than 15); and technological proficiency (beginner, intermediate, advanced). The levels of technological proficiency are defined as: beginner - limited experience with technology in the classroom and may require some training, intermediate - good understanding of common technology used in the classroom, advanced - very comfortable with a wide range of technology.
2) Attitudes towards the use of AI-generated lesson plans - 2 closed-ended and 8 open-ended questions aimed at exploring participants' attitudes. The first closed-ended question seeks to explore their previous experience with the concept of AI-generated lesson plans (yes-no question). The remaining 8 questions are open-ended, thus the participants had the freedom in describing their opinions and attitudes. There is one extra question added to receive respondents' feedback and suggestions regarding the study and procedures.

The first section of the questionnaire gives us an overall understanding of the sample's characteristics, while the second section discovers the overall attitudes of the participants.

Data analysis (Pilot Study)

In order to configure the data, this study uses thematic analysis to analyze qualitative data collected from open-ended survey questions in the direction of developing research questions. The use of open-ended questions allowed us to gather more detailed and nuanced information about the attitudes and experiences of the EFL teachers. This could provide a more comprehensive picture of the research topic and lead to more informed conclusions and recommendations.

Thematic analysis is employed to sort out all the open-ended responses that represent participants' attitudes, by virtue of coding them into codes and main themes that represent the main

idea of the respondents' answers. This research follows the thematic framework suggested by Clarke and Braun (2006) consisting of 6 steps:

1. Familiarization with the data
2. Initial coding generation
3. Deriving themes from the initial codes
4. Review of the themes
5. Themes identification and labeling
6. Report writing

All the data is inductively coded (data-driven) in order to develop themes from the analyzed open-ended data.

The first attempt to check the feasibility of our study was through the means of a pilot study. To ensure the reliability and validity of the questionnaire, a pilot study was conducted with a small group (n = 5) of secondary school EFL teachers. The researchers used their responses and comments to refine the questionnaire and find ambiguities within the question items.

Tools and materials used in the research

Apart from the questionnaire, other research tools were employed in this study. To help familiarize participants with the concept, an example of a lesson plan generated by OpenAI ChatGPT is presented, accompanied by prompt and key definitions and terms right in the questionnaire. All the data were collected by means of Google Forms and analyzed with Google Sheets, as they offer a wide range of statistical and analytical utilities.

Limitations

Possible limitations of this research include the generalizability to other populations, small sample size, and alternative explanations.

1) The generalizability of this research is limited, as it is focused on secondary school EFL teachers' attitudes towards AI-generated lesson plans.
2) A small sample size reduces the statistical power of the analyses and limits the generalizability of the results. A larger sample size could help to increase the precision and reliability of the findings.
3) Another possible limitation of this study is alternative explanations. Even if the interpretations of the researchers seem to be valid, some alternative explanations and meanings could be omitted. It is important to consider alternative explanations when interpreting the findings.

Mitigating research biases

To mitigate research biases, we as researchers took several measures throughout the research process:

A non-probability snowball sampling method was chosen to guarantee a heterogeneous group of participants. However, this method may still be subject to the vein of referral bias, where participants are more likely to be referred by people who share the same characteristics or opinions. To address this, we enlisted participants suggested by a diverse group of teachers that authors invited to participate in the study through the help of senior TFL students who had previously had an internship in secondary schools under the mentorship of EFL teachers to ensure a range of backgrounds, experiences, and perspectives. Under some limitations, the senior TFL students who worked as EFL teachers in secondary schools during their internship were also invited to participate in the study.

To ensure participant anonymity and informed consent certain measures were also taken. Needless to say, the questionnaire attendees were assured that the details of their responses were kept confidential and anonymous. Hence, the social desirability bias risks were undertaken, by giving participants a light opportunity to alter their responses.

In order to mitigate bias in terms of data analysis tools, several points were considered. As this study employs 2 types of analyses: thematic and statistical, it can face some biases related to the

limitations of these methods. Such as interpretations of all the contextual data are solely based on the subjective assessment of the researchers. Thus, the data was coded with the help of other fellow researchers to maintain objectivity in data explication. The participants could also correct their responses at any time to express their attitudes more explicitly.

Results and Discussion

General profile of participants

According to the statistical report, there were 27 participants in the study, most of whom were young EFL teachers. Specifically, 17 of the participants (63%) were between the ages of 18-24, 4 participants (14.8%) were between 25-34, 5 participants (18.5%) were between 35-44, and only 1 participant (3.7%) was between 45-55.

In terms of teaching experience, 13 participants (48.1%) had 0-2 years of experience, 8 participants (29.6%) had 3-5 years of experience, 1 participant (3.7%) had 6-10 years of experience, 3 participants (11.1%) had 11-15 years of experience, and 2 participants (7.4%) had more than 15 years of experience each.

Responding to the question about their technological proficiency, out of the 27 participants, the majority (63%) reported themselves as intermediate users, while 11.1% reported being beginners, and 25.9% of the participants reported being advanced users. Specifically, 3 participants (11.1%) were categorized as beginners, 17 participants (63%) as intermediate, and 7 participants (25.9%) as advanced users.

More than half of the participants (14 or 51.9%) have previously used AI-generated lesson plans in their teaching. Less than half (13 or 48.1%) have never used them in their teaching practices.

Deriving codes from responses

Analyzing the responses for the first question “How do you think AI-generated lesson plans can impact student learning outcomes?” we could derive the following codes (see Table 1). Most participants noted the positive impact of AI-generated lesson plans on student learning outcomes. Each number next to the theme is the frequency of this theme, appearing in responses sorted out by frequency (descending).

Table 1. Codes derived from the responses to the first question

Codes
Positive impact (11)
Need for teacher's intervention/modifications/adjustments (7)
Develops teacher's LP skills (4)
Not detailed/personalized (4)
Interesting and engaging activities (3)
Too vague/general (3)
Mixed feelings (2)
Diversify students' learning (1)
No impact (1)
Not flexible in extraordinary situations (1)

The codes for the second open-ended question “What do you think are the potential benefits of using AI-generated lesson plans in EFL teaching?” (see Table 2) represent participants’ opinion about the benefits of AI-generated lesson plans. The majority highlighted the ease and time economy that AI provides for lesson plan generation.

Table 2. *Codes derived from the responses to the second question*

Codes
Time-saving (21)
Creative ideas (11)
Materials generation (2)
Customizable (2)
Interesting and engaging activities (1)
LP is not important (1)

Third question was eliciting participants' opinions about potential drawbacks of AI-generated lesson plans. Most of the participants highlighted the negative aspects such as automation bias (high reliance on automated decision-making systems, even when these systems may provide incorrect or misleading information), too general lesson plans, lack of personalization, and lack of personal connection. The others noted that there are no drawbacks to the use of AI-generated lesson plans in the classroom. A lesser part of the respondents shared that they did not have enough experience to answer this question.

Table 3. *Codes derived from the responses to the third question*

Codes
Automation bias (7)
Too basic LP (7)
Lack of personalization (5)
No drawbacks (5)
No experience (3)
Lack of personal connection (2)
Need for teacher's intervention/modifications/adjustments (1)

Fourth question in the questionnaire was inquiring participants' opinion about the possibility of replacement of the traditional lesson planning by AI-generated lesson planning. The codes derived from their responses are presented in the table below (see Table 4).

Table 4. *Codes derived from the responses to the fourth question*

Codes
Can replace (10)
Cannot replace (12)
Partially (7)
Need for teacher's intervention/modifications/adjustments (3)
Uncertainty (3)

In the next question "In what situations do you think AI-generated lesson plans would be most useful?" The following codes were highlighted (see Table 5).

Table 5. *Codes derived from the responses to the fifth question*

Codes
Time-saving (13)
In any situation (8)
New ideas (4)
Materials generation (3)
For inexperienced teachers (1)
Interesting and engaging activities (1)

In the following table, respondents shared their experience of using AI-generated lesson plans in their teaching. Most of the participants did not use them in their teaching practices.

Table 6. *Codes derived from the responses to the sixth question*

Codes
No experience (14)
Time-saving (4)
Useful framework (2)
Customizable (2)
Comfortable (2)
Unclear activities (1)

The last question answers were collected regarding whether the participants have any concerns about AI-generated lesson plans (see Table 7).

Table 7. *Codes derived from the responses to the seventh question*

Codes
No concerns (10)
Automation bias (7)
No experience (4)
Need for personalization (3)
Uncertainty (3)

Review of the themes

After analyzing the coding of the responses, several prominent themes have emerged that reflect the overall attitudes of EFL teachers towards AI-generated lesson planning. These themes were mentioned frequently across all responses and can be categorized as follows:

1) Positive impact of AI-generated lesson plans on learning outcomes with teacher's guidance;
2) Benefits of AI-generated lesson planning: customizable plans that save time and suggest new ideas;
3) Drawbacks and concerns: automation bias and too general LP without personal connection;
4) Mixed views on traditional planning replacement.

Positive impact of AI-generated lesson plans on learning outcomes with teacher's guidance.

After collecting and analyzing responses to the first open-ended question, which is stated as "How do you think AI-generated lesson plans can impact student learning outcomes?", some responses (5) were not clear nor relevant to the question, and thus are excluded from the analysis.

The majority of the participants highlighted the positive impact of lesson plans generated by AI on learning outcomes after modifications and adjustments done by teachers. As these plans cannot be fully employed due to the lack of some specifications and peculiarities that should be added by the teachers themselves. Participants shared that AI-generated lesson plans have a positive impact on students' learning outcomes by providing a general lesson plan or basis for the actual lesson that can be further modified and adjusted by the teacher. Although AI can generate a decent lesson plan, teachers are those who actually lead the teaching and learning processes. This, in turn, can lead to better engagement and understanding of the lesson material. Some teachers even claimed that it can enhance their teaching skills, by presenting new teaching methods, techniques, and interesting activities in lesson planning.

Some of the teachers expressed mixed and negative feelings about AI-generated lesson plans as they did not see adherence to lesson plans as a very important part of their teaching practices. Moreover, they saw no significant impact of AI-generated lesson plans on student learning outcomes, as it, again, depends on the teacher. The other flaws mentioned that can negatively impact student learning outcomes were lack of flexibility in extraordinary situations, where teachers should quickly change the pace of the lessons or adapt to some unexpected situations during the lesson; lack of personalization and specifications in lesson plans created by AI; lesson plans are too general or vague.

Overall, to conclude their opinions, AI-generated lesson plans positively impact student learning outcomes in case the teacher is the administrator and moderator of the lesson plan, bringing changes accordingly. Otherwise, the machine may not understand all the peculiarities and students' needs in the teaching and learning process, by neglecting some important specifications, which can negatively impact the student learning outcomes.

Benefits of AI-generated lesson planning: customizable plans that save time and suggest new ideas.

The research results showed that efficiency was the most frequently mentioned benefit, with teachers noting that they save a significant amount of time compared to traditional lesson planning methods. This finding is particularly important given that many teachers struggle to find sufficient time for lesson planning amid their other responsibilities. According to the respondents, the reduced workload associated with using AI-generated lesson plans was found to be especially beneficial for those teachers who are new to the profession or have limited experience in lesson planning.

Customization was another benefit, with teachers reporting that they appreciate the ability to easily modify and adapt the plans to meet the needs of their students. This level of customization can help teachers to create more personalized learning experiences that better meet the needs of their students.

Innovative ideas were the third most frequently mentioned benefit by the teachers. They reported that these plans suggest new and creative ideas for lesson activities, which can improve student engagement and motivation. Which can potentially result in higher student performance.

Teachers who have previously used AI-generated lesson plans in their teaching expressed overall satisfaction with their lessons, mentioning the achievement of the main objectives of the lessons and their simple structure. However, they also expressed a wish for more detailed steps of lesson procedures with a clear description of each stage of the lesson.

Overall, this theme suggests that AI-generated lesson plans offer a range of benefits for teachers, including efficiency, customization, and innovative ideas for teaching. By automating certain aspects of lesson planning, these plans can help to reduce the workload of teachers and enable them to focus on other important tasks. Additionally, the customizable nature of these plans can help to create more personalized and effective learning experiences for students.

Drawbacks and concerns: automation bias and too general LP without personalization.

The study has revealed that the majority of participants emphasized that the integration of Artificial Intelligence in lesson planning could potentially impair the educators' expertise by limiting their capacity for creativity and preventing them from demonstrating their true qualifications as instructors. The aforementioned issue leads to the automation bias when educators rely only on AI in developing lesson plans, which can result in overreliance on technology that is not infallible and can be biased or make mistakes and errors.

Based on the responses, it is evident that the implementation of AI to create lesson plans presents a significant downside in the fact that they lack specificity in terms of students' needs, and personalizations. Therefore, AI-generated lesson plans still necessitate teachers' intervention, modifications, and adjustments. Another respondent stated that such plans may be inflexible in unanticipated circumstances.

Altogether, the teachers consider that the utilization of AI in lesson planning has both advantages and disadvantages. While AI-generated lesson plans can save the time and effort spent on lesson plan development, they lack the specificity and personalization required to meet the unique needs of students.

Furthermore, respondents suppose that high reliance on AI-generated lesson plans could potentially limit teachers' creativity and prevent them from showing their expertise as instructors. Therefore, it is essential to keep a balance between using AI technology and maintaining the teachers' role in lesson planning.

Mixed views on traditional planning replacement.

The replacement of traditional lesson planning methods with AI-generated lesson plans has sparked a debate among educators. While the advantages of automation and flexibility are undeniable, many teachers still hold onto the belief that their expertise and personal touch are essential to the teaching process. Most of the respondents consider it impossible to replace traditional lesson planning, due to the fundamental role that the teacher plays in lesson development and automation bias that can weaken the teacher's role and lead to many problems in decision making.

Some educators are open to the idea of using AI-generated plans, acknowledging that they could offer fresh ideas and save time. However, they also express concerns about the potential for automation bias, which could lead to an overreliance on technology and a lack of critical thinking in decision making.

Others take a more moderate stance, suggesting that AI-generated plans could be a useful addition to traditional planning methods in certain situations. They believe that technology can enhance the planning process, but it should not completely replace the teacher's role in designing and implementing lessons.

Finally, there are a couple of respondents who are uncertain about the idea of replacing traditional planning methods. They may have reservations about the reliability of AI-generated plans or simply need more information before forming an opinion.

In summary, the results reveal that the use of AI-generated lesson plans is a topic of mixed stances among educators. While some see it as a positive innovation, others remain cautious about its impact on the teaching process. Finding a silver lining between automation and the personal touch of a teacher is likely to be an ongoing challenge in the field of education.

Discussion

The goal of this study was to determine the overall attitude of EFL teachers toward the use of AI-generated lesson plans. Keeping this in mind, we tried to present a comprehensive analysis of the EFL teachers' attitudes concerning this topic. The majority of the teachers expressed a positive overall attitude towards the willingness to use AI-generated lesson plans in their teaching practices. However, some concerns that teachers express are essential to highlight. Some teachers were cautious about the use of these plans in their teaching practices, sharing concerns about their implementation, lack of personalization, details, and sophistication. So, the uncertainty and the lack of knowledge about this new technology might have served as the reason for their hesitation. There were a couple of teachers

who expressed strong unwillingness to use AI in lesson plan generation, by stating that the lesson plans do not play a significant role in their teaching processes. All in all, most of them asserted that innovational lesson planning with the use of AI technologies could elevate and ease the process of teaching and reduce the burden of plan creation. These ideas match with the prospects reflected in the study by Kang (2020). Although the attitudes regarding the replacement of traditional lesson planning are mixed, and some teachers do not welcome the full replacement, more than half of them are still positive about the idea of renovating this issue even partially.

When it comes to the benefits and concerns, we can see the most mentioned benefits were save of time, easy customization, and creative ideas. While concerns that appeared across many questions were automation bias, which limits teachers' creativity and involvement, lack of personalization, and vague lesson plans. These findings align with the results of the studies by Vincent-Lancrin and Van der Vlies (2020) and Nazaretsky et al. (2021) as they highlighted similar benefits of AI and concerns expressed by teachers. It is important to mention that some teachers expressed no concern about it. However, the reason for this could be a lack of knowledge and experience.

Another interesting point of our research is the unexpected finding that was discovered through our study. Before the initial process of collecting data, it was anticipated that the younger generation would be more prone to using AI in lesson plan generation. However, the outcomes have shown quite the opposite, older generations are more willing to implement this technology in their teaching practice, while younger EFL teachers are dubious about the novelty of AI-generated lesson plans, and raise some critical concerns about AIED ethics.

Analysis of the data revealed that teachers are willing to implement AI-generated lesson plans in their teaching; however, it is important to understand that their opinions slightly differ, due to the possible misunderstanding of the concept of AI or different teaching experiences. This could result in missing some alternative meanings and explanations behind the responses. Hence, it is important to address this gap in future, larger-scale research. Moreover, these findings reveal the necessity to provide teachers professional development and training, particularly on the effective use of AI in education. This could increase awareness about AI tools and empower teachers to implement AI features into their teaching practices without concerns and ambiguity. Overall, this research fulfilled its aim to explore current teachers' perceptions of AI-generated lesson plans. It also opens doors for longitudinal research and inquiries about the interrelations between technological innovations, teacher agency, and teaching integrity in the age of AI.

Conclusion

There have been no explicit studies conducted on the topic of EFL teachers' attitudes towards the use of AI-generated lesson plans in the Kazakhstan region. So, this research is one of the first steps in investigating this issue further on. It is important to learn about the views of educators, who extensively use lesson planning in their teaching practice and experience massive working overload and drop-outs, to make this process easier and more effective. Overall results are indicating that they are welcome to integrate and implement a brand-new method of lesson planning based on the help of AI. Nevertheless, some concerns need to be raised as the AIED, and ChatGPT, to be more precise, are not properly regulated and can produce bias, and are an object of debate among educators. The simplicity of lesson plans ChatGPT creates makes it unfavorable to some teachers, forcing them to put some effort to refine them according to the students' needs. So, educators raise the question of whether they can use the readymade material suggested by ChatGPT, and if it will be really efficient on its own without altering some parts of the lesson plan. Most of them believe that AI-generated lesson plans still need a touch of a teacher to be efficiently and beneficially used.

This study is not free of limitations and, thus, these limitations need to be addressed. As a qualitative study in design, it cannot be generalized to the general population, due to the small sample of the population, which is also very specific (Kazakhstani secondary school EFL teachers). In order to portray a deeper understanding of the attitudes of the population, more extensive research with representatives of the wider population is needed. Another limitation is the only tool used in this

research - the questionnaire. Other data collection methods could be used to triangulate the data. At last, the reason why teachers expressed negative and positive attitudes were not properly investigated.

Further research is needed to explore the potential benefits and challenges of using AI in lesson planning in the Kazakhstani context and to identify strategies for effectively integrating AI technology into the classroom.

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Алина Фазылова[1], Айжан Қайып[2]*
[1,2]SDU University, Қаскелең, Қазақстан
[*]e-mail: alina.fazilova@sdu.edu.kz

ҚАЗАҚСТАНДАҒЫ ШЕТ ТІЛІ РЕТІНДЕ АҒЫЛШЫН ТІЛІНІҢ МҰҒАЛІМДЕРІНІҢ ЖАСАНДЫ ИНТЕЛЛЕКТПЕН ЖАСАЛҒАН САБАҚ ЖОСПАРЛАРЫН ҚОЛДАНУҒА ДЕГЕН КӨЗҚАРАСЫ

Аңдатпа. Білім берудегі жасанды интеллект пен жалпы жасанды интеллект сферасындағы жемісті жетістіктер осы аталған технологиялардың ағылшын тілі шет тілі ретіндегі сферасында қалай қолданыла алатыны, сонымен қатар ағылшын тілін шет тілі ретінде жүргізетін мұғалімдерінің бұған деген көзқарастары туралы сұрақтар тудырады. Бұл зерттеу ағылшын тілін шет тілі ретінде жүргізетін қазақстандық орта мектеп мұғалімдерінің жасанды интеллекттің көмегімен жасалған сабақ жоспарларына деген көзқарастарын қарастырады. Онлайн сауалнаманың жауаптарын талдай отырып, зерттеу жалпы мұғалімдердің жасанды интеллект арқылы жасалған сабақ жоспарына деген көзқарастарын білдіретін бірнеше тақырыптарды көрсетеді. Зерттеу сапалық зерттеу дизайнына негізделіп, 27 қатысушыны қамтыды. Мұғалімдердің көзқарастары ашық сұрақтардан тұратын сауалнама арқылы жиналып, тақырыптық талдау әдісімен өңделді. Алынған нәтижелер егерде мұғалімдер жасанды интеллект жасаған сабақ жоспарларын өзгертіп, бейімдесе студенттердің үлгеріміне оң әсер етуі мүмкін екендігін анықтайды. Алайда, автоматтандыру мен жоспарлардағы жекешелендірудің жетіспеушілігі алаңдаушылық тудыратыны анықталды. Жасанды интеллект арқылы жасалған сабақ жоспарларының басты басымдылығына олардың тиімділігі, идеяларының даралығы және жаңашылдығы, ал басты кемшіліктеріне күтпеген жағдайларға бейімделе алмаушылығы және нақтыланған студент қажеттіліктерінің жеткіліксіздігі жатады. Зерттеу жасанды интеллект ұсынған сабақ жоспарлары мұғалімдерге көптеген артықшылықтар береді және оқытушылардың көмегімен өзгертіліп, бейімделген жоспарлар оқушылардың үлгерімін жақсарта алады деген қорытындыға келді. Нәтижелерге сәйкес, ағылшын тілін шет тілі ретінде жүргізетін мұғалімдер жасанды интеллекттің көмегімен жасалған сабақ жоспарлары мұғалімдер үшін бірқатар артықшылықтар беретінін және оларды бейімдеу арқылы студенттердің оқу жетістіктерін арттыруға болатынын мойындайды.

Түйін сөздер: жасанды интеллект, ағылшын тілі шет тілі ретінде, оқытушылар, сабақ жоспарлары, қарым-қатынас, Қазақстан.

Алина Фазылова[1], Айжан Кайып[2]*
[1,2]SDU University, Каскелен, Казахстан
[*]e-mail: alina.fazilova@sdu.edu.kz

ОТНОШЕНИЕ ПРЕПОДАВАТЕЛЕЙ АНГЛИЙСКОГО ЯЗЫКА КАК ИНОСТРАННОГО К ИСПОЛЬЗОВАНИЮ УРОКОВ СГЕНЕРИРОВАННЫХ ИСКУССТВЕННЫМ ИНТЕЛЛЕКТОМ В КАЗАХСТАНЕ

Аннотация. Плодотворные достижения в области искусственного интеллекта в образовании и искусственного интеллекта в целом вызывают вопрос о том, как эти технологии могут быть реализованы в сфере английского языка как иностранного и как учителя английского языка как иностранного относятся к планам уроков, созданным искусственным интеллектом. В данном исследовании рассматривается отношение преподавателей английского языка как иностранного в казахстанских средних школах к использованию планов уроков, созданных с помощью искусственного интеллекта. Анализируя ответы на онлайн-опрос, исследование выделяет несколько тем, отражающих общее отношение преподавателей к использованию планов уроков, созданных с помощью искусственного интеллекта. В исследовании использован качественный дизайн, и оно охватило 27 участников. Их ответы были собраны с помощью анкеты с открытыми вопросами и проанализированы методом тематического анализа. Результаты указывают на то, что использование таких планов может оказать положительное влияние на успеваемость студентов, если они будут модифицированы и адаптированы преподавателями. Однако выявлены также опасения относительно автоматизации и нехватки персонализации в планах. Преимущества использования планов уроков, созданных с помощью искусственного интеллекта, включают эффективность, индивидуальность и инновационность идей, а недостатки — отсутствие гибкости в неожиданных ситуациях и недостаточную конкретизацию потребностей студентов. Исследование заключает, что создание планов уроков с помощью искусственного интеллекта предлагает ряд преимуществ для преподавателей и может потенциально улучшить успеваемость студентов, если используется в сочетании с модификациями и адаптациями со стороны преподавателей. Согласно результатам, преподаватели английского языка как иностранного считают, что такие планы предлагают широкие возможности и могут повысить результаты обучения при условии адаптации и доработки со стороны учителя.

