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Editorial

La communication dans un monde en changement

May Abdallah

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La pandémie de coronavirus a profondément ébranlé les deux principaux piliers du développement : l'économie mondiale et la sécurité internationale. Elle a constitué une crise sanitaire sans précédent dans l'histoire politique moderne et a mis les pays du monde devant une grande épreuve : être confrontés à des défis qui ont des répercussions sur les relations internationales dans la majeure partie du monde. Alors que les États-Unis établissent leur isolement et leur retraite, la Chine s'impose comme une puissance mondiale alternative à cette incompétence et à cet échec américain, et le centre de la mondialisation et du leadership mondial pourrait passer des États-Unis à la Chine. La guerre cette fois est d'un autre genre, à laquelle le monde entier participe, Ses effets sont subis par le monde entier, en particulier sur le plan économique.

Mais cela peut avoir des répercussions sociales utiles si les gens bénéficient des nouvelles habitudes qui leur sont imposées par le « Corona ». Le penseur Thomas Hobbes a parlé de l'homme loup, et de son arrivée à d'étranges stades de sauvagerie, et voici la « sauvagerie » de l'homme reflétée dans le comportement et les actions des États et de leurs dirigeants, (Thomas Hobbes, 1651). Mais aujourd'hui, les pays de la région doivent chercher une autre option qui atteigne leurs objectifs autres que la puissance dure, et qui peut-être apporte la paix perdue entre eux, et c'est là que l'importance d'un emploi efficace de la culture émerge. Les politiques éducatives sont censées progresser aux niveaux quantitatif et qualitatif, mais toute politique

éducative efficace ne réussira que si elle répond aux besoins politiques, culturels, sociaux, psychologiques, intellectuels et éducatifs de la société.

En ce qui concerne la politique étrangère, il est préférable de rappeler que le soft power dépend du processus de gravité plutôt que de la puissance militaire ou des pots-de-vin, et dépend en partie de la façon dont nous définissons nos propres objectifs. Les politiques fondées sur des déterminants globaux et clairvoyants des intérêts nationaux sont plus faciles à rendre attrayantes pour les autres que la politique à perspective étroite. De même, les politiques qui expriment des valeurs importantes sont plus susceptibles d'être attrayantes lorsque les valeurs sont partagées. Toute politique étrangère réussie est basée sur la conquête d'amis et d'alliés sur la scène internationale. Un fait important doit être souligné : l'utilisation stratégique du soft power par les pays du Moyen-Orient ne réussira pas sans le renforcement du pouvoir des valeurs, des idéaux, des politiques et des systèmes de gouvernance locale en leur sein. L'avantage de ce pouvoir est qu'il vient de la puissance de l'intérieur.

L'efficacité des médias et de la communication et de la plupart de leurs ressources dépend de la façon dont le public les traite et y répond, car l'être humain est la valeur nette réelle sur laquelle toutes les stratégies sont formulées. D'autre part, le soft power culturel peut jouer un rôle majeur dans la maîtrise des manifestations d'extrémisme et de terrorisme, intellectuelles et comportementale, et assiéger les mouvements et organisations extrémistes, lorsque leur discours culturel est plus modéré et convaincant, et plus proche de la compréhension des gens et de leur niveau intellectuel. Aujourd'hui, il est impératif que les gens participent à transmettre une image différente au monde, et cela peut se faire grâce à une large influence culturelle, ce qui nécessite une nouvelle étude de la nature du produit culturel actuel, et savoir comment il est changé pour donner une impression influente à l'étranger.

Le développement et l'indépendance des médias est un mécanisme important de soft power culturel pour diffuser les valeurs de la société et Influencer l'opinion publique mondiale afin d'atteindre les objectifs de l'État. Tous les pays qui veulent jouer un rôle actif dans les relations internationales l'ont compris. Les pays du Moyen-Orient doivent également en être conscients, en s'efforçant de fournir l'infrastructure appropriée pour des médias prospères, professionnels et influents, non contrôlés par les gouvernements et non impliqués dans la fomentation de l'extrémisme et de la haine.