Ключевые слова: искусственный интеллект, английский как иностранный язык, учителя, планы уроков, отношение, Казахстан.

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Laura Lyadova[1], Kulakhmetova Mergul[2]*
[1]SDU University, Kaskelen, Kazakhstan
[2] Pavlodar Pedagogical University, Pavlodar, Kazakhstan
*e-mail: 231302005@sdu.edu.kz

THE IMPACT OF PROJECT-BASED LEARNING ON STUDENTS' MOTIVATION IN FOREIGN LANGUAGE LEARNING: A COMPREHENSIVE LITERATURE REVIEW

Abstract: This literature review explores the level of motivation when introducing Project-Based Learning (PBL) in the mainstream classes of the foreign language. A particular attention is given to its application in language education, highlighting benefits and possible challenges. This review synthesizes findings from various research studies that highlight the benefits of PBL, including increased engagement, deeper conceptual understanding, and faster language retention. Despite the fact that PBL stimulates students to acquire a foreign language, there are some challenges, such as the need for additional guidance, lack of teacher training and assessment techniques. Although the review highlights the exceeding advantages of PBL over traditional teaching methods, it also emphasizes the positive application of balanced approach for improving academic excellence of students. Moreover, the literature review takes into considerations the essence of cultural factor and suggest longitudinal application of PBL for identification of long-term effects on students' motivation to learn a foreign language. The review provides a foundation for further empirical research on integrating PBL into educational curricula and offer essential insights into its best practices in foreign language classrooms. To reach the assigned aim, the synthesized research articles have been taken from the following data bases, such as Google Scholar, Research Gate, JSTORE, and Web Science with prevailing number of them conducted between the period of 2018 and 2024.

Keywords: Project-Based Learning (PBL), impact, motivation, benefits, challenges, foreign language learning.

Introduction

The development and increasing popularity of learner-centered approaches has changed the vector of the educational process completely by encouraging instructors to investigate new innovative methods of teaching. One of the most effective approaches which is taking a great significance and prominence in the contemporary world is project-based programming. These days, numerous companies tend to give their choice over the candidates with developed soft skills, such as collaboration, communication, critical reasoning and a number of essential abilities that might enable their organizations to survive in the fast-changing globalization processes. Therefore, employees should learn all of these inspiring qualities in the university, so they can exhibit all required skills in the working life.

Project-based learning is considered to be one of the most appropriate and effective approaches that meet these elevated demands of a new working tendency. In other words, a project is the perspective when students hear not what they are going to learn, but what they are going to create by the end of the learning process (Lenz et al, 2015). According to Thomas (2000, p.1), "project is a model that organizes learning around projects." In this approach, students alleviate the arising issue through asking various questions, debating with each other, discussing their findings and creating new products.

The given freedom of choice and autonomy in organizing their own learning content is likely to influence students' engagement and raise their interest in the educational processes. Therefore, it has been discovered that PBL has a positive impact on students' motivation and their involvement in the learning (Hilvonen et al., 2010; Chiang et al., 2016; Carrabba et al., 2018; Shin, 2018). Over the past decades, PBL research area has shifted from the simple descriptive studies to very detailed

analysis of determining the effectiveness of real-life projects in stimulating intrinsic motivation of students, deepening their comprehension, and promoting transferable skills. The main aim of the following literature review is to synthesize a great spectrum of research studies and theoretical perspectives on PBL, with a particular focus on its application in foreign language learning. Before delving into empirical evidence of PBL in improving students' motivation, the given literature review explores the historical background and theoretical foundations of PBL. Additionally, it highlights unique challenges and benefits presented when implementing PBL in foreign language education and identifies critical gaps that future research study may address.

The essence of motivating students in foreign language learning process is well established in the literature of many scholars. To illustrate, according to Dörnyei (1990) motivation plays a key role in determining the success if language acquisition, whereas Deci and Ryan (1985) have underscored the significance of inducing students intrinsically throughout the process of language learning. Despite the existing backdrop, integration of PBL in foreign language education fulfills a wide range of motivational deficits by involving students meaningful and authentic tasks. In the following sections, the review will study and provide thorough information on identifying key concepts, historical antecedents, and current controversies around PBL, providing an in-depth analysis of its potential in transforming foreign language instruction.

Literature Review

This section of the research paper synthesizes essential research papers conducted in the field of Project-Based Learning and its effectiveness on students' motivation in foreign language learning.

Project-Based Learning

The history of project-based learning can be traced back to thousand years ago when a popular concept "learn by doing" had been practiced widely by ancient Chinese scholars, later on being implemented in the 16th century by Newton and numerous scholars who investigated the most important discoveries of the world. Nevertheless, most contemporary scholars relate the birth of Project-Based Learning to John Dewey's writings in the 1960s. As stated by the empirical philosophy of Dewey, project-based learning involves natural problems that should be alleviated by students through in-depth analysis (Shin, 2018). This type of instruction advocates to be based upon Vygotsky's constructivist and Dewey's experiential learning (Smith, 2005). According to Acar (2013), project-based learning is a constructive approach that is applied in the real-life settings around the fundamental projects which are fully chosen based on students' decisions and selections. Howard (2002) assumes that project-based learning provides students with a meaningful task, thereby improving their critical-thinking and creative abilities, also contributing to the enhancement of cooperation and self-directed skills. In other words, this is a long-term process that enhances student motivation by introducing authentic issues and giving ownership over their own projects. Students deal with the real-world problems where they learn to construct their own knowledge and experience beyond their current understanding (Oh et al., 2020). The main role of the teacher in this method is constructing tasks, challenging students through thought-provoking questions, as well as directing and encouraging social interaction between students. Eventually, the teacher evaluates the learning and knowledge gained at the end of the experience.

Before presenting the final output known as "artifact," students should go through different stages of PBL. The initial step is "Challenging Problem or Question", at this stage students are presented with intriguing questions by enabling them to pose other ones as well. This stage assists in defining the expected direction of the research. The following stages are "Sustained Inquiry" and "Authenticity" where students choose the product which is meaningful in the real-world. In the next stage, students make choices over the sources of information and topics. In some cases, students are given a chance to choose advisors or keep working without them. In the steps that follow, students receive feedback from their peers, analyse and work on mistakes. The last two stages ("Critique & Revision"; "Public Product") associate with students presenting their own work and reflecting on

their own learning processes by highlighting the areas of growth and challenges with which they had to cope throughout the process (Ministry of Education, 2014).

All of the essentials of PBL create a direct link between practical and intellectual abilities of students by promoting significant learning and enabling students to witness various experiences and knowledge-based situations. Based on the following merits of PBL, it has been discovered that there is a direct link between the intervention of PBL in the learning process and motivational improvements of students. According to Chiang and Lee (2016), students' motivation is stimulated in a wide range of ways in a PBL environment by conducting a group-discussion, regular meetings with the supervisor, immediate feedback, self-reflective sessions and sharing leadership.

Students' motivation in PBL

As a psychological phenomenon, motivation has been studied numerous times and defined by various scholars. According to Keller (1983), motivation can be understood as "the choice people make as to what experiences or goals they will approach or avoid and the degree of effort they exert in that respect" (p. 389). Whereas, Gardners (1985) believed that motivation is the combination of three main factors, particularly the learners' efforts to learn something, desires to achieve their goals and favorable attitudes toward it. In general, motivation can be divided into two main types: intrinsic and extrinsic motivation.

According to Plant and Ryan (1985), intrinsic motivation can be defined as a motive that emerges from the activity itself or within the person. Most students are self-motivated when they seek enjoyment, challenges, curiosity or self-expression. In literature, intrinsic motivation is measured through a free-choice task or self-report questionnaires (Deci & Ryan, 1985; Ryan & Grolnick, 1986). As for extrinsic motivation, it is believed to have a motive which arises outside of the activity (Liu et al., 2019). Based on the definition provided, any type of external incentives can be considered as the part of external motivation. For instance, Amabile et al. (1994) has divided extrinsic motivation into two main types: (a) compensation orientation which focuses on external rewards, and (b) outward orientation, which underlines the idea of people comparing themselves to each other.

Some of the research findings have discovered that the process of exchanging ideas and knowledge among participants in the learning increases students' intrinsic motivation (Koh et al., 2010; Rasiah, 2014). The research outcomes are supported by the study conducted by Oh et al. (2020), where it has been investigated that through the intervention of PBL the external factors have been internalized into intrinsic motivation. Students felt much more motivated by receiving the feedback from their peers, it has helped them in understanding their own abilities. Moreover, they felt much more motivated by having more freedom over the choice they make and control over the project outcomes, resulting in a sense of ownership. In addition, the study carried out by Acar (2013) has emphasized that the model of PBL shows very high results in increasing the internal motivation of professional sportsmen. However, it does not impact the internal motivation of the sportsmen of the national team level by leaving more space and time in extending further activities.

Another study conducted by Maftoon (2013) has discovered the existing discrepancy in their research results. The study results have shown that the motivation of foreign language learning have been identified and increased after the intervention of PBL only in two out of four Iranian EFL groups, whereas the rest of the two represented absolutely opposite results by demonstrating no changes in motivational level.

According to the study findings of Kortam et al. (2018), which have been conducted among Arab learners, have been revealed that students felt more motivated to study biology after the intervention of the PBL model. They highlighted the freedom of action and expression that PBL experience has offered them. Moreover, they mentioned that PBL helped them to understand the subject matter more profoundly since they had to search for information and materials to explain it to other students.

PBL in Foreign Language Education

The latest research studies conducted on effectiveness of PBL highlights major improvements in enhancing students' engagement and motivation in the process of foreign language learning. The recent studies illustrate that PBL integration fosters deeper learning, improve better retention of language, and cultivates essential communication skills by making students work in groups (Bui et al., 2020; P'ng et al., 2023). The given investigations emphasize the idea that PBL fully aligns with modern teaching paradigms which prioritize learner autonomy and critical thinking.

For example, a study conducted by Kim and Eisenhower (2019) investigated the impact of PBL on EFL students in a Korean university setting, showing that students have demonstrated a significant level of motivation and exhibited more positive attitude towards language learning compared to traditional learning classes. Likewise, Kavlu (2017) has explored the effects of PBL in English language classrooms within Fezalar Educational Institutions in Iraq by pointing out the enhanced language and social skills of students, highlighting their speaking confidence and increased motivation towards their learning process. Moreover, teachers pointed out not only students' improved abilities of speaking in English, but their willingness to communicate and interact with other students.

Challenges of PBL in Language Learning

Although PBL exhibits some significant improvements in foreign language education, there are certain difficulties as well. One common issue of PBL is the resistance of students to work autonomously, especially in countries where teacher-centered instruction can be considered as the norm of educational process (Wang, 2020). Some students still require scaffolding and structured guidance to be fully involved in PBL activities and struggle with self-directed learning.

Another essential issue is the assessment of PBL projects which do not align with traditional assessments methods due its emphasis on creativity, and real-world application (Bae, 2020). Therefore, educators are likely to adopt to alternative ways of assessing students' works, such as project presentations, portfolios, and peer assessments.

The role of teacher preparedness in integrating PBL into their educational curriculum plays one of the most crucial roles. Numerous language instructors lack basic training in PBL implementation which leads to ineffective facilitation and misalignment with curriculum goals (Yang, et al.,2021).

Comparative Analysis with Other Teaching Methods

When comparing PBL practices with traditional lecture-based instructions and task-based learning (TBL), PBL demonstrates distinct advantages in promoting motivation and engagement. As stated by Beckett & Slater (2021), unlike lecture-based learning where students are seen as "empty vessels," PBL actively involves students in authentic real-world tasks which focuses on developing students' problem solving abilities, collaboration, and creative thinking. This interactive approach associates with higher satisfaction and better retention of linguistic structures.

Nevertheless, some studies dispute the following concern by emphasizing the idea that PBL is unlikely to outperform TBL in terms of immediate language acquisition. Compared to TBL, PBL's broader scope may sometimes reduce attention to grammatical structures (Ellis, 2021). A balanced approach to learning which perfectly combines both methodologies can offer the benefits of task-based practice while maintaining motivational advantages of PBL.

Cultural and Institutional Factors

The effectiveness of PBL depends on the cultural setting where it is implemented and practices. Based on research findings, students from high-context cultures, such as Japan and China, tend to demand more guidance when adapting to PBL due to differing expectations about teacher authority and classroom roles (Chen et al. 2021). Conversely, students from low-context countries, Germany or the USA, more readily adapt to student-centered learning models.

In the context of Kazakhstan, due to the shift towards competency-based education which is outlined in national educational policies of the country, PBL started gaining its popularity as

innovative approach in modern teaching practices. Research studies conducted in Kazakhstani universities suggest that while students face some challenges with transition from teacher-centered methods to PBL, they eventually develop higher levels of learning involvement and motivation toward language acquisition (Tleubayeva & Abisheva, 2022). Despite the effective outcomes of PBL, there are some challenges as varying level of teacher training, lack of resources, and large class sized which hinder successful integration of PBL into Kazakhstani national system (Kenzhebekova, 2021).

Longitudinal Studies on PBL and Motivation

Long-term research studies on PBL and motivation reveal that the benefits of project-based learning go beyond the immediate classroom experience. For instance, a longitudinal study conducted by Song et al. (2023) practiced PBL three academic years and investigated that PBL activities have improved students' intrinsic motivation and self-efficacy towards foreign language learning. Moreover, the majority of students had a tendency to continue foreign language beyond expected coursework. Although without sustained and proper engagement and implementation policies, students may not feel motivated over the time (Chiang & Lee, 2016). This research finding underscores the need for continuous reinforcement through structured projects, mentorship and various opportunities to apply their gained knowledge in real-world context.

Conclusion

Project-based learning has emerged as an innovative and powerful approach in developing students' motivation and maintain their interest through the process of foreign language learning. Though numerous research studies emphasize its effectiveness, certain challenges, such as resistance to autonomy, challenges in assessment, and lack of teacher preparedness ought to be addressed for optimal implementation. Comparative analysis of various research studies suggests that a mixed approach both PBL and traditional methodologies may result in more effective and long-term outcomes. Furthermore, cultural and institutional factors play a crucial role in determining the success of PBL programs.

In Kazakhstan, PBL presents both possible opportunities, especially in foreign language acquisition, and challenges. While the integration of PBL aligns with the modern educational policies in education, the necessity for infrastructural support, teacher training, and localized teaching methods remains. Future research studies should focus on long-term impact of PBL in language proficiency and motivation of students, particularly in the context of Kazakhstan. By alleviating these challenges and leveraging institutional support, educators can maximize essential merits of PBL in fostering and creating more engaging and effective language learning experience for students.

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Лаура Лядова[1], Кулахметова Мергүл[2]*
[1]SDU University, Қаскелең, Қазақстан
[2] Pavlodar Pedagogical University, Павлодар, Қазақстан
*e-mail: 231302005@sdu.edu.kz

ЖОБАЛЫҚ ОҚЫТУДЫҢ ШЕТ ТІЛІН ОҚЫТУДАҒЫ СТУДЕНТТЕРДІҢ МОТИВАЦИЯСЫНА ӘСЕРІ: БАР ӘДЕБИЕТТЕРГЕ ШОЛУ

Аңдатпа. Бұл әдебиеттік шолу жалпы шет тілі сабақтарында жобалық оқытуды енгізудегі мотивация деңгейін зерттейді. Оның артықшылықтары мен мүмкін болатын қиындықтарды көрсете отырып, тілдік білім беруде қолданылуына ерекше назар аударылады. Бұл шолу жобалық оқытудың артықшылықтарын, соның ішінде белсенділікті арттыруды, тереңірек тұжырымдамалық түсінуді және тілді тезірек сақтауды көрсететін әртүрлі зерттеу зерттеулерінің нәтижелерін синтездейді. Жобалық оқытудың студенттердің шет тілін меңгеруіне ынталандыратынына қарамастан, қосымша нұсқаулардың қажеттілігі, мұғалімдерді оқытудың және бағалау әдістерінің болмауы сияқты қиындықтар бар. Шолу дәстүрлі оқыту әдістеріне қарағанда PBL артықшылығын көрсетеді, бірақ ол сонымен қатар студенттердің академиялық жетістіктерін арттыру үшін теңдестірілген тәсілдің оң қолданылуына баса назар аударады. Сонымен қатар, әдебиеттерге шолу мәдени фактордың мәнін ескереді және студенттердің шет тілін үйренуге деген ынтасына ұзақ мерзімді әсерлерін анықтау үшін жоба оқытудың бойлық қолдануды ұсынады. Шолу жобалық оқытуды білім беру бағдарламаларына біріктіру бойынша одан әрі эмпирикалық зерттеулердің негізін қалайды және оны шет тілі сабақтарында қолданудың озық тәжірибелері туралы маңызды түсініктерді ұсынады. Осы мақсатқа жету үшін синтезделген зерттеу мақалалары Google Scholar, Research Gate, JSTORE және Web Science сияқты келесі дерекқорлардан жиналды, олардың көпшілігі 2018 және 2024 жылдар аралығында жүргізілді.

Түйін сөздер: жобаға негізделген оқыту, әсер, мотивация, артықшылықтар, қиындықтар, шет тілін үйрену.

Лаура Лядова[1], Кулахметова Мергуль[2]*
[1]SDU University, Каскелен, Казахстан
[2] Pavlodar Pedagogical University, Павлодар, Казахстан
*e-mail: 231302005@sdu.edu.kz

ВЛИЯНИЕ ПРОЕКТНОГО ОБУЧЕНИЯ НА МОТИВАЦИЮ СТУДЕНТОВ В ИЗУЧЕНИИ ИНОСТРАННЫХ ЯЗЫКОВ: КОМПЛЕКСНЫЙ ОБЗОР ЛИТЕРАТУРЫ

Аннотация: В этом обзоре литературы изучается уровень мотивации при внедрении проектного обучения в основные классы иностранного языка. Особое внимание уделяется его применению в языковом образовании, подчеркиваются преимущества и возможные проблемы. В этом обзоре обобщены результаты различных исследований, которые подчеркивают преимущества проектного обучения, включая повышенную вовлеченность, более глубокое концептуальное понимание и быстрое сохранение языка. Несмотря на то, что PBL стимулирует студентов к изучению иностранного языка, существуют некоторые проблемы, такие как необходимость в дополнительном руководстве, отсутствие подготовки учителей и методов оценки. Хотя в обзоре подчеркиваются превосходящие преимущества PBL по сравнению с традиционными методами обучения, в нем также подчеркивается положительное применение сбалансированного подхода для повышения академического совершенства студентов. Кроме того, в обзоре литературы учитывается сущность культурного фактора и предлагается продольное применение проектного обучения для выявления его долгосрочного эффекта на мотивацию студентов к изучению иностранного языка.

Обзор закладывает основу для дальнейших эмпирических исследований по интеграции проектного обучения в образовательные программы и предлагает важные сведения о передовой практике его применения на занятиях по иностранным языкам. Для достижения поставленной цели были взяты синтезированные исследовательские статьи из следующих баз данных, таких как Google Scholar, Research Gate, JSTORE и Web Science, причем преобладающее количество из них было проведено в период с 2018 по 2024 год.

Ключевые слова: проектное обучение, влияние, мотивация, преимущества, проблемы, изучение иностранного языка.

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Dadayev Aslan [1]
[1]SDU University, Kaskelen, Kazakhstan
*e-mail: 231346008@sdu.edu.kz

DIFFERENTIATION OF HOMEWORK IN PHYSICS TO IMPROVE THE ACHIVEMENTS OF 9TH GRADE STUDENTS IN SECONDARY SCHOOLS IN KAZAKHSTAN

Abstract. This study examines the impact of differentiated homework assignments on the academic achievements of 9th-grade students in physics within secondary schools in Kazakhstan. The research employs a mixed-methods approach, incorporating both qualitative and quantitative data collection techniques, including pre- and post-assessment tests. The study aims to determine whether tailored homework assignments, based on students' proficiency levels and learning styles, enhance their understanding and performance in physics. Findings indicate that differentiation in homework positively affects student engagement, comprehension, and overall academic success. The research highlights the necessity of personalized learning approaches in physics education. This study contributes to the broader discourse on effective teaching methodologies and underscores the role of homework customization in fostering student achievement.

Keywords: differentiated homework, physics education, student achievement, personalized learning, secondary school, academic success, Kazakhstan, mixed-methods research.

Introduction

Improving students' academic performance in physics is a complex and significant challenge in education (Salar & Turgut, 2021, p. 11). Key questions arise: How can homework be used as a tool to enhance students' interest and engagement in learning physics (Keane & Heinz, 2019, p.15)? Can differentiated homework positively influence students' completion rates? In my teaching practice, I have observed that physics homework is primarily completed by students with above-average academic performance, whereas students with lower achievement often neglect these assignments. This trend suggests that academic ability may influence homework completion, which, in turn, can affect classroom participation and overall academic success (Kontur & Terry, 2015, p.7).

Notably, students who regularly complete homework tend to participate more actively in class discussions, grasp new concepts more quickly, and achieve better academic results (Delfino, 2019, p.9). Conversely, a lack of completed homework is typically correlated with lower grades, indicating a negative cycle of disengagement (Crocker, R. K., & Kleitsch, M., 2023, p. 11). When asked about their reasons for neglecting homework, some students remain silent, while others cite a lack of interest, insufficient time, or difficulty understanding the material (Smith, J., et al., 2019, p.36). Additionally, some students prioritize other activities over homework, perceiving assignments as less valuable. For others, intrinsic motivation to complete homework depends on whether the tasks are engaging and meaningful to their learning process (Patall, E. A., et al., 2010, p.10).

This raises the question: Is it possible to design homework that supports student learning without imposing an excessive workload (Jamal & Rizvi, 2021, p.276)? How can assignments be adapted to meet the diverse needs of students in a physics classroom? Moreover, can homework be tailored to students' personal interests, potentially fostering greater motivation and sustained academic engagement? Given that collaborative learning enhances students' understanding of classroom material, it may also offer potential benefits if integrated into homework design (Epstein, J. L., & Van Voorhis, F. L. 2001, p.183).

The purpose of this study is to examine the impact of differentiated homework on students' academic performance and engagement in physics lessons. The study will assess whether

personalizing assignments based on students' abilities and interests can positively influence their motivation and completion rates, thereby contributing to their overall success in physics.

General Information About the Study

This study aims to improve education and the teaching of physics in 9th-grade general education schools in Kazakhstan. In my view, one possible way to enhance learning is through the differentiation of physics homework. This approach should take into account students' individual interests. These interests may include achieving good grades, feeling comfortable while completing assignments and seeing results, having a genuine interest in physical phenomena and their study, enthusiasm for sports, a sense of superiority, focusing on a future profession, gaining recognition from parents and classmates, and other motivating factors.

To analyze the impact of differentiated homework on students' academic performance, two classes were selected: one following a traditional teaching methodology and the other serving as an experimental group. In the experimental class, homework assignments will be differentiated. Student learning outcomes will be measured, and the effect of differentiated homework on physics performance will be evaluated. The results will be assessed by comparing the academic progress of the traditional class and the experimental class. To enhance progress in the experimental class, differentiation will be implemented in several areas.

Relevance of the Study

Today, general education schools in Kazakhstan often have classes consisting of 24 to 32 students. Research suggests that large class sizes can hinder the effectiveness of teaching and learning, as individual attention is limited **(**Wyss, V. L., et al., 2007, p.49). In fact, studies indicate an inverse relationship between class size and academic performance, especially in subjects like physics, which require focused engagement and hands-on practice (Borland, M. V., et al., 2005, p.77). However, in my teaching experience, I have consistently observed that some students maintain high efficiency and dedication to their studies, completing homework on time, actively participating in discussions, and demonstrating unwavering focus even in overcrowded classrooms. Their motivation appears to stem not only from the desire to earn good grades but also from a deeply rooted drive to explore new and intriguing concepts (Ryan, R. M., & Deci, E. L. 2000, p.60).

Motivation is recognized as a key factor in student achievement, particularly in subjects perceived as challenging, such as physics (Schunk, D. H., & Zimmerman, B. J. 1998, p.14). Students who engage with physics through hands-on activities develop a deeper understanding and retain knowledge more effectively, as active participation fosters a strong learning momentum (Ellwood, R., & Abrams, E. 2018, p.1130). Differentiated physics homework provides an opportunity to cater to students' diverse interests and learning styles, making the subject more relevant and engaging for each individual. Such assignments not only promote a healthy interest in physics but also encourage students to strive for higher academic achievements (Rosário, et al., 2015, p.386).

Given the varying levels of intrinsic motivation among students, differentiated homework can serve as a tool to stimulate curiosity and willingness to explore beyond the classroom, even in large classes. This approach aligns with educational research showing that when assignments are tailored to students' abilities and interests, they are more likely to engage actively and achieve higher outcomes (Tomlinson, C. A. 2014, p.174). Thus, by personalizing physics homework, we can potentially enhance student engagement and overall academic performance, making the subject more accessible and enjoyable to study.

Research Objective

The objective of this study is to establish the relationship between differentiated physics homework and the improvement of students' academic performance through the results of formative and summative assessments in physics. The study aims to determine whether differentiated homework assignments influence students' achievement in physics lessons.

Research Tasks

- Determine whether differentiated homework has a positive impact on student engagement during lessons.
- Assess whether differentiated homework positively affects students' performance in the summative assessment for a specific unit.
- Examine whether differentiated homework positively influences students' overall summative performance for the academic term.

Research Hypothesis

Students' academic performance in physics can be improved through differentiated assignments. Academic achievement depends on students' level of interest in studying physics. Differentiated assignments should spark interest in unmotivated students and enhance the motivation of those with low engagement in learning physics.

Methodology Section

To achieve the research goal, observation methods were implemented. This included monitoring student activity in class and tracking academic performance through formative assessment. The study also involved monitoring homework completion, comparing the formative assessment results of the control and experimental classes, and graphically representing the final assessment results to visually demonstrate the effectiveness of the applied methods.

Materials Used in the Study

To collect initial data, the study utilizes student motivation surveys to determine their interest in studying physics, as well as academic performance testing for both the control and experimental classes. The results serve as the foundation for tracking further academic progress throughout the study.

In the experimental class, various types of homework assignments will be implemented, while in the control class, traditional assignments will remain unchanged. Throughout the learning process, observations of student engagement during physics lessons will be conducted, along with formative assessment during lessons and regular monitoring of homework completion. Additionally, students will complete final assessments for each unit, and the results of these assessments will be analyzed for both the control and experimental classes. Quarterly final assessments will also be administered, and their results will be compared between the two groups.

To visualize the findings, a progress chart will be created, clearly illustrating the academic development of both the control and experimental classes. Graphical representations of the research results will be used to compare the dynamics of student achievement across both groups.

Participants and Research Location

The study will involve two ninth-grade classes, with the results from the selected classes expected not to differ significantly. One class will be the control group, and the other will be the experimental group. The control group will serve as a baseline for comparison with the experimental group's results, and no changes will be made to their homework assignments.

The experimental class, which will have a similar level of knowledge as the control group, will receive differentiated homework assignments. To examine the impact, the class with a lower academic performance level will be chosen as the experimental group, allowing us to observe contrasts in the research results. Both classes will have the same number of students, and the lessons will be conducted on the same days.

The study will take place in a secondary school setting.

Research Algorithm

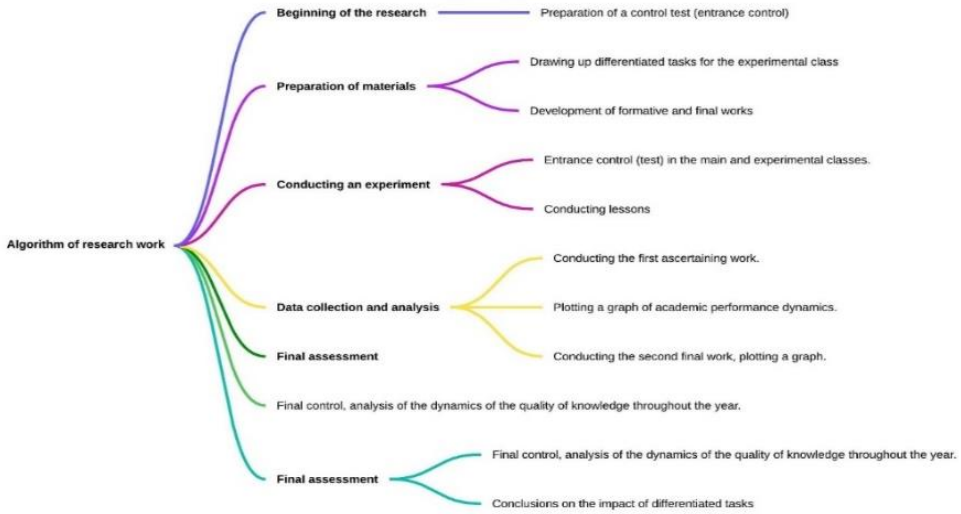

Figure 1- Research Algorithm

The study will begin with the selection of tasks for a control test, which will be used for both formative and summative assessments in the control and experimental groups. Differentiated assignments will be created for the experimental group, taking into account the theme of the lesson, practical focus, group work, student interests, and allowing for varying levels of difficulty.

The next step involves selecting tasks for formative assessments in the classroom and preparing the final tests for each topic. Additionally, final tests for the academic quarter will be prepared.

After preparing the materials, the data collection phase will begin. The first step will be conducting an initial control test in both the control and experimental classes. Lessons in both classes will follow the same structure. However, the homework assignments will differ: in the control class, the homework will follow the standard curriculum, while in the experimental class, the assignments will be differentiated based on the lesson content and students' ability to choose their level of difficulty.

At the end of the section on physics, summative assessments will be conducted in both the control and experimental classes. The summative assignments for both classes should be identical, and reliable, valid, and credible tasks should be used. After completing the summative assessments, the results of both classes will be graphically displayed. The data from the initial test and the first summative assessment will form the basis for analyzing the dynamics of academic performance in both the control and experimental classes.

Once the next section has been completed in both classes, a second summative assessment will be conducted. The results from the second final test will be graphically displayed for both classes. The data from the first two final tests will reveal the first dynamics of student performance, allowing for preliminary conclusions about the work and whether differentiated homework affects students' academic performance. Specifically, the impact of differentiated homework on student performance—whether positive or negative—will be analyzed.

At the end of the quarter, a final assessment will be conducted for both classes. The results will help determine the quality of knowledge in both the control and experimental groups, and a graph will be created to compare the knowledge quality in both classes. The graph should highlight the dynamics between the classes.

At the end of the research, a final test will be conducted in both classes. The results will be compared to the initial test results. By comparing the results of the initial and final tests, the dynamics of academic performance in both the control and experimental groups will be determined.

The results will allow for a conclusion on the effectiveness of the selected types of differentiated homework in improving the knowledge quality of students in the experimental class. By comparing and analyzing the dynamics of the obtained results, it will be possible to identify which types of

differentiated homework had the most significant impact on the knowledge quality of students in the experimental group.

Practical part

In order to determine the current level of knowledge, entrance testing was conducted in the main and experimental classes. The testing results are included in Table 1.

Table 1. Pre-test Results and Comparative Analysis

Entrance test results			
Control group		Experimental group	
Student No.	Maximum score - 30	Student No.	Maximum score - 30
1	20	1	9
2	15	2	10
3	15	3	13
4	19	4	20
5	18	5	15
6	11	6	15
7	21	7	13
8	15	8	19
9	21	9	13
10	13	10	15
11	12	11	13
12	12	12	18
13	14	13	15
14	15	14	18
15	16	15	14
16	20	16	12
17	12	17	13
18	11	18	20
19	16	19	14
20	14	20	23
21	15	21	18
22	13	22	12
23	14	23	16
24	11	24	10

In the control and experimental groups, there is a strong scatter of results: in the control group, the minimum score is 11, the maximum score is 21, in the experimental group, the minimum score is 9, the maximum score is 23. The results of the preliminary analysis are included in Table 2.

Table 2. Results of the Preliminary Analysis

	Control group	Experimental group
Minimum score	11	9
Maximum score	21	23
Average score	15,13	14,9
Range of values	10	14
Quantity estimate «5» (Great)	0	0
Quantity estimate «4» (Fine)	5	5
Quantity estimate «3» (satisfactorily)	18	16

Quantity estimate «2» (not satisfactory)	1	3

Analysis of the entrance testing shows that the difference in results is insignificant; overall, the picture of academic performance in both classes is similar.

Statistical Analysis of Pre-test Group Results

To ensure the initial equivalence between the control and experimental groups, a Welch's one-way analysis of variance (ANOVA) was conducted on the pre-test scores. This statistical test was chosen due to its robustness against violations of homogeneity of variances. The results indicated no statistically significant difference between the groups:

$F(1, 45.6) = 0.0462$, $p = 0.831$.

These findings suggest that the groups were comparable at the outset of the study, providing a valid foundation for subsequent comparisons in the post-test phase.

Table 3. Descriptive Statistics for Pre-Test Scores

	Groups	Number of students	Average	Standard deviation	Standard error (of the mean)
Pre-Test	Control	24	15.1	3.19	0.652
	Experimental	24	14.9	3.51	0.717

Table 3 presents the descriptive statistics for the pre-test scores in both the control and experimental groups. The control group (N = 24) had a mean score of 15.1 (SD = 3.19), with a standard error (SE) of 0.652. The experimental group (N = 24) had a mean score of 14.9 (SD = 3.51), with a standard error (SE) of 0.717.

These results suggest that both groups have similar average scores prior to the intervention, with only a slight difference in the means (0.2), which is not statistically significant based on the previous ANOVA results. The standard deviations (SD) for both groups are relatively similar, indicating that the spread of scores within each group is comparable.

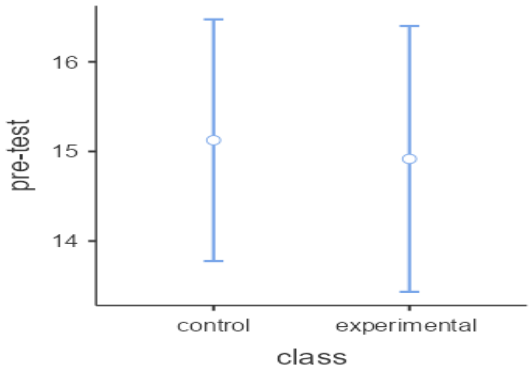

Figure 2- The mean values and confidence intervals for the pre-test

As shown in the graph (Figure 2), the mean values and confidence intervals for the pre-test are nearly identical, confirming the absence of significant differences between the groups at the initial stage.

Final academic performance of students before the start of the study.

To ensure initial comparability between the control and experimental groups, the final academic performance of students was analyzed prior to the pedagogical intervention (Table 4). This analysis serves as a baseline indicator of students' achievement levels in physics before the start of the study.

Establishing a comparable starting point is essential for an objective assessment of the impact of the implemented instructional approach.

The final grades reflect the cumulative results of students in physics prior to the use of differentiated homework. A one-way Welch's ANOVA was conducted to determine whether there were any statistically significant differences between the groups at the outset. The results of this analysis are presented below.

Table 4. Results of summative assessment of groups before the start of the study.

Results of summative assessment of groups before the start of the study			
Control group		Experimental group	
Student No.	Maximum value – 100%	Student No.	Maximum value – 100%
1	77	1	63
2	60	2	52
3	67	3	50
4	78	4	59
5	70	5	70
6	53	6	63
7	83	7	65
8	65	8	49
9	74	9	61
10	61	10	73
11	70	11	59
12	64	12	57
13	65	13	62
14	74	14	51
15	62	15	64
16	86	16	69
17	57	17	66
18	55	18	67
19	74	19	84
20	69	20	86
21	71	21	79
22	68	22	54
23	68	23	83
24	58	24	49

Table 5. One-way analysis of variance (Welch) of the results of the summative assessment of groups before the start of the study.

One-way analysis of variance (Welch)				
Condition	F-statistic (test value)	Degrees of freedom between groups	Degrees of freedom within groups	p-value (significance level)
	1.90	1	43.2	0.175

Table 6. Descriptive statistics of the group: Final academic performance of students before the start of the study

Descriptive statistics of the group

	Groups	Number of students	Average	Standard deviation	Standard error (of the mean)
Before the study begins	control	24	67.9	8.48	1.73
	experimental	24	64.0	11.03	2.25

To ensure baseline equivalence between the groups, a one-way Welch's ANOVA was conducted on students' final academic performance prior to the start of the study(Table 5 and Table 6). The analysis revealed no statistically significant difference between the control and experimental groups, $F(1, 43.2) = 1.90$, $p = .175$. This indicates that both groups had similar academic achievement levels at the outset, supporting the validity of subsequent comparisons. (Figure 3)

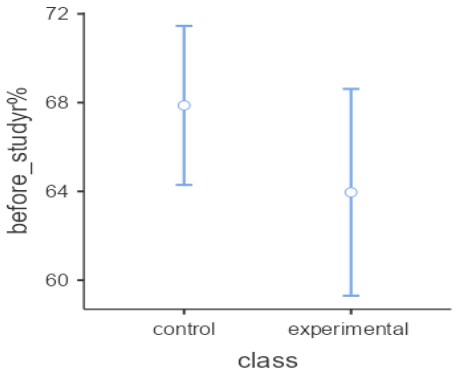

Figure 3- Basic equivalence between certificates

Description of the Phase Between the Pre-Test and Post-Test

Following the administration of the pre-test, which served to determine the students' initial level of understanding, the core phase of the study was initiated. This phase spanned the period between the pre-test and the post-test and involved the implementation of distinct instructional approaches in the experimental and control groups, particularly in relation to homework assignments.

In the experimental group, a system of differentiated homework tasks was introduced. These tasks were tailored to the individual learning needs, abilities, and interests of the students. The assignments varied in terms of complexity (basic, intermediate, and advanced), and included practical problem-solving tasks, research-based mini-projects, and activities designed to foster critical thinking and independent learning. The teacher played an active role in monitoring students' progress, providing ongoing feedback, and adjusting the level and type of tasks as necessary to maintain engagement and ensure accessibility.

In contrast, the control group continued learning through the traditional method, in which all students received identical homework assignments, regardless of their individual performance levels or learning preferences. The tasks were predominantly reproductive in nature, focusing on the repetition and reinforcement of classroom content without significant variation.

Throughout this phase, data collection was conducted systematically, including observations of students' engagement levels, task completion quality, and overall participation. Difficulties encountered by students in both groups were also recorded to allow for a more comprehensive analysis of the instructional strategies employed.

This phase concluded with the post-test, which was designed to assess the development of students' academic performance over the course of the intervention. The post-test was aligned with the same content areas as the pre-test, enabling a direct comparison of learning outcomes and providing insights into the effectiveness of differentiated homework assignments as a pedagogical intervention.

Post-Test Results and Comparative Analysis

To assess the effectiveness of the applied instructional strategies, a post-test was conducted in both the experimental and control groups. This section presents the outcomes of the post-test, highlighting key trends, differences, and patterns in students' performance that emerged as a result of the intervention.

The results of the post-test are entered into table 7.

Table 7. Post-Test results

Post-Test results			
Control group		Experimental group	
Student No.	Maximum score - 30	Student No.	Maximum score - 30
1	21	1	15
2	16	2	14
3	14	3	17
4	20	4	23
5	18	5	20
6	14	6	19
7	22	7	17
8	16	8	24
9	23	9	16
10	13	10	19
11	14	11	16
12	14	12	24
13	13	13	16
14	16	14	21
15	17	15	18
16	21	16	15
17	14	17	16
18	12	18	26
19	18	19	15
20	15	20	26
21	16	21	22
22	15	22	14
23	15	23	23
24	10	24	15

In both groups, the control and the experimental, there is a spread of post-test results: in the control group, the minimum score is 10, the maximum score is 23, in the experimental group, the minimum score is 14, the maximum score is 26. The results of the preliminary analysis are presented in Table 8.

Table 8. Descriptive Statistics of Student Performance Based on Grading Scale

Descriptive Statistics of Student Performance Based on Grading Scale								
Indicator	Minimum score	Maximum score	Average score	Score range	Number of "5" (Excellent)	Number of "4" (Good)	Number of "3" (Satisfactory)	Number of "2" (Unsatisfactory)
Control group	10	23	16.13	13	0	5	18	1

Experimental group	14	26	18.79	12	2	7	15	0

To evaluate the effectiveness of differentiated homework tasks, a one-way analysis of variance (Welch's ANOVA) was conducted, accounting for potential heterogeneity of variances between the groups. (Table 9 and Table 10).

Table 9. Results of One-Way Analysis of Variance (Welch) of the Post-Test results.

Results of One-Way Analysis of Variance (Welch)				
Condition	F-statistic (test value)	Degrees of freedom between groups	Degrees of freedom within groups (adjusted)	p-value (significance level)
Post-Test	6.49	1	44.8	0.014

Table 10. Descriptive statistics of the group of the Post-Test results.

Descriptive statistics of the group					
	Groups	Number of students	Average	Standard deviation	Standard error (of the mean)
Post-Test	Control	24	16.1	3.31	0.677
	Experimental	24	18.8	3.91	0.799

The analysis yielded the following result: $F(1, 44.8) = 6.49$, $p = 0.014$. Since the p-value is less than 0.05, the result indicates a statistically significant difference in post-test scores between the experimental and control groups. This finding suggests that differentiated homework had a positive impact on students' academic performance.

Therefore, it can be concluded that assigning homework tailored to students' individual readiness levels and learning needs contributed to improved learning outcomes. (Figure 4)

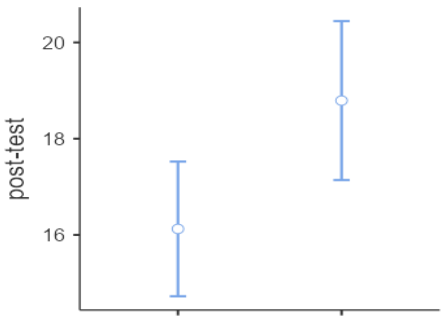

Figure 4- Mean post-test scores with confidence intervals in the control and experimental groups

Statistical Analysis of Summative Assessment Results Conducted After the Pedagogical Intervention

Upon completion of the study, a summative assessment was administered to both the experimental and control groups. The results of this assessment were used as a tool to track changes in students' academic performance compared to the data obtained during the pre-test phase. The statistical analysis presented in this section aims to identify differences in results between the groups and evaluate the potential impact of the implemented intervention on students' learning outcomes.

Results of the Final Assessment of the Groups After the Research Intervention

To evaluate the impact of the implemented instructional intervention, a comparative analysis of the final academic performance and test results was conducted between the experimental and control groups. The assessment aimed to determine whether the differentiated approach to homework assignments contributed to significant improvements in students' learning outcomes. The results were analyzed using descriptive statistics and one-way Welch's ANOVA to account for potential differences in variance between the groups. The findings are presented below. (Table 11).

Table 11. Final Assessment Results: Control vs Experimental Group

Control group		Experimental group	
Student No.	Maximum value – 100%	Student No.	Maximum value – 100%
1	78	1	66
2	59	2	53
3	66	3	52
4	76	4	62
5	75	5	72
6	56	6	66
7	83	7	68
8	66	8	51
9	73	9	66
10	63	10	76
11	70	11	63
12	65	12	66
13	66	13	66
14	73	14	52
15	65	15	66
16	89	16	70
17	60	17	66
18	61	18	69
19	76	19	87
20	69	20	89
21	69	21	81
22	67	22	57
23	67	23	86
24	60	24	51

The results of the one-way analysis of variance using Welch's test revealed statistically significant differences between the control and experimental groups on both measures.

For summary academic performance, the F-value was 10.22 with 1 degree of freedom between groups and 44.1 degrees of freedom within groups. The associated p-value of 0.003 indicates a statistically significant difference in overall performance, favoring the experimental group.

Similarly, for test results, the F-value was 6.31, with 1 and 46.0 degrees of freedom respectively. The p-value of 0.016 confirms a statistically significant difference between the groups in terms of test outcomes. (Table 12, Table 13, Figure 5)

Table 12. Results of One-Way Analysis of Variance (Welch) of the Final Assessment of the Groups After the Research Intervention

Results of One-Way Analysis of Variance (Welch)				
Comparison	F-value	Degrees of Freedom	Degrees of Freedom (Within Groups)	p-value

		(Between Groups)		
Difference in summary academic performance	10.22	1	44.1	0.003
Difference in test results	6.31	1	46.0	0.016

Table 13. Descriptive Statistics of the Groups of the Final Assessment After the Research Intervention

Descriptive Statistics of the Groups					
Comparison	Group	Sample Size (N)	Mean	Standard Deviation (SD)	Standard Error (SE)
Difference in summary academic performance	Control	24	0.958	2.14	0.436
Difference in summary academic performance	Experimental	24	2.750	1.73	0.352
Difference in test results	Control	24	2.208	1.64	0.335
Difference in test results	Experimental	24	3.417	1.69	0.345

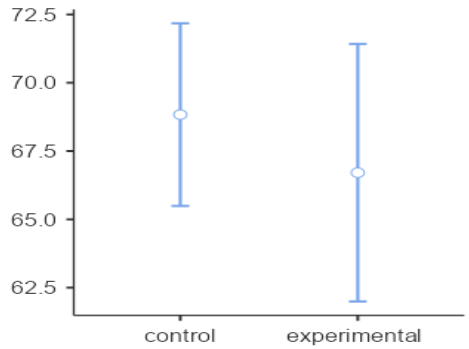

Figure 5- Comparison of average test performance between control and experimental groups, showing a significant difference.

These findings suggest that the intervention had a meaningful and positive effect on both the general academic achievement and specific test performance of students in the experimental group.

One-way Welch's ANOVA was conducted to analyze the dynamics of students' results in summative assessment before and after the intervention, as well as the changes in Pre-test and Post-Test performance in both the experimental and control groups.

The results of Welch's one-way ANOVA, table 14 and table 15, revealed statistically significant differences between the experimental and control groups in both the dynamics of summative assessment performance ($F(1, 44.1) = 10.22$, $p = .003$) and in Pre-test to Post-test performance ($F(1, 46.0) = 6.31$, $p = .016$).

Table 14. Welch's ANOVA Results for the Dynamics of Summative Assessment Performance Between Groups

Results of One-Way Analysis of Variance (Welch)				
Comparison	F-value	Degrees of Freedom (Between Groups)	Degrees of Freedom (Within Groups)	p-value
Difference in summary academic performance	10.22	1	44.1	0.003
Difference in test results	6.31	1	46.0	0.016

Table 15. Welch's ANOVA Results for Pre-test to Post-test Performance Between Experimental and Control Groups

Descriptive Statistics of the Groups					
Comparison	Group	Sample Size (N)	Mean	Standard Deviation (SD)	Standard Error (SE)
Difference in summary academic performance	Control	24	0.958	2.14	0.436
Difference in summary academic performance	Experimental	24	2.750	1.73	0.352
Difference in test results	Control	24	2.208	1.64	0.335
Difference in test results	Experimental	24	3.417	1.69	0.345

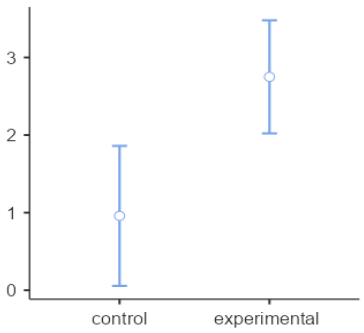

Figure 6- Difference in summary academic performance

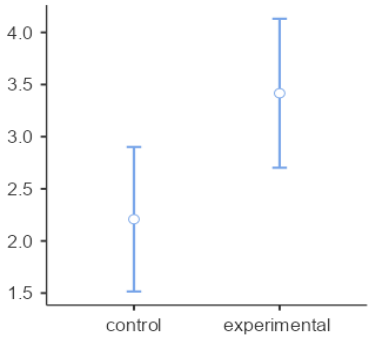

Figure 7-Difference in test results

These findings indicate the effectiveness of the intervention and confirm the positive impact of differentiated assignments on students' academic achievement (Figure 6, Figure 7).