L'université doit répondre aux besoins de la société plus qu'elle ne réponde aux besoins officiels de l'État, et il est également nécessaire de prêter attention à la qualité et à l'efficacité du processus de recherche scientifique lors de l'élaboration de toute politique éducative efficace, en prêtant attention aux départements de recherche scientifique en général, et à la recherche et aux groupes de réflexion en particulier. Ces institutions sont l'un des outils les plus importants du soft power, et un tributaire important du décideur, et la force et la solidité des think tanks viennent de leurs caractéristiques distinctives.

L'énorme circulation de l'information en provenance des chaînes satellitaires, de l'Internet, des journaux et des outils de communication exige de nouvelles qualifications et de nouveaux outils méthodologiques qui doivent être possédés pour sortir du blocus qu'il impose aux individus et aux sociétés, ainsi qu'aux États et aux institutions, à un degré qui n'est guère différent du blocus par le secret et l'interdiction. Notre réflexion sur l'avenir nous oblige à réfléchir à la base du panthéisme qui est aujourd'hui la communication sociale dans la sphère publique à travers les technologies modernes, et à penser aux illusions créées par la diffusion des technologies modernes, et donc à penser à la possibilité de l'émergence de

l'avenir comme une séparation de la connexion labyrinthique.

«Être dans le labyrinthe » est-il la fin de l'homme, de la connexion et de l'histoire ? En d'autres termes, est-il possible d'échapper à l'existence dans le labyrinthe, et la technologie elle-même peut-elle y contribuer et restaurer l'existence humaine en dehors du labyrinthe, ou succombera-t-il à la ruse du pouvoir post-technique?

Dans le labyrinthe de la technologie, l'homme entre dans un état de tranquillité, ou c'est l'illusion de la tranquillité, qui rassure la psyché humaine de sa conditionnalité conditionnée par la technologie, c'est-à-dire l'acceptation volontaire du statut d'otage et la soumission à cette force sur laquelle la destinée humaine est déterminée aujourd'hui. Par conséquent, le relâchement signifie le désengagement de l'unité technologique, c'est-à-dire se débarrasser de la situation de dépendance et des stéréotypes qui a conduit à être dans le labyrinthe de la technologie, et du labyrinthe inconditionnel, dans l'aventure qui mène à l'inconnu, et signifie la nécessité d'essayer de retrouver l'existence, et d'atteindre la présence pour compenser les besoins et un sentiment d'impuissance.

L'effet des réseaux sociaux sur la confiance et la transparence du citoyen envers le gouvernement (la police).

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Abstract

The purpose of this study is to discuss the relation between the use of social networks by governmental organizations (such as the police) and the trust of the citizens. The objective is to shed light on the principal authors who have carried out research on the key concepts relating to our study, in particular, the concept of "electronic government (E-government)", the definitions adopted by scholars, and the studies accomplished by researchers on the E-participation and the effect of social networks on transparency and citizens' trust. This paper raises the impact of government use of social media and their influence on citizens' trust.

Résumé

L'objectif de cette étude se concentre sur la relation entre l'utilisation des réseaux sociaux par les organisations gouvernementales (telles que la police) et la confiance des citoyens. L'objectif est de mettre en évidence les principaux auteurs qui ont mené des recherches sur les concepts clés relatifs à notre étude, notamment le concept du gouvernement électronique (E-gouvernement), les définitions adoptées par les chercheurs de ce domaine, et les études menées sur la participation numérique et l'effet des réseaux sociaux sur la transparence et la confiance des citoyens. Cet article soulève l'impact de l'utilisation des médias sociaux par le gouvernement et leur influence sur la confiance des citoyens.

Problématique

Un problème apparait rigoureusement en ce qui concerne la confiance du citoyen envers le gouvernement (la police), cette relation est mise en question. Ces forces de sécurité font recours aux plateformes sociales pour faire face à cette perturbation.

La question théorique à laquelle notre étude va répondre est la suivante :

- Les réseaux sociaux contribuent-ils à améliorer la confiance et la transparence de la police chez les citoyens ?

La problématique de notre étude est l'effet des réseaux sociaux sur la confiance et la transparence du citoyen envers le gouvernement.