Conclusion

In the present study, the hypothesis regarding the existence of statistically significant differences between the participants of the experimental and control groups was tested in terms of task performance indicators (i.e., the dynamics of students' results in summative assessments before and after the intervention) and academic performance levels (i.e., the dynamics of students' results in pre-test and post-test assessments). Welch's one-way analysis of variance (ANOVA) was used to analyze the data, as preliminary testing using Levene's test revealed a violation of the homogeneity of variances assumption (where a p-value < .05 indicates statistically significant differences in variances between groups, meaning that the variability within the groups is unequal, thus violating the assumption of homogeneity of variances required for classical ANOVA).

The results of the analysis showed statistically significant differences between the groups for both variables under investigation. For the variable measuring the dynamics of students' results in summative assessments before and after the intervention, a significant difference was observed: $F(1, 44.1) = 10.22$, $p = .003$. This indicates a substantial impact of differentiated homework assignments on academic achievement. Additionally, for the variable reflecting the dynamics of students' results in pre-test and post-test assessments, a statistically significant difference was found: $F(1, 46.0) = 6.31$, $p = .016$, suggesting that the intervention had a positive influence on final test outcomes.

Thus, the results support the proposed hypothesis: the implementation of the suggested methodology has a positive impact on students' academic performance. The most pronounced effect was observed in the dynamics of students' summative assessment results before and after the intervention, which may indicate increased engagement and improved quality in task completion within the experimental group. These findings highlight the importance of integrating pedagogical strategies aimed at individualizing instruction to enhance students' academic success.

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Дадаев Аслан[1]
[1]SDU University, Қаскелең, Қазақстан
*e-mail: 231346008@sdu.edu.kz

ҚАЗАҚСТАННЫҢ ОРТА МЕКТЕПТЕРІНДЕГІ 9-СЫНЫП ОҚУШЫЛАРЫНЫҢ ЖЕТІСТІКТЕРІН АРТТЫРУ МАҚСАТЫНДА ФИЗИКА ПӘНІНЕН ҮЙ ТАПСЫРМАСЫН САРАЛАУ

Аңдатпа. Бұл зерттеуде Қазақстандағы орта мектептердің 9-сынып оқушыларының физика пәні бойынша академиялық жетістіктеріне дифференциалданған үй тапсырмаларының әсері қарастырылады. Зерттеуде аралас әдіс қолданылып, сапалық және сандық деректерді жинау әдістері, соның ішінде бастапқы және қорытынды бағалау тесттері қамтылған. Зерттеудің мақсаты – оқушылардың дайындық деңгейі мен оқу стиліне негізделген бейімделген үй тапсырмалары олардың физиканы түсінуі мен үлгерімін жақсартуға ықпал ететінін анықтау. Алынған нәтижелер үй тапсырмаларын саралаудың оқушылардың белсенділігін, материалды меңгеруін және жалпы академиялық жетістіктерін арттыруға оң әсер ететінін көрсетеді. Зерттеу физика пәнін оқытуда жекелендірілген тәсілдердің қажеттілігін атап көрсетеді. Бұл жұмыс тиімді оқыту әдістері туралы кеңірек пікірталасқа үлес қосып, үй тапсырмаларын бейімдеудің оқушылардың үлгерімін арттырудағы рөлін айқындайды.

Түйін сөздер: Дифференциалданған үй тапсырмалары, физиканы оқыту, академиялық жетістік, жекелендірілген оқыту, орта мектеп, оқу жетістігі, Қазақстан, аралас зерттеу әдістері.

Дадаев Аслан[1]
[1]SDU University, Каскелен, Казахстан
*e-mail: 231346008@sdu.edu.kz

ДИФФЕРЕНЦИАЦИЯ ДОМАШНЕЙ РАБОТЫ ПО ФИЗИКЕ ДЛЯ ПОВЫШЕНИЯ УСПЕВАЕМОСТИ УЧАЩИХСЯ 9-Х КЛАССОВ СРЕДНИХ ШКОЛ КАЗАХСТАНА

Аннотация: В данном исследовании рассматривается влияние дифференцированных домашних заданий на академические достижения учеников 9-х классов по физике в средних школах Казахстана. В работе используется смешанный метод исследования, включающий как качественные, так и количественные методы сбора данных, включая предварительное и итоговое тестирование. Цель исследования – определить, способствуют ли адаптированные домашние задания, основанные на уровне подготовки и стилях обучения учащихся, улучшению их понимания и успеваемости по физике. Полученные результаты показывают, что дифференциация домашних заданий положительно влияет на вовлеченность учащихся, их понимание материала и общий академический успех. В исследовании подчеркивается необходимость персонализированных подходов в обучении физике. Работа вносит вклад в более широкий дискурс об эффективных методах преподавания и подчеркивает роль индивидуализации домашних заданий в повышении успеваемости учащихся.

Ключевые слова: Дифференцированные домашние задания, обучение физике, академическая успеваемость, персонализированное обучение, средняя школа, учебный успех, Казахстан, смешанные методы исследования.

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Dilnur Zhuman[1], Saule Tulepova[2], Kuralay Zhampeiis[3]*
[1,2] SDU University, Kaskelen, Kazakhstan
[3]Kazakh Ablai Khan University of International Relations and World Languages, Almaty, Kazakhstan
*e-mail: 231323011@gmail.com

PERCEIVED CHALLENGES AND SOLUTIONS TO FOREIGN LANGUAGE ANXIETY IN READING

Abstract. This study explores the difficulties and coping strategies of students who have anxiety when reading in a foreign language. Through a qualitative thematic analysis of interviews with 8 master's students, three main themes emerged: the challenges in foreign language reading include vocabulary difficulties, text complexity, and speed constraints; emotional responses such as anxiety, self-doubt, and external pressures; strategies to overcome reading anxiety include vocabulary building techniques, digital tools, and peer support. The findings are significant in highlighting the importance of motivation, self-regulation and structured pedagogical interventions in reducing reading anxiety. Learners can be supported by educators by introducing pre reading strategies, encouraging collaborative learning and incorporating technology into teaching to help in improving comprehension and confidence. Limitations of the study include small sample size and reliance on self-reported data.

Keywords: foreign language anxiety, reading, reading anxiety, second language acquisition, language learning, vocabulary difficulties, self-doubt, coping strategies.

Introduction

Foreign language anxiety (FLA) is a well-known entity with an adverse effect on learning and comprehension of a second language. Foreign language anxiety is defined as the feeling of stress and anxiety encountered in foreign language learning situations (Horwitz, Horwitz & Cope, 1986), while speaking, listening, writing and reading are but a few of the areas in which it might appear. Among these, reading anxiety poses particular difficulties because it is a direct predictor of comprehension, fluency, and, therefore, academic achievement. Learners who have reading anxiety in a foreign language will have problems with decoding unfamiliar vocabulary, understanding complex sentence structures and maintaining motivation. These challenges could be lack of confidence, little contact with the target language, and adverse experiences with language learning.

Reading foreign languages presents learners with multiple challenges. Students face difficulties with words that they know and understand, difficult sentence structures, and readings that contain elements related to the culture which students do not comprehend. Students face particular challenges in academic settings because they regularly encounter complex technical content. Students experience increased anxiety levels because academic journals and textbooks present dense formal writing which leads to avoidance behaviors that result in reduced engagement.

As Saito, Garza, and Horwitz (1999) pointed out, it is also attributed to fear of misunderstanding or misinterpreting information which makes them lose confidence and then they start to disengage. It is worrying for students in higher education who are expected to engage critically with advanced texts in order to improve their academic and professional development. However, students are reported to experience significant anxiety during reading activities which in turn limits their freedom to process and retain information as critical as foreign language reading proficiency. This anxiety however not only affects their learning in class but also affects their performance in academic activities like exams, assignments, and papers. This anxiety, in turn, limits their confidence and willingness to participate in reading tasks, which becomes a barrier to their language development.

As reading skills are central to academic success and personal development, it is crucial to understand the causes of foreign language reading anxiety to help teachers design appropriate pedagogical interventions. Previous research has investigated FLA from different angles, but the particular issues of reading in a foreign language have been paid relatively little attention, especially from the point of view of advanced learners.

The aim of this research is to explore the difficulties students experience in foreign language reading and investigate how to help students overcome foreign language anxiety. Through experiences of students, this study aims to contribute to the understanding of the emotional, cognitive, and psychological factors that underpin FLA and offer suggestions for establishing more effective and supportive learning environments.

Research questions:

1. What are the reading challenges caused by the foreign language anxiety?
2. What strategies and support can be used to help students overcome foreign language anxiety and enhance their reading effectiveness?

Literature review

Foreign language anxiety has been explored since Horwitz et al. (1986) made foreign language anxiety a concept in research through their pioneering study. It has been understood to be a particular disorder that does not overlap with general anxiety to comprehend it as a specific condition. The Foreign Language Classroom Anxiety Scale (FLCAS) has been widely used to measure learners' anxiety and to relate it to language performance. Studies have found that FLA has an adverse effect on language learning and performance particularly in productive skills like speaking and writing (MacIntyre & Gardner, 1991). Nevertheless, the reading skill has attracted relatively less attention than its receptive counterpart even though reading plays a vital academic and professional role.

Several studies have examined reading anxiety as a type of Foreign Language Anxiety (FLA). Garza, Horwitz and Saito (1999) were some of the first to pinpoint the specific factors that cause reading anxiety: unfamiliar vocabulary, complex grammatical structures, cultural differences, and the fear of misreading. Students experience cognitive overload when confronted with these elements which then impairs their comprehension and increases their anxiety. The expectations in advanced academic settings become a real issue because students are supposed to analyze and interpret specialized texts. Research by Zhao et al. (2013), as well as Sellers (2000), has shown that metacognitive awareness helps to decrease reading anxiety, because those learners who are aware of their reading processes and are able to control them are less likely to feel anxious.

A further factor which has been found to play a crucial role in the reduction of reading anxiety is self-efficacy, the belief in one's effectiveness. According to Bandura (1997), self-efficacy theory posits that students with more confidence in reading are likely to have a more favorable disposition towards reading and will not be deterred by difficulties. Zbornik and Wallbrown (1991) expanded on this by stating that self-efficacy is not only a determinant of performance but also of the emotional experience of the learner in the reading process. As such, for students who are likely to come across texts that require both linguistic and critical thinking skills, self-efficacy is particularly significant.

The literature identifies multiple approaches to help students with reading anxiety. The literature recommends prior reading strategies including vocabulary preview and background knowledge activation together with visual aids to ease learners' anxiety about both content and context before reading (Zhao et al., 2013). Research has also showed that students who engage in group discussions and peer support in collaborative learning strategies also enhance their learning and foster a safe environment that helps in the reduction of anxiety and improving comprehension (Su & Chu, 2023). Moreover, the application of digital technologies such as e-readers that come with a dictionary and annotation capabilities have been identified as improving the self-empowerment of the learners and decreasing their stress when it comes to reading difficult or even new texts (Lai & Zheng, 2017).

The experience of reading anxiety is also influenced by cultural factors. Mamat and Muhammad (2024) pointed out that students from collectivist cultures may have higher levels of anxiety because of the societal expectations of academic excellence, and the fear of face loss. It also has been found that some cultures may stigmatize students who cannot read in a language. These cultural pressures may add to the challenges that students face in trying to get help or even asking for help. On the other hand, students from individualistic cultures may display more proactive ways of dealing with reading difficulties, which means that teachers should be aware of cultural diversity in the classroom.

There is no overemphasizing on the role of teacher support and the classroom environment in overcoming reading anxiety. When teachers develop a positive and non-threatening learning environment, offer positive feedback, and ensure that students can express their feelings freely, then the level of anxiety will decrease (Young, 1991). In addition, scaffolding techniques have been shown to increase students' confidence and comprehension: For example, teaching them to break down complex texts into manageable segments, and guiding their practice. These strategies also highlight the importance of pedagogical practices that focus on the emotional well-being of students as much as their academic achievement.

Reducing reading anxiety through the application of mindfulness practices in language education provides an opportunity that shows much promise. The potential benefits of practices such, as mindfulness-based stress reduction (MBSR) and meditation in alleviating anxiety could be applied effectively in language learning environments (Gregersen & MacIntyre 2014). These methods promote learners to concentrate on the moment and cultivate an understanding of their feelings to enable them to approach reading activities, with enhanced tranquility and lucidity.

In addition, the problem of the role of parental involvement in helping children with reading anxiety, especially in younger children is also significant. According to Pomerantz et al. (2007), parents play an important role in supporting their children by engaging in reading and fostering a positive mindset, towards challenges while providing necessary resources. When teachers and parents collaborate harmoniously they can create an environment that helps students handle anxiety and cultivate resilience.

Method

A qualitative research design is employed in this study to explore the difficulties and solutions perceived by learners when dealing with foreign language anxiety (FLA). Qualitative research is a well-suited to delve into how learners view and experience things such as reading anxiety in language learning settings. It can offer valuable insights into the struggles people face and ways to overcome them effectively.

This study sampled participants from 8 master's degree students who are currently using foreign language learning and reading tasks. Master's students were chosen because they are regularly tasked with responding to demanding academic texts that contain difficult vocabulary, complex syntax and cultural references. Through purposive sampling, participants who meet the inclusion criteria of being currently enrolled in a master's program and having prior experience with foreign language reading tasks were selected. It is intended that, with diverse academic backgrounds and linguistic proficiency, students will provide some rich insights into the phenomenon of reading anxiety.

Through the use of semi-structured interviews, data was collected, with this method providing flexibility and the ability to explore in depth the experiences of participants. First, some initial questions were developed to explore general attitudes of participants toward reading in a foreign language. Then some more specific questions were asked about the challenges they have encountered during reading tasks (such as vocabulary, cultural references, or text complexity). Next, questions were asked about their emotional and psychological responses to reading anxiety (including avoidance behaviours, stress, and self-perception), then questions about coping strategies and solutions they have identified to help manage reading anxiety. Finally, some recommendations for educators and institutions on how to minimize reading anxiety.

Face to face or online platforms were used to conduct interviews based on the convenience of participants. Every interview were 30-45 minutes long and were conducted with the consent of participants, and the interview was audio-recorded to ensure that the transcription and analysis are accurate.

Interview data was analysed with thematic analysis. This method entails categorizing, comparing and interpreting the data to identify patterns and themes. Several steps are involved in the analysis process. The first step involved finding out the data through the interview transcripts and reading them to establish an initial understanding. After that, some initial codes were developed to label systemically important features of the data. The themes were developed from the codes which represented the overarching ideas and recurring patterns. After that, themes were reviewed to make sure they represent the data accurately and are not similar to one another. After finalizing them, themes were defined and named to ensure clarity. With the findings presented through the use of data examples, the research was concluded by reporting the results in relation to the research questions and existing body of knowledge. Through this structured process, experiences of participants of reading anxiety and the problems and solutions encountered are analysed in depth.

Results

Thematic Analysis

The interviews were analyzed thematically to provide useful information on the perceived challenges and solutions to foreign language anxiety in reading. The analysis revealed three main themes which can help to understand how students feel and how they cope with anxiety in reading. The main themes include (1) challenges in foreign language reading, (2) emotional responses to reading in a foreign language, and (3) strategies for overcoming reading anxiety.

The theme “challenges in foreign language reading” included three subthemes: (a) vocabulary and comprehension difficulties, (b) text type and contextual knowledge, and (c) speed and processing constraints. “Emotional responses to reading in a foreign language” theme has subthemes (d) anxiety and self-doubt, (e) motivation and interest in the topic, and (f) influence of external pressures. The third main theme “strategies for overcoming reading anxiety” is subdivided into (g) developing personal coping mechanisms, (h) utilizing external resources and support systems, and (i) maintaining motivation and concentration.

Theme 1: Challenges in Foreign Language Reading

Subtheme 1: Vocabulary and Comprehension Difficulties

A challenge noted to be most frequent in reading in a foreign language was vocabulary and comprehension. Participants expressed that unfamiliar words disrupted understanding, which was frustrating and discouraging. Participant 3 mentioned, "One and only problem that I have regarding reading texts is vocabulary. When you read advanced or upper intermediate level passages, I always have a couple of words that I don’t know."

Participant 4 also mentioned that despite having reading abilities sometimes unfamiliar words can still cause a bit of disruption in understanding.

"Even if you understand 90% of it, some unfamiliar words can distract your comprehension."

Subtheme 2: Text Type and Contextual Knowledge

The challenges of reading in a language depended on the kind of text and how well the reader knew its subject matter as some participants found specialized texts particularly tough to understand. Participant 1 stated, "If I work with literary texts, I prefer to work with Russian texts because I think that all the beauty of language provides feelings which I would like to see."

However, they mentioned that scientific texts or documents related to work were more manageable regardless of the language used. Participant 2 also mentioned, "The topics that I do not have enough knowledge about are the hardest topics."

Subtheme 3: Speed and Processing Constraints

Speed reading posed a challenge for participant as they felt compelled to read quickly in academic environments which caused them to experience heightened levels of anxiety. Participant 1 shared, "I need much time in order to process the text because it's how my brain works personally. In this case, what they [professors] do is make me increase the speed of reading." This pressure to read faster produced participants as feeling lost or overwhelmed especially in group settings where peers were waiting for them to finish.

Theme 2: Emotional Responses to Reading in a Foreign Language

Subtheme 1: Anxiety and Self-Doubt

Some participants felt anxious and doubtful about their ability when reading in a foreign language. They got nervous over unknown words and lack of comprehension. Participant 5 said, "When I saw unknown words all the time, it kinda made me feel unconfident and not smart enough, so I avoided reading on purpose." In a similar manner, participant 1 shared, "If I don't understand the meaning in English or Russian, then I feel that perhaps I do not know either language well."

Subtheme 2: Motivation and Interest in the Topic

Motivation played a key factor in determining the willingness of participants to engage in reading in a foreign language. Comprehension was higher and anxiety was lower when they were interested in the topic. A lack of interest led to frustration. Participant 2 shared their experience, "If it's about obligation, then I have to make myself do it. But if I find it interesting, I can read without any problem." Participant 1 also mentioned, "If I am interested in the context, then I will understand the meaning of the sentences I have. If I do not understand the context, for example, medical or political texts, I think I will meet some issues."

Subtheme 3: Influence of External Pressures

Some participants pointed out that social pressures like group discussions or academic expectations contributed to their anxiety. Time pressure was another issue that created stress. Participant 1 noted, "Sometimes, of course, I feel lost while reading the text when I know that I have my time limit and need to follow these frames. I start losing myself, so I just read, read, read… and maybe it's even useless." Similarly, participant 6 mentioned, "Every time I felt that I was struggling, it made me feel as if I was not smart or intelligent enough."

Theme 3: Strategies for Overcoming Reading Anxiety

Subtheme 1: Developing Personal Coping Mechanisms

Many participants had their own ways of dealing with anxiety. For instance, some participants followed a systematic way of translating and memorizing the unknown words. Participant 3 stated, "If I don't understand something, I try to underline new words, then translate and memorize." Some of them used mental strategies. Participant 8 mentioned, "I just realized that it is okay not to know all the words and phrases in English as it is not my mother tongue. There is no one who knows a foreign language 100 percent fluently."

Subtheme 2: Utilizing External Resources and Support Systems

Some participants talked about the role of instructors, peers, or digital tools in helping them with reading challenges. However, while some of the participants felt that their professors did not provide much support, others found alternative resources. Participant 2 noted, "These days, I get instructions from AI-generated apps that give me a chance to understand texts in an easier way."

Peer discussions were also found to be helpful as well. Participant 4 mentioned, "After you read individually, you can discuss it with your peers in order to see if you understand the information correctly."

Subtheme 3: Maintaining Motivation and Concentration

Several participants, however, highlighted the issue of maintaining motivation and concentration. Participant 1 described a unique strategy, "Sometimes, I take a photo of one moment from the text, let's say one paragraph that I find the most interesting, and if I have problems with another page, I can come back to this photo, reread it, and it raises my motivation."

Others suggested taking breaks or just reading in shorter intervals to avoid exhaustion. Participant 7 suggested, "If I come across any unknown words, first I try to find the meaning through the context itself. If it is too complicated, I just translate it and try to memorize so the next time I will not struggle.

Discussion

The findings of this study offer useful information about the difficulties, the emotional reactions, and the ways of coping with foreign language reading anxiety. The findings are in line with the recent studies in second language acquisition which stress the role of vocabulary problems, speed of processing, motivation and external pressures.

Research highlights that lexical knowledge is the single most important predictor of reading fluency and vocabulary and comprehension difficulties were the most common challenges in this participant group (Shi & Lee, 2025). A limited vocabulary causes interference and stress because learners fail to understand the information they are required to process (Zhao et al., 2025). Furthermore, according to the schema theory, prior knowledge also dramatically affected comprehension with text type and contextual knowledge being the significant factors (Paul & Kendeou, 2024).

Students experienced additional stress because of text complexity and insufficient background knowledge when reading academic or culturally unfamiliar materials. The findings support Bernhardt's (2011) compensatory model of L2 reading because learners depend on their prior knowledge when their linguistic proficiency is not enough. Grabe (2009) found that pre-reading discussions activate schema which substantially enhances comprehension as demonstrated by Participant 1's preference for texts related to their interests. The research supports educational scaffolding methods like Koda's (2005) metacognitive strategy training to assist students with complex text navigation.

Speed and processing constraints were also frequently mentioned, which are also characteristic of academic environments, where reading is often expected to be fast. A recent study has found that making learners read at a faster rate increases their anxiety levels and reduces their comprehension (Kosaka, 2024). However, when learners are given more time to process information, they tend to retain and understand more.

Anxiety and doubt were the main factors that influenced reading experiences. Research also shows that students with higher levels of reading anxiety perform worse in reading than their peers (Alshehri, 2025). Those who got unknown words frequently and avoided reading altogether, confirmed the previous findings that perceived self-competence is a determinant of motivation and persistence in language learning (Zhang et al., 2024).

Motivation was also found to play an important role in reducing reading anxiety. Those participants who were interested in the reading topic got higher comprehension and less stress, which is supported by self-determination theory that states that intrinsic motivation enhances learning achievements (Ryan and Deci, 2020). However, in addition to the internal factors, external pressures like peer comparisons and academic demands increased anxiety, as has been found in research on social influences in second language learning (Cao et al., 2024).

The findings about participants' coping strategies receive empirical evidence. The study by Chun (2011) on technology-enhanced reading supports the use of digital tools such as dictionary apps and the peer discussions follow Vygotskyan (1978) social learning principles. The annotation strategies described by Kern (1994) support Participant 7's method of word translation and memorization.

The findings have several implications for educators and learners. Teachers should incorporate flexible reading speeds, vocabulary-building exercises, and contextual learning to reduce student anxiety. Encouraging students to personalize their reading strategies, such as focusing on key vocabulary, using digital aids, and peer discussions could help increase confidence.

This study also has some limitations. The sample size was small, which limits the generalizability of the findings. Future research should include a bigger and more diverse participant group to include

other experiences. Also, the study was qualitative in approach, but use of quantitative data on reading anxiety levels at different times could have been helpful in enhancing the findings.

Conclusion

This study reveals significant challenges to foreign language anxiety in reading, such as vocabulary issues, text difficulty, the rate of processing information, and other pressures, all of which affect comprehension and confidence. However, learners use coping strategies, like vocabulary building, digital tools, and peer support to help reduce anxiety. The results highlight the importance of teachers to design supportive learning contexts, incorporate pre-reading approaches, and advise students to regulate their reading efforts for better fluency and interest. However, future work should go further to investigate larger, more representative samples with quantitative indicators of anxiety levels across time. While the study offers important findings, the limited sample size prevents generalization, and larger, more diverse groups with quantitative assessments of anxiety levels over time should be examined in future work.

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Дилнур Жұман[1], Сауле Тулепова[2], Құралай Жампейіс[3]*
[1,2] SDU University, Қаскелең, Қазақстан
[3]Kazakh Ablai Khan University of International Relations and World Languages, Алматы, Қазақстан
*e-mail: 231323011@gmail.com

ШЕТ ТІЛІНДЕГІ ОҚУҒА БАЙЛАНЫСТЫ ШЕТ ТІЛІ МАЗАСЫЗДЫҒЫНЫҢ ҚАБЫЛДАНҒАН ҚИЫНДЫҚТАРЫ МЕН ШЕШУ ЖОЛДАРЫ

Аңдатпа. Бұл зерттеу шетел тілінде оқығанда мазасыздық сезінетін студенттердің қиындықтары мен оларды жеңу стратегияларын зерттейді. 8 магистрантпен жүргізілген сұхбаттар негізінде сапалы тақырыптық талдау арқылы үш негізгі тақырып анықталды: шетел тілінде оқудағы қиындықтар — сөздік қорының тапшылығы, мәтіндердің күрделілігі және уақыт шектеулері; эмоциялық жауаптар — мазасыздық, өз-өзіне сенімсіздік және сыртқы қысым; ал мазасыздықты жеңу стратегиялары — сөздік қорын дамыту әдістері, цифрлық құралдарды пайдалану және құрдастардың қолдауы. Бұл зерттеу нәтижелері мотивация, өзін-өзі реттеу және құрылымдалған педагогикалық тәсілдердің оқудағы мазасыздықты азайтудағы

маңыздылығын көрсетеді. Мұғалімдер білім алушыларды алдын ала оқу стратегияларын енгізу, бірлесіп оқуды ынталандыру және оқытуда технологияны қолдану арқылы қолдай алады, бұл түсіну мен сенімділікті арттыруға көмектеседі. Зерттеудің шектеулері — таңдаманың аз болуы және өзіндік есеп беру деректеріне сүйенуі.

Түйін сөздер: шет тіліндегі мазасыздық, оқу, екінші тілді меңгеру, шет тілдерін үйрену, сөздік қорындағы қиындықтар, өзіне деген сенімсіздік, күресу стратегиялары.

Дилнур Жуман[1], Сауле Тулепова[2], Куралай Жампейіс[3]*
[1,2] SDU University, Каскелен, Казахстан
[3]Kazakh Ablai Khan University of International Relations and World Languages, Алматы, Казахстан
*e-mail: 231323011@gmail.com

ВОСПРИНЯТЫЕ ТРУДНОСТИ И РЕШЕНИЯ СВЯЗАННЫЕ С ИНОЯЗЫЧНОЙ ТРЕВОЖНОСТЬЮ ПРИ ЧТЕНИИ НА ИНОСТРАННОМ ЯЗЫКЕ

Аннотация. Это исследование посвящено изучению трудностей и стратегий преодоления, с которыми сталкиваются студенты, испытывающие иноязычную тревожность при чтении. На основе качественного тематического анализа интервью с восемью магистрантами были выделены три основные темы: во-первых, трудности при чтении на иностранном языке связаны с ограниченным словарным запасом, высокой сложностью текстов и нехваткой времени; во-вторых, эмоциональные реакции проявляются в виде тревожности, неуверенности в себе и давления со стороны окружающих; в-третьих, стратегии преодоления тревожности включают развитие словарного запаса, использование цифровых инструментов и получение поддержки от сверстников. Полученные данные подчеркивают значимость мотивации, навыков саморегуляции и целенаправленных педагогических вмешательств для снижения уровня тревожности при чтении. Преподаватели могут эффективно поддерживать учащихся, внедряя стратегии предварительного чтения, поощряя совместную работу и интегрируя технологии в учебный процесс для повышения понимания текста и уверенности в своих силах. Ограничениями исследования являются небольшой объем выборки и опора на самоотчетные данные.

Ключевые слова: иноязычная тревожность, чтение, овладение вторым языком, изучение иностранных языков, трудности со словарным запасом, неуверенность в себе, стратегии преодоления

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Aigerim Anuarbekova[1], Mehmet Ali Yaylacı[2]*
[1]Dostyq School, Almaty, Kazakhstan
[2]Galaxy International School, Almaty, Kazakhstan
[*]e-mail: darkhanqyzy.a@gmail.com

CHALLENGES FACED BY HIGH SCHOOL STUDENTS IN PREPARING FOR THE ENGLISH EXAM AT UNT IN KAZAKHSTAN

Abstract. This study examines some primary challenges faced by 11th-grade students at Dostyq School in Kazakhstan as they get ready for the English section of the Unified National Testing (UNT). From semi-structured interviews of 15 students, a few themes that recurred emerged. Participants reported many difficulties with vocabulary acquisition, reading comprehension, and grammar, which they identified as definite barriers to achieving high scores. Exam-related stress was also of important concern, with many students expressing feelings of anxiety and pressure leading up to the test. Some students considered preparing for the IELTS exam, with the possibility of converting IELTS scores into UNT points, while feeling unprepared in terms of time and language skills. Many students relied upon external support, such as several private tutors, multiple group courses, or diverse online platforms, including Juz40, EDUCON, KURSANT, and YouTube. However, many people noted that these resources frequently lacked some personalized guidance that they needed. They required this guidance to address their particular weaknesses. Students highlighted the emotional strain from parental expectations, in addition to academic challenges. These findings suggest a need for much more accessible as well as tailored preparatory materials, in addition to stronger emotional together with motivational support systems that better equip students for the demands of the English UNT.

Keywords: UNT (Unified National Testing), English Language, English exam, student preparation, vocabulary, emotional stress, Preparation for UNT, challenges, Kazakhstan, school exams.

Introduction

Unified National Testing is a significant tool for assessing school graduates' academic performance and plays a vital role, as it affects their entrance to university and their eligibility for a grant. The English language constitutes one of the few selected subjects of the exam, and its expertise guarantees academic and professional development, also helping secure a grant.

The Unified National Testing (UNT) constitutes a key element of Kazakhstan's educational system. It simultaneously serves as a graduation and entrance exam. First introduced in 2004, the UNT has become a tool for standardizing graduates' knowledge and combating corruption within university admissions (Israliev, 2013).

According to the Ministry of Education and Science of the Republic of Kazakhstan (2023), more than 70% of graduates annually pass the UNT, which confirms its status as the main exam of educational selection for higher education. The exam itself involves assessing students' knowledge of vocabulary, grammar, use of English, and reading comprehension skills. In comparison with international exams like IELTS and TOEFL, UNT does not check listening and speaking skills. Despite the narrow format, preparation for the UNT requires a deep understanding of language structures and the ability to process information presented in a test format quickly. The UNT plays an essential role in ensuring transparency and objectivity in the distribution of state grants, especially for rural school graduates (Smagulov & Smagulov, 2018). Due to a unified approach to assessment, students from different regions receive equal conditions for participation in the competition for study at universities.

However, it is noted that excessive focus on the testing format leads to narrowing the school curriculum. The educational process is increasingly reduced to preparing for the test, which limits the development of critical thinking, creativity, and interdisciplinary connections (Oralbekova, 2024). This raises concerns among both educators and researchers who are studying the effectiveness of the education system as a whole. The literature also raises the issue of social inequality. Despite the formally equal conditions for passing the UNT, access to quality training, trial tests, and tutors remains uneven, especially in rural areas (Sagidolda & Zhanbyrbayev, 2024).

Along with this, several studies highlight the high level of stress in students. For example, Smagulov & Smagulov (2018) conducted a physiological assessment of high school students and found elevated cortisol levels, anxiety symptoms, and signs of emotional exhaustion. Physiological measurements show significant stress in school children during the period of preparation for the UNT, which reduces not only their academic performance but also their overall psycho-emotional state (Smagulov & Smagulov, 2018). Similarly, Tuleutayeva & Nurgaliyeva (2020) reported that students often experience sleep disorders and reduced academic motivation as testing approaches. These findings suggest that excessive academic pressure not only hinders learning but may also have long-term health implications. Now, Kazakhstan is actively reforming the UNT: the option of multiple passes has been added, the choice of subjects has been increased, and elements of profiling are gradually being introduced. Nevertheless, the issue of integrating a competency-based approach and flexible forms of assessment remains relevant (Zueva, 2017).

Students who prepare for the English exam at UNT face various challenges that reduce the effectiveness of their learning and exam results.

The purpose of this study is to identify the main challenges that students face when preparing for the English exam at UNT. The study answers the following question:

What difficulties do students face when preparing for the UNT in English?

Challenges Encountered in English Exam Preparation at UNT

Preparation for the UNT in English in Kazakhstan is a challenge for both students and teachers. Despite the growing popularity of this subject among graduates, there are a number of persistent problems that make it difficult to provide quality preparation. Despite efforts to develop trilingual education in Kazakhstan (Kazakh, Russian, and English), the level of English proficiency among the population remains low. According to the 2023 EF English Proficiency Index (EF EPI), Kazakhstan ranked 104th out of 113 countries, which corresponds to a “very low” level of English proficiency. In 2024, the situation improved only slightly: the country moved up to 103rd place out of 116, remaining in the very low proficiency group. These statistics show that, despite the introduction of trilingual education, many Kazakhstani students and adults continue to experience difficulties in mastering the English language.

One of the main difficulties is the mismatch between the school curriculum and the UNT format. School English classes are still focused on the grammar-translation approach, while testing requires reading comprehension skills and vocabulary knowledge (Ishmuratova & Nortseva, 2018). This leads to students not developing sustainable communication skills.

In addition, many graduates have insufficient language proficiency, especially in the regions. Research shows that even having received a high score on the UNT, students often have weak real-life communication skills in English (Zhumagulova & Nurpeys, 2016). An additional difficulty is the lack of a language environment and qualified teachers, especially in rural areas. As noted by Alzhanova and Baimenova (2021), many schools employ teachers whose level of English is below the level required to prepare for the exam.

Another important barrier is the psychological insecurity of the students themselves. Students are afraid of tests in English and prefer to choose more “predictable” subjects, such as the history of Kazakhstan or biology (Alyamova, 2017).

Teachers, in turn, do not always have modern methodological skills. English language teaching methods are often not adapted to the UNT format, and digital resources and trial tests remain

unavailable in many regions (Ibraeva & Kharchenko, 2018; Akhmetzhanova & Tusupbekov, 2016). Thus, to improve preparation for the UNT in English, it is necessary to develop the infrastructure of language education, strengthen support for teachers, and reform teaching methods toward a practice-oriented and communicative approach.

Factors Affecting Successful Preparation

Successful passing of the Unified National Test (UNT) in Kazakhstan depends not only on subject knowledge but also on many other factors - psychological, social, strategic, and even physiological. First of all, the students' cognitive abilities are essential. A higher level of subject knowledge and logical thinking, as well as the ability to analyze tasks, directly affect the final result (Ishmuratova & Nortseva, 2018). The capacity for consciously managing preparation processes is also important, for example, for identifying weaknesses and adjusting strategies (Zueva, 2017).

The psychological state of the student does play an equally important role. Research indicates that high anxiety may diminish academic success, despite possessing needed knowledge (Smagulov & Smagulov, 2018). At that same time, naturally motivated and self-confident students are apt to show a high degree of results.

Success is also affected by the environment. This includes the quality of teaching as well as the availability of additional resources — textbooks, practice tests, and online platforms (Akhmetzhanova & Tusupbekov, 2016). The family's level of support is also important: parental involvement, moral support, and trust—all of this creates a favorable atmosphere to prepare.

Preparation strategies, too, are important: students who fully plan their lessons in advance, divide material into parts and regularly practice practice assignments, usually feel confident during exams and show improved results.

Finally, physiological factors, such as adequate sleep and nutrition, can have a strong effect. Physical activity can also have an unexpectedly strong effect. Sufficiently little sleep before an exam can reduce concentration and performance. This commonly happens under stress.

Thus, successfully passing the UNT is the result of an integrated approach, such as a combination of knowledge, psychological stability, planned thinking, and a favorable educational environment.

Methods and Materials

The purpose of this study is to determine the key obstacles that 11th-grade students encounter as they prepare for the UNT English Exam, and to offer useful advice for how they can overcome these obstacles. The study intends to answer a research question: (1) What difficulties do students face in their preparation for the UNT in English?

To achieve the stated goals, a qualitative approach, combining a review of scientific literature and semi-structured interviews, was used. This design enables integration within theoretical frameworks alongside empirical understandings, allowing a deeper exploration into complex educational phenomena (Creswell & Poth, 2018; Kvale & Brinkmann, 2015).

The literature review included studies published from 2015 through 2024, relating to the problems involved in preparation for the UNT, learning English at school, and also pedagogical, psychological, and organizational aspects concerning passing standardized tests. The main sources were scientific publications posted in the CyberLeninka, eLibrary, and Google Scholar databases. The purpose was to identify the already existing scientific approaches to the problem, formulate the present difficulties, and justify the need for empirical confirmation.

The empirical part of the study was implemented using a semi-structured interview. The interview involved around 15 11th-grade students, in preparation to pass the UNT in English and Geography or English and World History, at a private High School. Respondents were interviewed either in person or online, based on their availability. Each interview lasted for about 15-20 minutes.

The collected data were recorded and subjected to content analysis, following a structured process of coding and interpretation (Elo & Kyngäs, 2008). Semantic categories were identified,

including: cognitive and subject difficulties, preparation strategies, emotional states, resources used, and student suggestions. Generalizations and conclusions were formulated based on recurring themes and individual emphases (Braun & Clarke, 2006). All study participants provided voluntary informed consent. The principles of anonymity, voluntary participation, and confidentiality of information were respected, in line with established ethical standards for qualitative research (Orb, Eisenhauer, & Wynaden, 2001). The data was used exclusively for research purposes.

Findings

The analysis of 15 semi-structured interviews with 11th-grade students preparing for the English section of the Unified National Testing (UNT) revealed six major semantic categories. These categories reflect the students' lived experiences, concerns, and perspectives during their exam preparation process.

1. Cognitive and Linguistic Challenges

The main challenge reported by students was related to linguistic knowledge, particularly vocabulary limitations. Many students stated that while they were familiar with grammatical rules, their restricted vocabulary made it difficult to understand reading texts and solve related tasks. The use of phrasal verbs and professional terminology was also frequently cited as problematic:

> *I know the rules of grammar, but when I read the test or texts, I often don't understand the meaning because of unknown words.*

Students also mentioned that they could not always apply grammar effectively in context, especially under exam conditions. This disagreement between theoretical knowledge and practical application created confusion and lowered their confidence.

2. Preparation Strategies

Students used various strategies to prepare for the UNT. The most common approaches included private tutoring, group courses, and self-study using online platforms such as DOSTYQ, EDUCON, juz40, KURSANT, and YouTube channels. While tutoring and courses were seen as helpful, several students noted the lack of individualized attention in group settings:

> *In group classes, the teacher doesn't have time for everyone, and if you don't understand something, it stays unclear because the time of the online meeting is limited* (Student 2)

Additionally, some digital resources were considered expensive or hard to access, especially for students living outside urban centers. This created disparities in preparation quality and access to effective tools.

3. Emotional Experiences

Anxiety, fear, and self-doubt emerged as central emotional experiences for most students. Stress was particularly high in the final months leading up to the exam. Many students reported feeling overwhelmed by the unpredictability of the test format and their own perceived lack of readiness. Students also shared their regrets about not passing the IELTS exam because the English scores will be converted to UNT scores.

> *Even when I prepare a lot, I feel nervous and scared. What if I forget everything? If I had IELTS 6.0, I would be confident in myself* (Student 3)

These emotional responses were intensified by comparisons with peers and by external expectations from families.

4. Support Systems

Students' experiences with support systems varied. Some expressed appreciation for teachers who provided additional lessons or one-on-one help. However, others noted that school support was inconsistent and insufficient. In contrast, support from families was often perceived as pressure, not encouragement.

Teachers help when they can, but parents expect too much. It's stressful. (Student 4)

Psychological support was almost completely absent. Students felt that having access to a school psychologist or mentor could help manage stress during the preparation process.

5.Motivational Factors

Students were primarily motivated by the desire to enter university and obtain a scholarship or grant. Many saw academic success as a means of achieving financial independence and improving their future prospects. The influence of family members, particularly siblings who had already succeeded, was also a motivating factor.

My goal is to get a grant. I don't want to burden my family financially. (Student 5)

Some students viewed English not only as a subject for the exam but also as a valuable skill for future studies or life abroad.

6. Student Suggestions for Improvement

Participants offered a variety of suggestions for improving preparation for the English UNT. These included introducing more communicative, real-life tasks in English classes, creating free centralized online platforms with full preparation materials, and ensuring access to mock exams with automatic checking and feedback.

We need a website where everything is in one place—grammar, practice tests, and videos. (Student 8)

Students also emphasized the importance of having access to personalized feedback and suggested that schools provide psychological support to reduce exam-related anxiety.

The results obtained largely correspond to the findings of Ishmuratova and Nortseva (2018), who noted a lag in the vocabulary base from grammatical knowledge of students, and the studies of Smagulov and Smagulov (2018), recording a high level of anxiety. The observation of Akhmetzhanova and Tusupbekov (2016) about inequality in access to educational resources is also confirmed.

Thus, students clearly understand their strengths and weaknesses, are able to formulate needs, and have a critical view of the educational process. Their proposals can serve as a basis for pedagogical and administrative reforms aimed at improving the quality of preparation for the UNT.

Conclusion

This study explored the challenges faced by 11th-grade students in preparing for the English section in the Unified National Testing (UNT) of Kazakhstan. Based on a literature review and interviews with students, several key difficulties were identified. These included various limited vocabulary, multiple problems with understanding reading texts, weak grammar application, and a noticeable lack of access to personalized resources. Furthermore, most students experienced emotional stress. Such stress was frequently increased by parental pressure instead of school pressure.

While the students used various preparation methods, such as with tutors, through online platforms, and in group courses, they often felt that these were not enough to fully meet their needs.

A few expressed a preference for taking the IELTS instead of the UNT, as it offered another path toward university admission, though time and language barriers made that route rather difficult.
The findings show that preparing for the English UNT is not just an academic challenge but a psychological as well as structural one. To improve overall outcomes, students need increasingly accessible and affordable learning materials, improved emotional support, and effective teaching methods that focus not only on test-taking but also on real language use. Hearing the voices of students as well as acting according to their feedback is necessary for making preparation for exams more effective and fair to everyone.

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Айгерім Ануарбекова[1*], *Мехмет Али Яйладжи*[2]
[1]Dostyq School, Алматы, Қазақстан
[2]Galaxy International School, Алматы, Қазақстан
[*]e-mail: darkhanqyzy.a@gmail.com

ҚАЗАҚСТАНДАҒЫ МЕКТЕП ОҚУШЫЛАРЫНЫҢ ҰБТ-ҒА АҒЫЛШЫН ТІЛІ БОЙЫНША ДАЙЫНДЫҚ КЕЗІНДЕ КЕЗДЕСЕТІН ҚИЫНДЫҚТАРЫ

Аңдатпа. Бұл зерттеу Қазақстандағы «Достық» мектебінің 11-сынып оқушыларының Ұлттық Бірыңғай тестілеудің (ҰБТ) ағылшын тілі бөліміне дайындалу барысында кездесетін негізгі қиындықтарын қарастырады. 15 оқушымен жүргізілген жартылай құрылымдалған сұхбаттар нәтижесінде бірнеше қайталанатын тақырыптар анықталды. Қатысушылар сөздік қорын дамыту, мәтінді түсіну және грамматиканы меңгеру мәселелерін жоғары балл алуға кедергі келтіретін маңызды факторлар ретінде атап өтті. Емтиханға байланысты стресс те маңызды мәселе ретінде көрінді: көптеген оқушылар тест алдындағы қобалжу мен қысымды сезінетіндерін айтты. Кейбір оқушылар IELTS емтиханына дайындалуды қарастырғанымен, уақыт пен тілді меңгеру деңгейінің жеткіліксіздігіне байланысты өзін дайын емес сезінді. Көптеген оқушылар қосымша қолдауға сүйенген: жеке репетиторлар, топтық курстар немесе Juz40, EDUCON, KURSANT, YouTube секілді әртүрлі онлайн платформалар. Алайда, бұл ресурстардың көпшілігі оқушылардың нақты әлсіз тұстарын жекелей түсіндіретін бағыт-бағдар бере алмайтынын атап өтті. Сонымен қатар, ата-аналардың үмітімен байланысты эмоционалды жүктеме де оқушылар үшін қосымша қиындық туғызады. Осы зерттеу нәтижелері БҰТ-ке дайындықты жеңілдететін, қолжетімді әрі жеке қажеттіліктерге бейімделген оқу материалдары мен оқушылардың эмоциялық және мотивациялық жағдайларын қолдауға бағытталған жүйелердің қажеттілігін көрсетеді.

Түйін сөздер: ҰБТ (Ұлттық Бірыңғай тестілеу), ағылшын тілі, ағылшын тілі емтиханы, оқушы дайындығы, сөздік қор, эмоционалды стресс, ҰБТ-ге дайындық, қиындықтар, Қазақстан, мектеп емтихандары.

Айгерим Ануарбекова[1*], *Мехмет Али Яйладжи*[2]
[1]Dostyq School, Алматы, Казахстан
[2]Galaxy International School, Алматы, Казахстан
[*]e-mail: darkhanqyzy.a@gmail.com

ТРУДНОСТИ СТАРШЕКЛАССНИКОВ ПРИ ПОДГОТОВКЕ К ЕНТ ПО АНГЛИЙСКОМУ ЯЗЫКУ В КАЗАХСТАНЕ

Аннотатция. В этом исследовании рассматриваются некоторые основные проблемы, с которыми сталкиваются ученики 11-го класса школы «Достык» в Казахстане при подготовке к разделу английского языка Единого национального тестирования (ЕНТ). Из полуструктурированных интервью с 15 учениками было выявлено несколько повторяющихся тем. Участники сообщили о многочисленных трудностях с приобретением словарного запаса, пониманием прочитанного и грамматикой, которые они определили как определенные препятствия для достижения высоких баллов. Стресс, связанный с экзаменом, также был важной проблемой, поскольку многие ученики выражали чувство тревоги и давления перед тестом. Некоторые ученики рассматривали подготовку к экзамену IELTS с возможностью конвертации баллов IELTS в баллы ЕНТ, чувствуя себя неподготовленными по времени и языковым навыкам. Многие ученики полагались на внешнюю поддержку, такую как

несколько частных репетиторов, несколько групповых курсов или различные онлайн-платформы, включая Juz40, EDUCON, KURSANT и YouTube. Однако многие люди отметили, что этим ресурсам часто не хватало некоторых индивидуальных рекомендаций, в которых они нуждались. Им требовалось это руководство для решения их весьма специфических слабостей. Студенты подчеркнули эмоциональное напряжение от родительских ожиданий в дополнение к академическим трудностям. Эти результаты указывают на необходимость гораздо более доступных, а также адаптированных подготовительных материалов в дополнение к более сильным эмоциям вместе с системами мотивационной поддержки, которые лучше подготавливают студентов к требованиям ЕНТ по английскому языку.

Ключевые слова: ЕНТ (Единое национальное тестирование), английский язык, экзамен по английскому языку, подготовка студентов, словарный запас, эмоциональный стресс, подготовка к ЕНТ, трудности, Казахстан, школьные экзамены.

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Yekaterina Nam[1*], *Davronzhon Gaipov*[2]
[1,2] SDU University, Kaskelen, Kazakhstan
[*]e-mail: 231302009@sdu.edu.kz

STUDENTS' PERCEPTIONS OF TEACHERS' CODE-SWITCHING IN ENGLISH MEDIUM INSTRUCTIONS CONTEXT

Abstract. English Medium Instructions (EMI) is a system that has become commonly adopted by numerous universities, and according to its specific peculiarities, EMI can deliver both opportunities and challenges to the learners. To prevent the challenges, some teachers implement code-switching into their lessons. This study is focused on students' perceptions of teachers' code-switching in EMI-context, considering TFL and Engineering students as representatives of students from Humanitarian and STEM faculties. Face-to-face interviews were conducted in this qualitative study. Eight participants: four students from the TFL faculty and four from the Engineering faculty, revealed their perspectives. The collected data was processed in thematic analysis. In conclusion, it was investigated that TFl-students' perceptions of code-switching appear rather negative, contrasting with Engineering students' perceptions. It was recommended for teachers to implement either code-switching or translanguaging strategically, in a deliberate manner, taking into account learners' first languages, thus not leading to the phenomenon of discrimination.

Key-words: English Medium Instructions, code-switching, translanguaging, STEM, Humanitarian, TFL, Engineering

Introduction

The phenomenon of English Medium Instructions (EMI) in educational institutions is becoming more and more globally significant due to the beneficial effect this spreading trend provides; a number of universities nowadays adopt the system of EMI. EMI refers to the learning context, where students whose native language is not English get education in English language. It is considered that studying in EMI-context indeed can provide new opportunities for the learners, such as having access to a larger academic library, since English is assumed to be to a greater extent common in scientific fields; the possibility to increase competence in English; receiving wider professional horizons, and other meaningful opportunities. Yet, it is indisputable that with the row of opportunities students of EMI-context, in addition, face various challenges. For instance, the obvious complication of learning the disciplines in the second language. Thus, according to Defaouz, Camacho-Minãno (2016), STEM-students are noticed to be under difficult educational conditions due to their issues with understanding technical vocabulary, combined with the problematic expression of themselves, as well. It is obvious that studying in an EMI-environment provides its own positive and negative peculiarities, affecting students' motivation to learn, omnifarious in-class interactions, perception of the professional disciplines, in some cases - their academic performance changes. All these factors determine the individual situation for a learner; therefore, it is also complicated enough to say about the accuracy of EMI-system's impact on learners' study, as well as about how to resist the appearing challenges.

Admittedly, the issue of suitable strategies for guiding learners in EMI-setting is an infinitely discussed topic, and there is the variety of techniques that hypothetically may assist. For instance, in order to simplify the process of studying in a second language, it can be proposed to use such strategies as code-switching from the teacher's side, since it is assumed that it may potentially support the learners studying in a monolingual English-language environment (Rahman & Singh, 2022). The term "code-switching" was originally created by Haugen (1956), and it refers to the practice of the individuals speaking more than one language or dialect during the conversation. As it is obvious,

code-switching can serve a variety of communicative and social functions. Romaine (1995) defines two types of code-switching: situational and metaphorical, where situational code-switching is used, when external factors can influence the choice of the language; metaphorical code-switching is to a greater extent connected to the social meaning. Code-switching is a debatable aspect with the row of functions and consequences, including assistive options. Yet, despite the positive side, from the other perspective, it can be hypothesized that code-switching may be perceived differently by the circle of learners. For example, theoretically, not strategic implementation of code-switching by a teacher can sometimes lead to total misinterpretation and confusion among students who learn English in the context. Furthermore, some groups of students may find teacher's code-switching limiting them in learning the language (Akhtar et. al, 2016). Additionally, what is ambiguous, the students' perception of the teacher's code-switching in EMI-context may to some extent differ across faculties.

The aim of this study is to explore students' perceptions of the role of teachers' code-switching in understanding the content in EMI-context. Taking into account students' perspectives, this research aims to contribute to the teacher's usage of code-switching during their classes, and establish how students' perceptions of code-switching can differ across the different faculties.

Research questions

1. How does code-switching influence students' understanding of content in the EMI-environment?
2. How do students' perceptions of code-switching in EMI-context differ across the different faculties?

Literature review

It can be noticed that English Medium Instructions is becoming globally trendy in high education settings due to the number of specific peculiarities, which it delivers with its implementation. Admittedly, it is obvious that no absolutely indisputable strategy for the increase of quality of education exists; therefore, EMI is not an exclusion, and it also can provide some negative consequences. There can be various suggestions which a teacher can possibly use while teaching in EMI-context; code-switching, which has become relatively in demand because of its offer to transit from one language to another, is one of the acceptable solutions. According to Üstunel (2016), code-switching, to some degree, is believed to be a bridge between teaching and the learning process. Yet, code-switching from the teacher's side still cannot be considered as a perfect suggestion for the further facilitation of learners' studying process in EMI-environment, since it is an individual case. It is true that a teacher's code-switching, as any other strategy, can be perceived by students in different contrasting ways.

Firstly, it is hypothesized that an instructor's implementation of code-switching in the teaching process can be faced positively by the circle of learners. According to Cicillini (2023), code-switching plays a supportive role in EMI-context, replenishing some lexical gaps, quiding in social interaction, delivering an explanation to special cultural references, anecdotes, specific lesson details, and other aspects which can be found useful in EMI-classroom. Furthermore, it was said that code-switching, in addition, works well in pedagogical and communicative aspects, in general. Code-switching itself can be considered a positive strategy in EMI-environment, where it is indeed required to to greater extent to be focused on content, yet not language; thus, code-switching can appear truthfully supportive, especially, for STEM-faculties. Li (2015) suggests that the opinion about Cantonese-English code-switching, being "a negative language behavior", should be reconsidered. It was explained that people may see this strategy as one that leads to the loss of cultural peculiarities of one language or that limits the vocabulary, however, the truth is that the appropriate usage of Cantonese-English code-switching can help maintain discipline in the classroom because of Cantonese's cultural peculiarity, and even can affect the vocabulary of Cantonese speaker positively. The author adds that it is complicated to imagine communication without code-switching; the opinion about code-switching being avoided at all is too strict. Fishman (1997) refers to code-switching playing a noticeable role in intercultural communication, in social identity within one group, and in the bilingual context, as well. Code-switching plays a significant role in cultural assimilation and

social structures. Ahmad and Jusoff (2009) indicated that code-switching may be a good companion, if teachers need to check the comprehension level of students. Sahan and Rose (2021) find the code-switching and translanguaging phenomenon effective in EFL-classrooms, especially, with some additions to the framework. Continuing the beneficial influence of code-switching, it may lead to a deeper understanding of the material and more active participation in the classroom, if taking into account particularly secondary schools, where the research itself was found (Tsaona and Vic, 2013). In addition, Shartiely (2016) states that code-switching is a well-appreciated strategy in teacher-students' interactions, where a teacher may use it to influence a student's behavior, for necessary praising or complementing. Thus, Al-Qaysi (2016) calls code-switching one of the most effective educational strategies in EMI, taking into consideration predominantly the place of the research: the Gulf region (specifically Oman). It must be noted that the context of the research was computer technology lessons, where code-switching would be implemented. Moreover, code-switching may appear useful in simple social interactions, which are, admittedly, frequent in EMI-environment. In this case, Bond (2001) illustrates the situation where bilinguals feel more open to sharing specific thoughts using code-switching, for instance, if they tell an embarrassing story, it is convenient for them to transition to the second language. Research provided by Myrzabek et al. (2023) refers to the spectrum of the reasons why transition to code-switching happens: it can be achieving the level of comfort in conversation or habit. Logically, the opportunities provided by code-switching devices, can be implemented into teacher-student interaction with benefits for the purpose of simple further social convenience and openness. Phuntsog (2017) delivers the results of the research about code-switching from the teacher's side in this way: it can appear as a good scaffolding device; moreover, code-switching can play a beneficial role in reinforcement learning. Concluding the row of opportunities of code-switching in EMI-environment, it indeed can deliver a solution for the students of STEM faculty in terms of communication issues, loss of understanding of each other, the need for explanation, and anxiety of students (Moulisa, 2020). With the proper implementation of code-switching by a teacher, where it is required, students of STEM-faculty are, theoretically, closer to having a higher quality of education.

In contrast, in some cases, the teacher's implementation of code-switching into the lessons is even, to some extent, proximate to prevent the educational process. Thus, Ospanova (2017) delivered the results of the qualitative study, where it was revealed that the instructor's code-switching was faced negatively by the students of translation studies. It was shared that in this particular case code-switching in fact prevented the process of language learning, to some degree retarding the language learning. Predominantly, such a result was received, due to the teachers' possible lack of knowledge on how to use code-switching properly with its all provided opportunities. Humanities students, overall, may have totally negative attitudes towards the code-switching process (Zhang & Lütge, 2024). It was stated that code-switching in the classroom represented a challenge in academic integration and social interactions in the educational environment, contrasting with the STEM-faculty's students' perception of the code-switching phenomenon. Tsaona and Vic (2013) also provided the negative effects of code-switching in secondary schools' classrooms: it does not guide in the language development. Hua (2008) even believes that code-switching in fact delivers numerous complicacies. It is said that despite code-switching often appearing as a supportive tool, it is not positive to overuse it, and it would be more effective to implement not just code-switching, yet with the instructions. In case of the overuse of code-switching, there is a possibility of getting negative sequences in learning language (Jingxia, 2010). The later research of Nurhamidah, Fauziati, and Supriyadi (2018) combine the findings and conclude that code-switching is an indisputably highly appreciated tool with the two factors taken into account: the appropriate amount of usage; purposeful usage of it within the classroom.

What is interesting, regarding code-switching, there were also multiple cases of its usage in a rather neutral way. For instance, Bahous et al. (2014) remarked that some teachers use code-switching in the lessons without being conscious of it, while their students may implement it with a motive. Meruert (2020) states that the effect of a teacher's code-switching on students' perceptions may differ based on the aim of the teacher. For example, if the aim of code-switching was to provide a deeper

explanation of the material or expression, it can be perceived rather positively. Yet, if a teacher used code-switching due to a lack of knowledge (does not know the translation, for instance), then it is considered to be poorly welcomed.

In conclusion, code-switching from the teacher's side can be perceived by students in different ways, since it is individual. The effect of code-switching can be positive, negative, and also neutral in the classroom. Furthermore, as it was noticed by the researchers, such as Zhang & Lütge (2024), various faculties can consider the phenomenon of "switching" between languages from differing perspectives. Thus, Humanities students can meet the code-switching to a greater extent negatively than positively, while students of STEM-faculty, in contrast, can find it rather supportive.

Method

A purposive sampling was integrated into the qualitative study (N=8), where students from Humanistic and STEM faculties expressed their perspectives on teachers' code-switching. A purposive sampling was considered as appropriate within this research, since, in this case, the students from Engineering and TFL faculties who had experience of studying in EMI-context, and study on the courses higher than first, participated. This sampling can be explained by the participants' amount of experience of studying in EMI-system, which they, hypothetically, could receive during a longer period of studying. Thus, 4 students from TFL-faculty and 4 from Engineering-faculty were recruited for the purpose of investigating the phenomenon from various sides, since the data in literature review demonstrated how students' perceptions of teachers' code-switching can possibly vary across the faculties. The study was conducted in one of EMI-universities of Kazakhstan, Almaty region. Participants were students of different years of study and educational degree: 4 freshmen MA students (Master of Arts) from TFL-faculty, 3 Bachelor's Degree 4-year students and 1 Bachelor's Degree 3-year student from Engineering faculty. The students' age varies from 20 to 25 years old. Before conducting the study, consent letters were sent to the participants, thus getting them acquainted with the aims of the research. Participation was voluntary, all the participants were assured that the information they provided would be confidential.

Procedure: Semi-structured interviews. The data was collected through the interviewing process and analyzed through thematic analysis at the later stages. All the interviews lasted from 15 to 30 minutes, and the data-collecting process was held for a week. The data was recorded, using a dictaphone and then transcribed. After analyzing the data, it was decided to divide the answers into two main groups for further convenience: TFL-students' responses and Engineering students' responses. In this case, on the other hand, random selection without any frames in terms of a year of study supported to a greater extent diversified research, where participants of different lengths of study (from a STEM-faculty) in one university could express their positively different perspectives. In addition, in case TFL MA students could not provide much information about their experience of facing code-switching from the teacher side in their Master's Degree program, they were able to appeal to their past experiences of studying in Bachelor's Degree. Furthermore, MA TFL-students had an impressive experience of facing teachers' code-switching, since 100% of participants graduated from EMI-universities. On the other hand, the limitation within the study may appear there - it would be, from one perspective, more balanced to collect the data exclusively from MA students in order to balance the data of two faculties; however, the results from both MA and Bachelor's students, in theory, may lead to receive more varied points of view.

Data analysis

Firstly, the audios were transcribed; the data from the recorded audios was converted to the text format. The obtained data was grouped into TFL and Engineering students' perspectives and analyzed separately. The next step was to generate codes for the participants and apply them to the data set. As the third stage, inductive thematic analysis was utilized: the main themes of the research were identified, after analysing the transcription. The participants' specific quotations were sorted out in order to relate it then to one of the themes. At the final phase the parallels between two faculties'

students' perceptions of teachers' code-switching were established. The quotations of the participants of two cohorts: STEM and TFL students were analyzed under the themes, which were revealed at the previous stages, and it became possible to receive the summary from two observed cohorts.

Results

Thematic analysis of the rows of the interviews revealed such topics as: students' challenges connected to teachers' code-switching (challenges); benefits of teachers' code-switching (benefits), students' attitudes towards teacher the teacher using code-switching (perception of the teacher), disciplines where code-switching is appropriate, opinion about perceptions of teachers' code-switching by students from other faculties (view of other faculties' perceptions). In addition, in some cases the participants provided their recommendations on how teachers may use code-switching in a more quiding way, which can be established as the separate subtheme of "benefits" - "recommendations". The listed themes were noticed during analyzing the data of participants of both TFL and Engineering faculties.

TFL students' perceptions of teachers' code-switching

Theme 1: Students' challenges connected to teachers' code-switching

1) "I don't think there is a challenge for me. I know English pretty well, that's why I understand everything. I don't encounter any challenges, besides when the teacher code-switches to the language I don't know". (Participant 1, MA, freshman)

2) "Sometimes, switching to one language, which is not understandable for some students, might be a discrimination". (Participant 2, MA, freshman)

3) "I haven't actually faced any challenges with it, because mostly my teachers don't use code-switching, they use it really-really rarely". (Participant 3, MA, freshman)

In the majority of cases, the participants provided the similar answers that they do not meet any challenges due to a number of reasons: three of the participants mentioned high English proficiency, and one mentioned low frequency of using code-switching by their teachers. In addition, the factor of discrimination of using the languages of minorities was remarked by the participants. They considered it as an aspect which should be taken into account by their instructors.

Theme 2: Benefits of teachers' code-switching

1) "During my Bachelor's Degree, I think, most of my teachers code-switched, because students didn't understand some terms. So, in order to help them understand the topic in class, they could switch to Kazakh or Russian". (Participant 1, MA, freshman)

2) "Mostly, according to my experience, the teacher used code-switching to joke. To create the environment. Sometimes teachers can use it to explain some things like some terms. Joking and explaining". (Participant 3, MA, freshman)

To interpret, code-switching can be in fact beneficial in such cases as explaining the terminology (N=4) or creating a comfortable environment, where a teacher can produce jokes (N=1).

Theme 3: Students' attitudes towards the teacher using code-switching

1) "Well, I personally feel not really good when the teacher uses code-switching, because if the teacher uses just English, it wouldn't be so unclear. So, I just don't understand their purpose. Sometimes, on one subject, the materials are in Russian, and it's difficult for me to understand the terminology in Russian, because then it is required to tell about it in English. It could be just explained by the teacher just in English, it would be easier. (Participant 2, MA, freshman)

2) "I don't think much about the teachers themselves, but I think they just don't know how to express themselves in English. My overall opinion about that is rather negative, but not, like, really negative… Let's take the example. If teachers use code-switching, in case their students don't understand, then I can think that this teacher is quite cool. They are trying to help students and don't just teach and then leave, they need to know that their students understand everything well. It

influences my opinion about their code-switching… Well, I remember one teacher who used to code-switch a lot: he code-switched to Turkish, and I do not know Turkish. I think, in this case it was inappropriate to code-switch, he didn't consider the languages of all the students". (Participant 4, MA, freshman)

All the participants find it inappropriate, when the teachers integrate code-switching into their teaching. The reasons vary from switching to the language of minority to unpurposeful code-switching, thus confusing the audience. Nevertheless, the most frequent case is code-switching without any strategy serving as a negatively perceived tool.

Theme 4: *Disciplines where code-switching is appropriate*

1) "I'm studying in TFL, that's why, I think, there is no appropriate case for a teacher to use code-switching". (Participant 2, MA, freshman)

2) "I think, in all subjects it is appropriate. It rather depends on what purposes it is used. For example if you use it in Major Foreign Language too often, you might lose the purpose of your subject, as a teacher of EMI". (Participant 3, MA, freshman)

According to the opinion of three participants, code-switching is inappropriate in TFL-classroom, and according to the opinion of one participant, code-switching can be implemented in a positive way, in case it was purposeful.

Theme 5: Participants' view of other faculties' perceptions

1)"Some faculties can think that code-switching is necessary, like, mathematics or some faculties that are related to physics or just technical disciplines. Mostly, in this very case, their level of English can be not that high. They are focused on formulas, numbers, rather than on communication. I think, in these cases the need for code-switching is higher". (Participant 4, MA, freshmen).

2) "I think in STEM code-switching is more common. I think they might perceive it actually more positively". (Participant 3, MA freshmen).

All the participants mentioned code-switching as a supportive linguistic approach for STEM-specialties.

Engineering students' perceptions of teachers' code-switching

Theme 1: Engineering students' challenges connected to teachers' code-switching

1) "When my teacher mixes the languages, it is confusing. It is not like code-switching, it is just a remix of languages. One sentence can start in Russian, then it is in English, and the end is in Kazakh. Code-switching or not, it feels like a strange thing". (Participant 5, BS, 4th year).

2) "You know, I don't really know Kazakh. I like code-switching, but when my lecturer starts using the language I don't know, I don't understand, like, anything. I start asking my groupmates what he said and feel very bad". (Participant 6, BS, 3rd year)

3) "It will be more complicated in future to understand some terms in English, because the teacher said in Russian or in Kazakh. Especially difficult, if it sounds different in English and maybe Russian". (Participant 7, BS, 4th year).

The majority of students mentioned the confusing usage of code-switching by their teachers. In some cases, the instructor integrates code-switching without any strategy or without considering the languages of the students. One participant delivered a statement about inappropriate usage of code-switching for terminology.

Theme 2. Benefits of teachers' code-switching

1) "I wasn't familiar with this word "code-switching", but I think it is good. Teachers can use it, when they can't explain something in English, or if we don't understand. It is cool, when they understand when it's time to say it not in English". (Participant 8, BS, 4th year)

2) "It is so helpful to hear some terminology in Russian or Kazakh, Thanks for it. It is easier to understand and to do my laboratory work then, of course". (Participant 7, BS, 4th year).

Four participants found code-switching truthfully guiding in terms of terminology. Furthermore, the participants expressed their respect towards teachers who implement code-switching.

Theme 3. Students' attitudes towards teachers using code-switching

1) "Honestly, I understand them. They don't know a word, it's a normal thing, it's indeed fine to say it in your native language… Sometimes they don't know how to say something, so I'm okay with it". (Participant 7, BS, 4th year).

2) "I feel mostly neutral about the teacher. It's more interesting for me which words were code-switched and not why. In general, I think it's fine. Maybe he just didn't know the translation of the specific terms". (Participant 5, BS, 4th year).

The majority of participants (N=3) expressed their positive attitudes towards teacher's code switching, and one felt neutral about it. What is similar, all the four participants hypothesized that the main purpose of their teachers using code-switching is them possibly being not familiar with some technical words.

Theme 4: *Disciplines where code-switching is appropriate*

1) "In "гуманитарные науках" like philosophy or sociology it's appropriate. It's kind of useful to discuss it in Russian and English. It is much easier. As you noticed, I've just code-switched. Am I right? It is because I didn't know the translation". (Participant 7, BS, 4th year)

2) "Where we have a lot of terminology". (Participant 6, BS, 3rd year)

Two students emphasized the appropriateness of code-switching within Humanitarian disciplines, and two mentioned the subjects with a great amount of terminology.

Theme 5: Participants' view of other faculties' perceptions

1) "Of course, everybody has their own opinion, but I think they will say the same thing, since code-switching is very convenient". (Participant 7, BS, 4th year)

2) "I think other faculties will like it too, because why not? A lot of people don't understand something. Many specialties have unknown difficult words. Code-switching is effective, in my opinion". (Participant 6, BS, 3rd year)

To summarize, all the four participants suppose that code-switching is an appropriate linguistic approach for all faculties, since it is convenient due to a row of reasons, especially in case there are a number of unfamiliar words.

Discussion

The aim of this study was to identify students' perceptions of teacher's usage of code-switching in the EMI-classroom. In order to diversify the research, two faculties were taken into consideration: TFL-faculty and Engineering faculty. The participants answered the specific questions regarding opportunities and challenges of teacher's code-switching, their attitudes toward their instructor who implements code-switching, disciplines where it is inappropriate, and revealed their perspective about how other faculties might perceive teachers' code-switching. Thematic analysis, face-to-face interviews were conducted in this study. The received results from both faculties were analyzed in depth and compared to each other.

Challenges connected to students' code-switching

Students provided their possible challenges, when their teacher implemented code-switching, and it was expectedly established that TFL-students face less challenges, compared to students from Engineering faculties.nIt was revealed that the frequency of using code-switching by the teachers from different faculties was varying, since teachers from TFL-faculty were mentioned to rarely use this linguistic approach, while Engineering students marked in their interviews code-switching as a normal case in their classroom. STEM-faculties encounter such challenges in EMI-classroom as the confusion which they receive, when their teacher "interferes" with code-switching without any strategy, which lead to the similarities with the results of the study provided by Nurhamidah, Fauziati, and Supriyadi (2018) about purposeful code-switching.

Participants shared their feelings, in case the code-switching was implemented inappropriately, and it can be interpreted as how dramatically confused they, in some cases, can feel; thus establishing a parallel with the number of studies, such as Hua (2008), where it was mentioned that the purpose and frequency of code-switching also indeed have significance. It is clear that code-switching can indeed influence students' level of comprehension. Code-switching is a useful tool, yet it needs to be considered by its appropriateness and the languages of the students in EMI-classroom. Furthermore, what is interesting, two faculties in fact expressed the significance of the linguistic inclusivity in EMI-context; teachers are recommended to take into consideration to which language exactly it is relevant to switch, which languages are familiar for their students, and how students who are not aware of some languages might feel, if code-switching is unavoidable. TFL-students used the term "discrimination", since they hypothesize code-switching needs also to be considered from the sociolinguistic perspective, and not exclusively as a tool for convenience.

Benefits of teachers' code-switching

Overall, all the participants were focused on the importance of teacher's code-switching in terms of explanation within the EMI-classroom. Students reacted positively to the teacher's code-switching, thus emphasizing the supportive function of it. TFL-students mentioned that code-switching can also be used as a tool for creating a comfortable atmosphere in the classroom, for story-telling, and in case a teacher is intended to tell an anecdote. Cillini (2023) achieved the close outcome, revealing that code-switching is supportive as a tool for interactions, some cultural references, jokes or other specific moments during the lessons. Both faculties mentioned about the most appropriate positive sides of teachers' code-switching for their particular faculties. For instance, TFL-students express the significance of code-switching in terms of terminology and supporting the atmosphere in EMI-classroom; Engineering students' opinion was mostly concentrated on instructors' explanation of terminology, as it was studied by Camacho-Minãno (2016) about STEM-students considering technical terminology in EMI-context to some extent problematic.

Students' attitudes towards teachers using code-switching

Interestingly, it was the moment where students of different faculties expressed their totally varying thoughts. As Zhang and Lütge (2024) investigated, different faculties can consider the phenomenon of code-switching in contrasting ways. Engineering students were noticed to have neutral or to a greater extent positive attitude towards their teachers integrating code-switching to their lessons. It was revealed that the dominating feeling in students from Engineering faculty, in this case, is understanding. Code-switching was observed to be supportive for STEM-students due to the row of positive peculiarities, as it was mentioned in the study of Moulisa (2020), where code-switching appeared indeed helpful for the STEM-disciplines specifically. The majority of participants expressed their level of empathy, if a teacher does not know a specific word, and implements code-switching at these moments. At the same time, TFL-students' perceptions of teachers' code-switching is negative, especially, if it was unpurposeful, and a teacher did not consider learners' needs, native languages and other important factors. The identical result about students from Humanitarian faculties perceiving code-switching negatively appeared in the research provided by Zhang & Lütge (2024). To summarize, code-switching should be strategically implemented, and must not confuse students in any form, according to TFL-students' responses.

Disciplines where code-switching is appropriate

TFL-students expressed about inappropriateness of code-switching in any discipline which figurates in their faculties, yet repeated the statement how it can be quiding, in case code-switching was purposeful, and no challenges appeared after the implementation; while Engineering students named two cases, where code-switching is possibly appropriate: humanitarian disciplines and disciplines with the large amount of terminology. To generalize, students from Humanitarian faculties indeed might have negative perceptions of teachers' code-switching due to peculiarities of their faculties. The fact of the students of Humanitarian faculties possibly perceiving teachers' code-switching in a comparatively

negative way is close to the results of the study of Ospanova (2017), where students of translation studies provided the same result. Yet, regarding STEM-faculties and their peculiarities, students can commonly perceive code-switching positively, thus building a positive image about the teacher who implements code-switching. What cannot be ignored, is the fact of code-switching which has to be strategically used; therefore, the negative challenges can be minimized.

Participants' view of other faculties' perceptions

Responses from TFL-students were totally about the significant role of code-switching in STEM-faculties, STEM-students may face challenges with technical vocabulary or issues connected to English language knowledge. On the other hand, from a STEM-student's perspective, teachers' code switching can be appropriate in all cases, all disciplines, due to the convenience of code-switching. To interpret, TFL-students were concentrated on the special details of the role of code-switching, because, in their case, totally positive implementation of code-switching is questionable and needs to be integrated with strategy, which was emphasized. STEM-students faced less obstacles with code-switching; therefore, they shared their perspective about code-switching being a supportive linguistic strategy for all disciplines, thus taking into account the general quiding image of code-switching.

Limitations of the study

The sample of participants was too wide: in the research appeared TFL students of Master's Degree and Engineering students from Bachelor's degree, which can possibly lead to some inaccuracy in the study. From the one hand, TFL-students were able to appeal to their previous experience while responding to the questions. The answers can be diversified according to the perceptions of students with different backgrounds, yet it could be more appropriate to be to a greater extent focused on the exclusively students of Master's or Bachelor's Degrees.

Conclusion

Teachers code-switching is a supportive linguistic tool in EMI-classroom, which can deliver numerous benefits: explanation of terminology, establishing comfortable atmosphere, humorous purposes and other significant reasons. Yet, it is highly recommended to implement code-switching with strategy, considering the learners' needs in combination with their first languages. To summarize, TFL-students have to a greater extent negative perceptions of teacher's code-switching in EMI-context, and truthfully recommend to purposefully integrate it in the classroom, while Engineering students find code-switching a supportive tool, and suppose, teacher's code-switching can appear appropriate in other faculties, as well. However, the results, theoretically, could appear more relevant, if the study was focused on Bachelor's or Master's students separately; therefore, the research could deliver more details about one selected context. This paper suggests future research to consider exclusively Master's students or Bachelor's students.

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Екатерина Нам[1], Давронжон Гаипов[2]*
[1,2] SDU University, Қаскелең, Қазақстан
[*]e-mail: 231302009@sdu.edu.kz

СТУДЕНТТЕРДІҢ ENGLISH MEDIUM INSTRUCTIONS КОНТЕКСТІНДЕ МҰҒАЛІМДЕРДІҢ КОДТАРЫН АУЫСТЫРУДЫ ҚАБЫЛДАУЫ

Аңдатпа. English Medium Instructions (EMI) - бұл көптеген университеттерде жалпы қабылданған жүйе және өзінің ерекшеліктеріне сәйкес EMI оқушылар үшін мүмкіндіктер де, проблемалар да бере алады. Кейбір мұғалімдер проблемаларды болдырмау үшін кодтарды өз сабақтарына ауыстыруды енгізеді. Бұл зерттеу TFL және инженерлік мамандықтардың студенттерін гуманитарлық және STEM факультеттерінің студенттері ретінде қарастыра отырып, EMI контекстінде мұғалімдердің кодтарын ауыстырып қосуды студенттердің қабылдауына бағытталған. Бұл сапалы зерттеуде бетпе-бет сұхбаттар жүргізілді. Сегіз қатысушы: TFL факультетінен төрт студент және инженерлік факультеттен төрт студент өз көзқарастары туралы айтып берді. Жиналған деректер тақырыптық талдауда өңделді. Қорытындылай келе, TFL студенттерінің кодтарды ауыстырып қосуды қабылдауы инженерлік мамандықтағы студенттердің қабылдауымен салыстырғанда теріс болып табылатыны зерттелді. Мұғалімдерге кодтарды ауыстырып қосуды немесе транслингвизмді оқушылардың ана тілдерін назарға ала отырып, әдейі, осылайша кемсітушілік сияқты құбылысқа әкелмей, енгізу ұсынылды.

Түйін сөздер: English Medium Instructions, кодтарды ауыстырып қосу, транслингвизм, STEM, гуманитарлық, TFL, инженерлік

Екатерина Нам[1], Давронжон Гаипов[2]*
[1,2] SDU University, Каскелен, Казахстан
[*]e-mail: 231302009@sdu.edu.kz

ВОСПРИЯТИЕ СТУДЕНТАМИ ПЕРЕКЛЮЧЕНИЯ КОДОВ УЧИТЕЛЯМИ В КОНТЕКСТЕ ENGLISH MEDIUM INSTRUCTIONS

Аннотация. English Medium Instructions (EMI) — это система, которая стала общепринятой во многих университетах, и в соответствии со своими специфическими особенностями EMI может предоставлять как возможности, так и проблемы для учащихся. Чтобы предотвратить проблемы, некоторые учителя внедряют переключение кодов в свои уроки. Это исследование сосредоточено на восприятии студентами переключения кодов учителей в контексте EMI, рассматривая студентов TFL и инженерных специальностей как представителей студентов гуманитарных и STEM-факультетов. В этом качественном исследовании проводились очные интервью. Восемь участников: четыре студента с факультета TFL и четыре с инженерного факультета, рассказали о своих точках зрения. Собранные данные были обработаны в тематическом анализе. В заключении было исследовано, что восприятие студентами TFL переключения кодов является скорее негативным, контрастируя с восприятием студентов инженерных специальностей. Учителям было рекомендовано внедрять либо переключение кодов, либо транслингвизм стратегически, преднамеренно, принимая во внимание родные языки учащихся, таким образом не приводя к такому феномену как дискриминация.

Ключевые слова: English Medium Instructions, переключение кодов, трансингвизм, STEM, гуманитарный, TFL, инженерный.

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Aidos Myrzabek[1], Gaukhar Yersultanova[2], Medet Jandildinov[3]*
[1,2]SDU University, Kaskelen, Kazakhstan
[3]Abai Kazakh National Pedagogical University, Almaty, Kazakhstan
*e-mail: aidos.myrzabek@sdu.edu.kz

FORMATIVE ASSESSMENT IN KAZAKHSTAN'S ENGLISH LANGUAGE CLASSROOMS: A NARRATIVE REVIEW OF CURRENT PRACTICES AND THE ROLE OF AI TOOLS

Abstract. Formative assessment (FA) has emerged as a critical component of effective teaching and learning, providing ongoing feedback that guides both teachers and students in improving educational outcomes. This narrative literature review examines the implementation of formative assessment in Kazakhstan's English language classrooms and explores how artificial intelligence (AI) tools are enhancing and could further enhance these practices. The review synthesizes international and local research on FA – defining its key concepts, components, benefits, and challenges – within the context of Kazakhstan's recent education reforms that mandate a criteria-based (formative) assessment system. It also discusses current applications of AI (such as adaptive learning platforms, natural language processing for feedback, and AI-driven peer/self-assessment tools) in education, and considers potential future uses of AI to support teachers and learners in formative assessment. The findings indicate that while formative assessment is valued for improving student engagement and achievement, Kazakhstani teachers face challenges in its implementation, including large classes and shifts in ingrained grading practices. AI technologies offer promising solutions to personalize feedback, automate routine assessment tasks, and inform data-driven instruction, albeit with the need for teacher training and careful integration. The review concludes with implications for educators and policymakers in Kazakhstan, emphasizing that blending proven formative assessment strategies with AI support can foster more responsive and effective English language teaching.

Keywords: Formative Assessment; English Language Teaching; Kazakhstan; Artificial Intelligence; Educational Technology; Feedback; Assessment for Learning; Peer Assessment; Self-Assessment.

Introduction

As a potential teaching strategy to improve instruction and learning, formative assessment (FA) has attracted interest from all across the world (Grant & Gareis, 2017). Particularly, assessments like formative assessment or assessment for learning have shown increasing interest over the past 20 years (Black & Wiliam, 1998; Burner, 2016). FA is the outcome of how educational assessment procedures have evolved. Assessment has benefited greatly from the contributions of researchers from nations including the US, the UK, New Zealand, and Australia. FA was introduced to the field of education research and teacher professional development, namely by the Assessment Reform Group (Grant & Gareis, 2017).

Unlike summative assessments that evaluate learning at the end of an instructional period, formative assessments are embedded within the teaching process to provide continuous feedback and guide adjustments to instruction. Pioneering work by Black and Wiliam (1998) underscored the *"pivotal role of formative assessment in providing valuable information not only to teachers but also to students, guiding improvements in teaching and learning to optimize student outcomes"*. A broad consensus has since emerged that effective use of formative assessment strategies leads to higher student engagement and achievement.

Although Kazakhstan had a good framework in place to combat the social and economic issues that impoverished pupils experience and the government allowed schools to address the educational

needs of students who struggle academically (OECD, 2015), the quality of secondary education was not promising a decade ago. For instance, the Kazakhstani government has established a strategic plan, known as "the Centre of Excellence (CoE) program," which aimed to train roughly 40% of school teachers by 2016 (Wilson et al., 2013, p.1). At that time, one third of fourth and eighth grade children were academically unsuccessful, which may have been due to the fact that the remaining 60% of teachers still needed training (OECD, 2015). Furthermore, teachers are valued based on the UNT results of their students and Olympiads rather than the former's teaching process (OECD, 2015).

However, the quick development of artificial intelligence (AI) in education increases the chances to improve formative assessment experiences. AI tools for education purposes – from automated tutoring software to AI essay grader – can assist teachers by bearing the potential to provide instant feedback, analyze learners works, and even facilitate collaborative learning exchanges between peers. Internationally, one can see increased attention to how AI tools are able to make formative assessment. Globally, there is growing interest in how AI can make formative assessment more adaptable and tailored. For instance, English language classrooms in the Kazakhstani context, teachers can use AI tools to support their students but also themselves by tracking individual learners' language learning progress and adapting AI tools to their students' needs. It can be argued that integrated AI tools will support teachers to improve formative assessment quality through the automation of routine processes and data insights, and it allows teachers to engage in more complex pedagogical decision-making and individual tutoring.

Rationale and Aim of the Study: Given the importance of formative assessment in improving language education and the emergence of AI as a potential aid, this narrative literature review aims to synthesize current knowledge on formative assessment in Kazakhstan's English language classrooms and examine the role that AI tools are playing or could play in enhancing these practices. By bringing together international literature on formative assessment and educational technology with local studies and reports from Kazakhstan, the review provides a comprehensive picture of: (a) the principles and benefits of formative assessment, (b) how formative assessment has been implemented in Kazakhstani English teaching contexts (successes and challenges), and (c) existing and future applications of AI to support formative assessment. The goal is to highlight insights and gaps in the literature, and to draw out implications for teachers, school leaders, and policymakers seeking to improve English language teaching through formative assessment and innovation.

Methods and Materials

This article adopts a *narrative literature review* methodology, integrating findings from a broad range of sources rather than following the strict protocols of a systematic review. The literature selection process was guided by the focus on formative assessment in English language education within Kazakhstan, as well as the intersection of formative assessment with AI tools. We searched scholarly databases and digital libraries (e.g., Google Scholar, ERIC) for peer-reviewed journal articles, conference papers, dissertations, and reports using keywords in English and Russian such as "formative assessment", "assessment for learning", "English language teaching", "Kazakhstan education", "criteria-based assessment Kazakhstan", "artificial intelligence in education", and "AI feedback learning". Particular attention was given to literature published in the last 10–15 years to capture recent developments, especially regarding AI in education. Additionally, we included seminal works on formative assessment (e.g., Black & Wiliam's foundational studies) to establish the theoretical background, as well as relevant policy documents and educational guidelines from Kazakhstan to understand the local context.

We identified *international literature* that elucidates the concepts, components and efficacy of formative assessment, including meta-analyses and influential frameworks, and *local literature* from Central Asia (especially Kazakhstan) that reports on the implementation of formative assessment in schools. To address the AI component, we reviewed articles and case studies on educational technology and AI applications that align with formative assessment processes (such as automated feedback systems, adaptive learning platforms, and AI-enhanced peer assessment tools). The inclusion criteria emphasized sources that discuss formative assessment in the context of language

learning or general K-12 education, and sources that connect AI tools with formative feedback or assessment for learning. Both English-language and Russian-language sources were considered to ensure a comprehensive regional perspective.

In analyzing the literature, we employed a *thematic synthesis* approach. We first reviewed the sources to extract key themes and findings, organizing them into categories corresponding to our objectives: (1) definitions and theoretical underpinnings of formative assessment, (2) components and strategies of effective formative assessment, (3) benefits and impact of formative assessment on learning (with sub-focus on language education where available), (4) challenges and practices in implementing formative assessment in Kazakhstan's school system (especially in English classes), and (5) the role of AI in formative assessment, including current applications, opportunities, and challenges. We then compared and integrated findings across these themes, noting points of consensus, divergence, and evidence strength. Because this is a narrative review, we did not statistically aggregate results but rather present a qualitative synthesis that weaves together insights from the literature. All sources used are cited in-text and listed in the References section. The resultant discussion is structured to first present the state of formative assessment practice and its impacts, and subsequently to explore the intersection of these practices with AI innovations, particularly as relevant to Kazakhstan's English language teaching context.

Results and Discussion

Formative Assessment: Concept and Components

Assessment is *"formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, and their peers to make decisions about their next steps in instruction"* (Black & William, 2009, p. 9). In simpler terms, formative assessment is an ongoing process whereby teachers gather information on student learning during the learning process and use it to adjust teaching, while students use it to improve their understanding and skills. Unlike summative tests that are assessments of learning, formative assessment is often described as *assessment for learning* because its primary purpose is to improve continuous learning (William, 2011).

Over the years, researchers have identified specific *components and strategies* that make formative assessment effective. Moss and Brookhart (2010), for example, outline six interrelated components of formative assessment that teachers and students engage in during learning activities:

- *Sharing learning targets and criteria for success:* clearly communicating the lesson's objectives and what successful achievement looks like. Students need to understand the goals they are working towards.
- *Feedback that "feeds forward":* Providing timely and specific feedback that not only evaluates current work but also offers guidance for improvement on future tasks. Effective feedback is actionable and linked to the criteria for success.
- *Student goal setting:* encouraging students to set their own learning goals aligned with the targets, which fosters ownership and self-regulation in learning.
- *Student self-assessment:* involving students in assessing their own work against the criteria, helping them identify gaps in their understanding and strategies to improve.
- *Strategic teacher questioning:* using thoughtful, open-ended questions to probe student thinking and promote deeper understanding, rather than just checking for factual recall.
- *Student engagement in asking questions:* cultivating a classroom culture where students feel comfortable to ask questions about the content and their own learning process, thereby actively directing their learning inquiries.

These components work in tandem; when applied together, they create a powerful feedback loop in the classroom. In fact, Moss and Brookhart (Ibid.) liken the formative assessment process to a windmill where each "blade" (component) must move in sync to effectively drive student achievement.

Importantly, Topping (2010) add peer assessment as a crucial component of formative assessment because it encourages teachers to refine assessment goals, standards, and grading methods. Furthermore, teachers are likely to gain metacognitive advantages from the process. Moreover, Sadler (1989) noted that peer assessment is most effective when learners are trained to

make and defend judgments about each other's work, as this process not only reinforces their understanding of the criteria but also develops critical thinking. Additionally, activities such as peer feedback on written works and oral presentations among students increases learners' commitments. However, it is important to provide students with clear guidelines to ensure feedback is constructive.

To summarize, a number of components are encompassed in formative assessment, and it encourages consistent teacher and student interaction. Through the interaction students learn to pose critical questions, provide constructive feedback, and identify their current knowledge base and areas that they need improvements. However, unless these activities are repetitive, they may fail to impact English learners' language acquisition and skills.

Advantages of Formative Assessment in English Language Education

A substantial body of research (e.g. Alvarez et al., 2014) supports the view that formative assessmsent has an important role in advancing students' learning results, including English language education. Furthermore, engaging in constructive feedback practices students gain self-confidence and self-regulation in addition to academic achievement (Abduazizovna & Lazokat, 2025).

AI enhances student communication abilities while boosting student participation and delivering personalized education with positive student attitudes. Specifically, the combination of AI chatbots enhances spoken communication abilities and boosts learning engagement while delivering personalized feedback to match user needs. Students tend to view AI chatbots positively because they show readiness to adopt technological integration. AI chatbots provide additional practice opportunities beyond traditional classrooms which helps students develop their language proficiency. AI chatbots should expand their applications in EFL instruction by delivering educational resources and innovative teaching approaches (Kemelbekova et al., 2024).

According to Black and Wiliam (1998), improving FA in classroom practices leads to significant improvements in the performances of students, resulting in substantial benefits for students who in the early stage learning a language. Regular and constructive feedback and opportunities for correction assist in addressing early confusion before it results in substantial educational setbacks. For instance, immediately clarifying a grammatical inaccuracy is more beneficial compared to postponed correction after standardised assessments.

Additionally, qualitively exploring language classes at a secondary school level, Lee (2011) observed the changes in learners' attitudes towards writing tasks. Lee (2011) observed a marked transformation in students' outlooks to writing tasks. Lee's (Ibid.) study showed that during the initial phase of the academic year, students found tasks as overwhelming, but consistent exposure to FA and revisions of their works several times shifted their outlook to FA by showing confidence and willingness to engage in challenging tasks. These findings put forward the idea that FA can help create an academic setting where making mistakes is accepted as a necessary phase in learning, and that alleviates anxiety and foster foreign language learning. In addition to integrating this practice into language classes in the context of Kazakhstan, where feedback types and approaches may differ from other contexts, may improve the quality of students' active participation in activities that focus on output skills, writing and speaking, and motivate and encourage them to support their learning environment.

Next benefit is developing self-regulated learning skills. For instance, according to Wei (2023), once students are evaluated based on AI formative assessment and are offered tailed feedback, they improve their self-regulated learning, and they become motivated to learn independently. Furthermore, Yaşar & Karagücük's (2024) study found a significant positive correlation between AI literacy and English language learning motivation among 397 participants. The mean score for motivation was 65.02 that indicates an overall aspiration to learn English, and 61.95 for AI literacy that shows a strong foundation in artificial intelligence. These results suggest that improving AI literacy is highly likely to motivate students to learn English, and this is a clear indication of the importance of integrating AI tools into language learning and teaching (Yaşar & Karagücük, 2024). Self-regulation and L2 speaking skills have improved more as a result of Duolingo programs (Qiao & Zhao, 2023). AI platforms increase student involvement as well, although there are still issues with

guaranteeing regular participation and adapting these tools to a variety of learning settings. For instance, through practices like self-assessment and goal setting (key components mentioned earlier), students learn to monitor their own progress and become more reflective about their learning strategies. Over time, this can foster learner autonomy. Research by Carrol and Christenson (1995) demonstrated that training students in goal-setting can lead to tangible performance improvements. In their study, middle school students who set specific targets (e.g., improving the structure of their essays) and identified strategies to reach them saw better outcomes; one student noted rising from "C" grades to "A"s and "B"s in writing after working harder towards his personal goals. Similarly, Moeller et al. (2012) found that language learners who regularly set personal goals showed greater gains and motivation than those who did not. These findings underscore that formative assessment practices not only impart content knowledge but also teach students *how to learn* – an especially vital skill in language learning where consistent practice and self-monitoring (for pronunciation, grammar usage, etc.) are needed. Based on these findings, we argue that when teachers in Kazakhstan share *learning goals* for a unit (e.g., the ability to use past tense correctly in a narrative) and then have students periodically check their work against these goals, students start to internalize the standards and evaluate their own work critically.

Furthermore, formative assessment benefits teachers as well by improving instructional decision-making. The ongoing "feedback loop" gives teachers richer insight into their students' understanding, so they can tailor their teaching more effectively. For instance, during a lesson on English grammar, if a quick formative quiz or observation reveals many students misunderstanding a concept like possessive apostrophes, the teacher can immediately revisit that point. This approach is called Immediate Instructional Adjustment according to Popham (2011). The example from the literature recounts how a teacher, upon seeing her class confused about apostrophe usage, paused the lesson to re-explain the rule and then provided a short practice quiz. She even had students work in pairs to compare answers with an answer key, facilitating peer discussion to clear up misconceptions. As a result, students left the class with a corrected understanding, rather than carrying the confusion forward. This kind of responsive teaching, made possible by formative assessment, leads to more effective learning sequences than sticking rigidly to a plan or waiting until an end-of-unit test exposes the issue. Teachers also find that by involving students in assessment (through self or peer review), they can manage their time better – for example, while students are engaged in peer assessment, the teacher can circulate and confer with individuals who need extra help (Topping, 2010). Overall, formative assessment creates a more dynamic classroom where teaching is continuously informed by evidence of learning, which is beneficial for both learners and instructors.

In summary, when well-implemented, formative assessment in English language classrooms can lead to higher achievement, better attitudes, and more engaged and autonomous learning – outcomes highly desirable in any educational context.

Implementation of Formative Assessment in Kazakhstan: Practices and Challenges

Kazakhstan's drive to implement formative assessment in schools has been ambitious, backed by nationwide curriculum reforms and teacher training initiatives. English language classrooms in secondary schools have been a particular focus, given the country's emphasis on improving English proficiency among youth (Kaiypova & Kim, 2024). Here, we explore how formative assessment has been put into practice in Kazakhstani classrooms and the challenges faced, drawing on both research studies and contextual reports.

Policy and Practice

The 2016 curriculum reform mandated a *criteria-based assessment* system, which essentially integrated formative assessment (ongoing classroom evaluation) with modified summative assessments (Global Cities, n.d.). Teachers were trained to develop clear assessment criteria, design formative tasks, and provide feedback aligned with those criteria. According to the reform guidelines, English teachers, for example, should regularly use techniques like questioning, quizzes, observation checklists, and portfolio tasks to gauge student progress in language skills. Schools also introduced new record-keeping practices. One major shift was the use of electronic journals (such as the

Kundelik.kz platform) where teachers log assessment results. Initially, formative assessment results were meant to be descriptive (narrative feedback). However, during the COVID-19 pandemic when schooling moved online, the Ministry encouraged teachers to assign scores for formative tasks on a 10-point scale to motivate student participation in remote learning. This practice has continued in some schools post-pandemic, effectively making formative assessments count in a visible way for students and parents. While this added accountability can increase student effort, it also introduced confusion. Using grading scores between one and ten for formative assessment departed from the traditional 5-point grading familiar in Kazakhstan and resulted in potential confusion among students and parents, indicating a need for improved communication and clarification regarding the new grading methodology. This example illustrates a broader implementation challenge: balancing the qualitative, informal spirit of formative assessment with the entrenched expectations of formal grading.

Teacher Understanding and Beliefs

For many Kazakhstani teachers, formative assessment represented a paradigm shift. While teachers conceptually agree with the benefits of formative assessment, their depth of understanding can vary. For instance, Colby-Kelly and Turner (2007) reported that teachers new to formative assessment emphasized the importance of giving positive and timely feedback to students, and saw motivational benefits in doing so. This aligns with the training emphasis on feedback as a tool to encourage learners. Nonetheless, teachers also bring prior beliefs; some initially saw formative assessment as an additional burden or worried it might reduce their authority if students become more autonomous. In an innovation summary from the Nazarbayev Intellectual Schools (NIS) (), it was noted that *"formalisation of FA in policy has not fully induced substantive change in classroom practices because FA concepts often appear to conflict with the early beliefs and experience of teachers"* (HundrED**,** 2024). For example, teachers accustomed to teacher-led instruction might struggle with the student-centered aspects of formative assessment, such as letting students self-assess or letting them learn through making mistakes. Over time, however, with experience and peer support, many teachers adjust. Black et al. (2002) notes that initially embracing formative assessment felt *scary* because it meant giving up some control, but eventually it shifted his focus more onto students' learning needs, which he found highly rewarding as it improved his teaching effectiveness (William, 2008). This highlights the importance of mindset: when teachers see formative assessment not as a threat but as a tool to empower their teaching, they become more confident in facilitating it.

Classroom Practices and Student Reactions

In practice, Kazakhstani English teachers have been using a variety of formative techniques. Common ones include short quizzes at the end of a lesson (exit tickets), oral questioning during reading comprehension exercises, one-on-one mini-conferences to discuss essay drafts, and peer review sessions for speaking or writing tasks. Many teachers also use rubrics (scoring guides) provided by the Ministry or created collaboratively to clarify expectations for assignments such as projects or essays. There is anecdotal evidence indicating that students appreciate knowing the criteria in advance and receiving feedback in relation to these criteria, as it makes the learning process more transparent. However, the extent of student engagement in formative assessment can depend on class culture. In some classrooms, students have readily taken to self- and peer-assessment, enjoying the interactive and reflective activities. In others, students were initially hesitant – for instance, some students felt uncomfortable giving feedback to peers or doubted the fairness of peer assessment if they perceived their classmates as lenient or too critical. The two focus group discussions conducted by McGarr and Clifford (2013) revealed that a few students were reluctant to be assessed by peers they considered less capable, while others were overly generous out of friendship or empathy. Such challenges are not unique to Kazakhstan, but they underscore the need for teachers to teach students how to assess constructively. Teachers have been addressing this by explicitly teaching students how to use rubrics, modeling feedback language, and emphasizing the learning purpose of these activities (as opposed to just "giving a grade). Over time, these efforts can build a classroom environment where peer and self-assessment are normal and valued.

Systemic Challenges

Several broader challenges affect the implementation of formative assessment in Kazakhstani English classrooms:

- *Large Class Sizes:* in regular public schools, English classes can have 25–30 or more students. Providing individualized feedback and tracking each student's progress in such settings is demanding. Such significantly large classes hinder the quality of formative assessment since a single teacher can only interact meaningfully with so many students in a limited time because 30 students can strain a teacher's ability to frequently check each student's writing or give each one a chance to speak in a 45-minute lesson. Teachers often have to be strategic, for instance, rotating focus among students or using group work to manage this limitation.
- *Time and Workload:* implementing formative assessment requires time for planning and follow-up. Teachers need to design good questions or tasks, prepare feedback, and possibly provide extra help to those who are struggling. Kazakhstani teachers have reported that the new system, while beneficial, increases their workload – they spend more time preparing lesson plans with integrated assessment and more time reviewing student work continuously. Without adequate non-teaching time or support (like teaching assistants), this can lead to superficial feedback (e.g., just a check mark) instead of the detailed guidance formative assessment ideally provides. Wylie and Lyon (2015) emphasize that high-quality formative assessment implementation demands extensive teacher skill across multiple domains (content, pedagogy, assessment) and thus requires robust professional development. In Kazakhstan, ongoing teacher training and communities of practice are critical to help teachers manage these demands efficiently.
- *Alignment with Summative Assessment:* another challenge is ensuring coherence between formative and summative assessments. Students in Kazakhstan still face important summative assessments (e.g., final exams, unified national testing). There can be tension if what is emphasized formatively in class doesn't appear on summative tests, or vice versa. Ideally, formative assessment prepares students for summative success by continuously building the required skills. The reforms tried to address this by making summative tasks also criteria-based and known in advance, but some misalignment can occur, causing teachers or students to revert to teaching to the test habits and neglecting formative practices when exam pressure mounts. Clear communication that formative assessment is meant to enhance summative performance in the long run (by improving learning quality) is needed to keep all stakeholders invested in it.

Despite these challenges, there have been positive developments. For example, the Nazarbayev Intellectual Schools network, which often pilots innovations, developed a set of *"Formative Assessment – Proactive Teacher"* resource cards to help teachers systematically plan formative assessment activities in their lessons. These resources have been shared nationally, providing practical guidance on implementing strategies like sharing learning goals, giving feedback, and fostering student questions in everyday teaching. Empirical findings further show that well-supported teachers become more confident in using formative assessment, ultimately fostering a stronger feedback culture within classrooms. The research conducted by Kenzhetaeva et al. (2020) in the Kazakhstani context highlights the need for proper preparation of pre-service teachers for the criteria-based assessment system. Such preparation has proven essential in helping even primary school educators overcome initial difficulties and boost student engagement through formative approaches.

The adoption of formative assessment in English language classrooms throughout Kazakhstan marks a major change in educational teaching methods. Educators across the board have started implementing teaching methods that follow international standards which has led to more interactive learning environments with built-in feedback systems. The implementation of formative assessment faces ongoing challenges because of workload pressures and habitual teaching practices and systemic constraints. The identification of these obstacles creates a starting point to evaluate how artificial intelligence technology could help reduce some burdens while improving formative assessment practices.

Integrating AI in Formative Assessment Practices

One encouraging trend in the growth of educational practice is the convergence of artificial intelligence (AI) with formative assessment. When used carefully, AI systems can improve assessment procedures by handling data-intensive activities that might otherwise overwhelm teachers and providing prompt, personalised feedback. In addition to highlighting ethical and practical issues, this section examines the current and prospective uses of AI to help formative assessment, particularly in English language training in Kazakhstan.

Current Applications of AI

AI-powered solutions to enhance evaluation for learning are being tested by educators worldwide. The ability of AI to automate repetitive evaluation activities and provide rapid, comprehensive feedback is one of its most immediate contributions. AI-enabled platforms, for example, may rapidly assess vocabulary and grammatical exercises in language instruction and give students instant feedback. These quick feedback systems support formative assessment concepts by assisting students in modifying their understanding while learning is still ongoing.

AI applications such as automated writing evaluation tools (e.g., Grammarly or Turnitin's Revision Assistant) utilize natural language processing to identify issues in grammar, coherence, and lexical choice. Although they cannot fully replace teacher input on content and structure, these tools can offer initial feedback that allows students to revise their work before receiving more targeted feedback from instructors. In Kazakhstan, these tools could be integrated into writing instruction, giving students a clearer idea of their recurring mistakes and enabling teachers to focus on more substantive improvements.

This immediacy helps students correct mistakes while the lesson is still fresh, embodying the formative principle of quick feedback loops. A widely discussed instance is automated essay scoring and feedback systems. Tools such as *Grammarly, Turnitin's Revision Assistant, or ETS's Criterion* use natural language processing (NLP) to evaluate writing and provide feedback on grammar, cohesion, vocabulary usage, and even organization to some extent. When students write an English essay or a short answer, these systems can highlight errors or suggest improvements almost instantly. While not a replacement for teacher feedback on content and ideas, such tools offer a first round of formative feedback that students can use to revise their drafts. Teachers in Kazakhstan could leverage these for English writing assignments: a student submits a draft to an AI feedback tool, learns about common mistakes (for example, misuse of articles or verb tenses), corrects them, and then submits a cleaner version to the teacher for more focused feedback on argumentation or style.

Another application of AI is in *adaptive learning systems* that personalize practice tasks for students. These platforms (such as Khan Academy's mastery system, iTutorGroup, or language-specific apps like Duolingo) use algorithms to adjust the difficulty and focus of questions based on a learner's performance. In a classroom setting, adaptive software can serve as an ever-available teaching assistant: as students work through exercises, the AI identifies their strengths and weaknesses and provides additional questions or hints accordingly. For example, Tomasik et al. (2018) showed that computer-based curriculum systems could detect distinct learning pathways and adapt content to optimize individual progress. In an English class, an adaptive reading program might give more vocabulary support to a student who is struggling with comprehension, or an adaptive grammar tutor might spend more time on past tense for a student making repeated errors there. By differentiating practice in real-time, AI supports the formative goal of meeting each student at their level – something a single teacher might find challenging to do for every student simultaneously. Such tools also generate a wealth of data on student performance. Teachers can review dashboards that highlight which topics students have mastered or where they are making errors, enabling data-informed instructional adjustments. This aligns with formative assessment's emphasis on using evidence to guide teaching. Indeed, AI systems can aid teachers in collecting and analyzing longitudinal data and in generating learner profiles to trace progress over time. This means a teacher can quickly grasp how a student's English vocabulary has grown over months allowing more targeted interventions.

AI can also enhance feedback quality and personalization beyond what is feasible manually. Modern AI algorithms can detect patterns in student work that might not be obvious to teachers who are grading quickly. For instance, an AI might analyze a student's pronunciation practice recordings and identify specific phonetic sounds that consistently pose difficulty, then suggest exercises to practice those sounds. Or in writing, AI might notice that a student frequently makes errors with prepositions and then prompt the student with focused tips on that grammar point. An example is an AI-based tutoring system that provides next-step hints when a student is stuck on a problem or asks guiding questions that lead the student to figure out the answer (mimicking a Socratic approach). In an English learning context, imagine a chatbot that converses with students: if a student hesitates or makes an error, the bot might ask a question or give a clue to prompt self-correction, thereby acting as a formative assessor. Some experimental systems and language learning chatbots are already exploring this space.

Peer and Self-Assessment with AI

Interestingly, AI can also support peer and self-assessment processes. Large Language Models (LLMs) such as GPT-4 can be used to generate scaffolding for peer review. For example, students might be asked to review a peer's essay; an AI tool could provide a checklist or even suggest constructive feedback points based on the essay, which students can then discuss and refine before giving to their peer. Er et al. (2021) found that peer assessment can be supported with prompts from language models, helping students provide more substantive feedback and also reflect on their own work in the process. Essentially, the AI can guide students on how to assess, ensuring that even if students are novices at giving feedback, they have a framework to do so productively. For self-assessment, AI-driven reflective tools can ask students questions about their learning ("Which part of this assignment was most challenging for you and why?") and even analyze their responses for sentiment or understanding, giving the teacher insight into student self-perceptions. While these applications are still emerging, they show how AI might act as a catalyst, prompting deeper student engagement in formative assessment activities that traditionally rely purely on human initiative.

Use in Kazakhstan (Current Status)

The adoption of AI in everyday classrooms in Kazakhstan is still at an early stage. However, there are signs of interest and initial usage. The Ministry of Education has collaborated with various ed-tech providers to introduce digital platforms; for example, *BilimLand* is a digital educational resource platform used in many schools, and while not fully AI-driven, it contains interactive content and quizzes that give immediate feedback to learners. Some schools, particularly in urban areas or the NIS network, have piloted adaptive learning software or intelligent language labs. Moreover, Kazakhstani students and teachers increasingly have access to global tools like the ones mentioned (e.g., teachers might encourage students to use Grammarly for writing assignments or use Kahoot/Quizlet adaptive modes for vocabulary review). Thus, the groundwork for AI-assisted formative assessment is being laid through growing digital literacy and infrastructure.

Potential Future Uses of AI in Enhancing Formative Assessment

Looking ahead, the integration of AI into formative assessment in English language classrooms could become more seamless and powerful. A few potential developments and their implications include:

- *Intelligent Tutoring Systems for Language Learning:* future AI tutors could engage students in spoken or written dialogues, simulating a conversation partner or writing coach. For instance, an AI tutor might have a conversation with a student learning English, adapting its level of vocabulary and speed of speech to the student's ability, and gently correcting mistakes in real time. Such a system can continuously assess the student's language use (pronunciation, grammar, fluency) and feed that information to both the student and teacher. This would be a form of highly individualized formative assessment, available on-demand. If a student practicing speaking consistently drops articles ("I went to _ store"), the AI can notice and remind the student of the missing article in context, something a teacher might not catch until

later. By the time the student meets the human teacher, the basic errors might already be reduced, allowing the teacher to focus on more nuanced instruction.

- *AI-Generated Formative Assessment Content:* teachers often spend time creating quizzes, prompts, or rubrics for formative assessment. Advances in generative AI suggest that these tools could take on some of that workload. For example, a teacher could ask an AI system to generate five comprehension questions about a text the class is reading, targeting different levels of Bloom's taxonomy (some factual, some inferential, etc.). The AI could also generate a draft rubric for an oral presentation assignment, which the teacher can then refine. This accelerates the preparation of formative assessment activities and potentially introduces more variety. Teachers in Kazakhstan could leverage this to get ideas that are culturally relevant – for example, prompting the AI to use Kazakh names or local contexts in word problems or dialogues to increase student relatability.
- *Advanced Analytics and Early Warning Systems:* AI's ability to handle big data can be applied to longitudinal student data to identify trends or predict areas of need. Over a semester, an AI system might analyze all the formative assessments a student has completed – quizzes, assignments, participation – and identify that the student's progress in listening skills has plateaued in the last month. It could alert the teacher that this student might need extra auditory practice or identify which types of listening questions the student often misses. Similarly, AI could help ensure no student falls behind by flagging those who consistently struggle, enabling targeted formative interventions (like a remedial session or adjusted instruction) before high-stakes exams. In larger Kazakhstani schools, where teachers handle 5–6 classes, such an AI-driven analytic tool could be invaluable for keeping track of individual progress amidst heavy teaching loads.
- *Cultural and Language Adaptation:* For AI to be most effective in Kazakhstan, future tools should be adapted to the multilingual context. An AI writing assistant, for example, could be tuned to recognize and address common errors that native Kazakh or Russian speakers make when writing in English (influenced by their first language). It could provide explanations or feedback in the student's first language when appropriate, thereby making formative feedback more accessible. Additionally, AI could help develop formative assessments that integrate Kazakh cultural content, which increases student interest and preserves cultural relevance while learning English. Although these are not direct uses of AI, they are improvements in AI's ability to support learning in specific contexts, making the formative assessment more effective.

While the prospects are promising, it is crucial to address the *limitations and considerations* of using AI in formative assessment:

- *Reliability and Validity of AI Feedback:* AI systems are not infallible. They may sometimes misidentify an error or provide incorrect feedback, especially with open-ended language tasks. Teachers must therefore oversee AI feedback and train students to critically evaluate the feedback they receive. As a best practice, AI-generated feedback should be treated as suggestions rather than absolute judgments. For instance, an AI might flag a perfectly acceptable but less common turn of phrase as "awkward" simply because it deviates from its training data patterns. Teachers and students should verify and discuss such feedback, which can itself be a learning experience (why did the AI think this was a mistake? Is it actually a style choice?).
- *Teacher Role and Professional Development:* Introducing AI does not diminish the teacher's importance – in fact, it requires teachers to develop new skills. Teachers need to understand how to interpret AI-provided data, how to integrate AI activities into lesson plans, and how to guide students in using AI tools responsibly. Engeness (2021) argues that teachers must develop a digital identity and pedagogic design principles for digital environments to truly enhance student learning. In Kazakhstan, this means teacher training programs and in-service workshops should include components on educational technology and AI literacy. If teachers are not comfortable with the technology, they might underutilize it or use it superficially.

Additionally, teachers must maintain the human touch in assessment – AI might handle the grunt work of marking or analysis, but the encouragement, empathy, and expert judgment that teachers provide are irreplaceable. Ideally, AI frees up more time for those human aspects by taking on mechanical tasks.

- *Equity and Access:* Not all schools in Kazakhstan have the same level of access to advanced technology or high-speed internet, especially in rural regions. Over-reliance on AI tools in formative assessment could inadvertently widen gaps if some students benefit from AI-assisted learning and others do not. It's important for policymakers to ensure that technological enhancements are introduced in a way that's inclusive. Perhaps initial implementations will be in well-resourced schools, but plans should be made to expand access or provide alternatives (like offline AI tools or low-tech adaptive materials) to less advantaged contexts. Encouragingly, many AI tools can be accessed via smartphones, and Kazakhstan has a high rate of mobile phone usage, which might be leveraged.
- *Ethical Considerations:* With AI systems collecting detailed data on student performance, privacy and data security are paramount. Clear policies should govern what data is collected, who can access it, and how it's used. Additionally, transparency in AI decision-making (often termed algorithmic transparency) is important so that teachers and students trust the feedback. There is also the issue of ensuring that AI recommendations do not introduce biases. For example, if an AI system's training data is mostly from English learners in other countries, it might not perfectly fit Kazakhstani learners. Continuous monitoring and localization of AI tools can mitigate this.

In sum, AI offers a toolkit to potentially lighten teachers' loads and enrich the formative assessment process with rapid feedback, personalization, and data-driven insights. In the foreseeable future, Kazakhstan English language classrooms might have students interacting with AI-powered apps during independent work, receiving instant guidance, while the teacher roams and assists where needed, later reviewing AI-compiled reports to plan the next lesson's focus. Such a scenario embodies a blend of technology and human pedagogy. Yet, achieving it will require thoughtful implementation, training, and a clear vision of AI as a supplementing tool rather than a replacement for pedagogical practices. Adaptive learning technologies also show promise in this context. These systems serve as digital assistants that offer differentiated support by customising practice exercises according to each learner's performance. For instance, an adaptive platform could provide extra focused practice for a student who is having trouble with English past tense forms. Additionally, these technologies can produce extensive data on student achievement, allowing teachers to base their instructional decisions on the strengths and shortcomings of their students.

Conclusion

Particularly in the context of second language learning, formative assessment remains a very successful method to enhance student learning and engagement. Kazakhstan's strong commitment to learner-centred education is expected to be successful by adopting criteria-based formative assessment model. The current review emphasised the multidimensional benefits of FA and its significance in English language education.

However, complications have taken place when Kazakhstan transitioned to learner-centred education. For instance, teachers find implementing FA demanding in terms of time, class size, and systematic hurdles. It requires different forms of resources to consistently improve the assessment quality and monitor the quality of its application. Although AI tools can assist in overcoming certain difficulties, strategic planning and application of it requires attention from different stakeholders. If the assessment is implemented strategically, AI can systematise and improve assessment tasks, provide instant feedback, and support learner-centred education. All these are consistent with the aim of FA. Importantly, the review suggests that English language teachers should be skilled in digital technologies and be encouraged to integrate AI tools in their teaching practices.

Although using FA in English language teaching in Kazakhstan's secondary schools is in steady progress, further empirical research is necessary and should be conducted urgently to investigate and

assess the outcome quality of AI integration in FA in teaching and learning English so different stakeholders can establish guidelines to apply AI tools in or out of classrooms. Finally, the driving force behind this urgency and necessity lies a basic yet effective principle: assessment should eventually serve learning (William, 2011).

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Айдос Мырзабек[1], Гаухар Ерсұлтанова[2], Медет Жандилдинов[3]*
[1,2] SDU University, Қаскелең, Қазақстан
[3]Абай атындағы Қазақ ұлттық педагогикалық университеті, Алматы, Қазақстан
[*]e-mail: aidos.myrzabek@sdu.edu.kz

ЖАСАНДЫ ИНТЕЛЛЕКТ ҚҰРАЛДАРЫН ҚАЛЫПТАСТЫРУШЫ БАҒАЛАУҒА КІРІКТІРУ: ҚАЗАҚСТАН МЕКТЕПТЕРІНДЕГІ АҒЫЛШЫН ТІЛІ САБАҚТАРЫНА ӘСЕРІН ЗЕРДЕЛЕУ

Аңдатпа. Формативті бағалау – оқытудың тиімді құрамдас бөлігіне айналды, себебі ол мұғалімдер мен оқушыларға оқу нәтижелерін жақсартуға көмектесетін үздіксіз кері байланысты қамтамасыз етеді. Бұл шолулық әдебиеттер зерттеуінде Қазақстандағы ағылшын тілі сабақтарында формативті бағалауды енгізу мәселесі қарастырылады, сондай-ақ жасанды интеллект (ЖИ) құралдарының осы практикаларды қалай қолдап жатқандығы

және болашақта қалай күшейте алатындығы зерттеледі. Бұл шолу формативті бағалау бойынша халықаралық және жергілікті зерттеулерді біріктіреді – негізгі ұғымдарына, құрамдас бөліктеріне, артықшылықтары мен қиындықтарына анықтама беріледі – және бұл талдау Қазақстанда соңғы жылдары енгізілген критериалды бағалау жүйесі аясында жүргізіледі. Сонымен қатар, қазіргі білім беру саласындағы ЖИ-дің қолданылу мысалдары талқыланады (мысалы, бейімделетін білім беру платформалары, табиғи тілді өңдеу арқылы кері байланыс беру құралдары және ЖИ негізіндегі өзара/өзін-өзі бағалау жүйелері), әрі қарай ЖИ-ді формативті бағалауға қолдау ретінде пайдалану мүмкіндіктері қарастырылады. Нәтижелер көрсеткендей, формативті бағалаудың оқушылардың ынтасы мен үлгерімін арттырудағы маңыздылығы мойындалғанымен, оны жүзеге асыру барысында қазақстандық мұғалімдер бірқатар қиындықтарға тап болады, оның ішінде сыныптардың тым үлкен болуы және қалыптасқан бағалау тәжірибелерін өзгерту қажеттігі бар. ЖИ технологиялары кері байланысты жекелендіруге, күнделікті бағалау тапсырмаларын автоматтандыруға және оқытуды деректер негізінде басқаруға мүмкіндік беретін болашағы зор шешімдерді ұсынады, дегенмен олардың тиімді енгізілуі үшін педагогтарды даярлау және мұқият интеграциялау қажет. Қорытындыда Қазақстандағы педагогтер мен білім беру саясаты өкілдеріне арналған ұсыныстар келтіріледі. Онда формативті бағалаудың дәлелденген стратегияларын ЖИ қолдауымен ұштастыру ағылшын тілін анағұрлым икемді әрі тиімді оқытуға жол ашатыны атап көрсетіледі.

Түйін сөздер: формативті бағалау, ағылшын тілін оқыту, Қазақстан, жасанды интеллект, білім беру технологиялары, кері байланыс, оқытуға бағытталған бағалау, өзара бағалау; өзін-өзі бағалау.

Айдос Мырзабек[1], Гаухар Ерсултанова[2], Медет Жандилдинов[3]*
[1,2]SDU University, Каскелен, Казахстан
[3]Казахский национальный педагогический университет имени Абая, Алматы, Казахстан
[*]e-mail: aidos.myrzabek@sdu.edu.kz

ИНТЕГРАЦИЯ ИНСТРУМЕНТОВ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ФОРМАТИВНОЕ ОЦЕНИВАНИЕ: ИССЛЕДОВАНИЕ ИХ ВЛИЯНИЯ НА УРОКИ АНГЛИЙСКОГО ЯЗЫКА В ШКОЛАХ КАЗАХСТАНА

Аннотация. Формативное оценивание стало ключевым компонентом эффективного обучения, обеспечивая непрерывную обратную связь, которая помогает учителям и ученикам улучшать результаты обучения. В данном обзорном исследовании литературы рассматривается внедрение формативного оценивания в классах английского языка в Казахстане, а также исследуется, как инструменты искусственного интеллекта (ИИ) усиливают и могут в дальнейшем усилить эти практики. В обзоре обобщаются международные и местные исследования по формативному оцениванию – дается определение его основных концепций, компонентов, преимуществ и проблем – в контексте недавних реформ образования в Казахстане, которые ввели критериально-ориентированную систему оценивания (формативное оценивание). Также обсуждаются современные примеры применения ИИ (такие как адаптивные образовательные платформы, инструменты обработки естественного языка для предоставления обратной связи, и системы взаимо- и самооценивания на основе ИИ) в образовании и рассматриваются потенциальные способы использования ИИ в поддержку формативного оценивания в будущем. Результаты показывают, что несмотря на признание ценности формативного оценивания для повышения вовлеченности учащихся и их успеваемости , казахстанские учителя сталкиваются с трудностями при его реализации, включая большие классы и изменение устоявшихся практик выставления оценок. Технологии ИИ предлагают многообещающие решения для персонализации обратной связи, автоматизации рутинных оценочных задач и информирования преподавания на основе данных, хотя для их

эффективного внедрения необходимы подготовка педагогических кадров и тщательная интеграция. В заключение приводятся выводы для педагогов и представителей образовательной политики в Казахстане, подчеркивающие, что сочетание проверенных стратегий формативного оценивания с поддержкой ИИ может способствовать более гибкому и эффективному обучению английскому языку.

Ключевые слова: формативное оценивание, преподавание английского языка, Казахстан, искусственный интеллект, образовательные технологии, обратная связь, оценивание для обучения, взаимооценивание, самооценивание.

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