Méthodologie

Notre méthodologie se base sur une revue de la littérature qui permet de synthétiser, d'analyser et d'organiser plusieurs articles pour fournir un aperçu des recherches scientifiques déjà menées dans ce domaine, tout en se basant sur plusieurs définitions et recherches adoptées par nombreux chercheurs sur le gouvernement électronique, en abordant le thème de la participation digitale, ainsi que l'effet du numérique sur la transparence et la confiance.

Introduction

Depuis l'introduction du Web 2.0 et ses fonctions dynamiques et interactives en 2004 (Chaimbault, 2007) et jusqu'à nos jours, les plateformes de médias sociaux comme, Facebook, Twitter, Snapchat, Instagram, LinkedIn, et autres, se multiplient et se trouvent intégrés dans tous les domaines de la vie : social, économique, artistique, culturel, professionnel et autres. Les technologies offertes par le Web 2.0 permettent d'entrer en interaction avec d'autres individus par des procédés inédits, entrainant l'émergence de nouveaux modes de socialisation. Désormais, leur utilisation dépasse

l'usage privé et professionnel pour s'étendre au secteur des administrations publiques aussi bien pour ce qui a rapport avec la vie sociale, économique, environnementale, politique, légal, que dans le domaine policier qui concerne la sécurité des citoyens et surtout la relation entre le citoyen et les organismes chargés de veiller à sa sécurité, et avec lesquels il peut aujourd'hui interagir comme partenaire (Crump, 2011).

Ainsi, Les médias sociaux se présentent comme une forme de communication et de dialogue à double sens qui a permis d'instaurer à distance des relations avec les citoyens. Ces plateformes de réseautages s'avèrent un atout incontournable pour les forces de sécurité (la police) pour but d'informer, d'engager, de bâtir des liens de confiance avec le citoyen et autres objectifs exploités à l'aide du numérique.

1- Le gouvernement électronique

2- Définitions et aspects de l'E-gouvernement

3- Deux définitions du gouvernement électronique sont présentées ci-dessous, l'une provenant de chercheurs travaillant sur le thème des services d'e-gouvernement et l'autre de l'État du Texas. Khan et al. (2023), dans leur étude sur les facteurs influençant la confiance des individus dans l'utilisation des médias sociaux pour les services d'administration en ligne, définissent le e-gouvernement comme «un ensemble de technologies basées sur les TIC (technologies de l'information et de la communication) qui ont modifié les opérations commerciales traditionnelles et influencé les services gouvernementaux ». L'État du Texas, quant à lui, souligne l'importance des TIC dans les activités des services gouvernementaux (cité par Brown, 2005) : «des activités gouvernementales s'opérant par des processus numériques dans un réseau informatique, généralement l'Internet, entre l'administration et les membres du public ainsi que les entités du secteur privé, en particulier les entités réglementées. Ces activités concernent généralement

l'échange électronique d'informations dans le but d'acquérir ou de fournir des produits ou des services, de passer ou de recevoir des commandes, de fournir ou d'obtenir des informations, ou de réaliser des transactions financières. »

Par ailleurs, Brown (2005) constate que l'e-gouvernement englobe tous les rôles et activités administratives et repose sur les technologies de l'information et de la communication (TIC). Brown souligne également que l'e-gouvernement réunit deux éléments auparavant sans lien naturel : d'une part, l'environnement de l'administration et de la société créé par l'utilisation de technologies électroniques (ordinateurs, courrier électronique, Web, technologie sans fil, etc.) et d'autres TIC et modèles tels que le client/citoyen ; d'autre part, le modèle de base de l'État et de l'administration publique qui relie les dynamiques de la démocratie, de la gouvernance et de l'administration publique. Cependant, Meijer, Curtin et Hillebrandt (2012) mettent en avant le degré de contrôle des citoyens et leur influence sur les processus gouvernementaux, notamment grâce à la prise de décisions et l'accès aux informations gouvernementales.

En conséquence, de nombreux services de police adoptent les réseaux sociaux pour renforcer leurs liens avec la communauté. Carpentier-Laberge (2005) qualifie dans Maîtrise en criminologie intitulée : « La police et Twitter : l'utilisation des médias sociaux par les services policiers canadiens », la police utilisant les nouvelles technologies de communication de «Police communautaire ». Ces forces de l'ordre sont proactives, décentralisées et cherchent à établir des relations avec les citoyens et les partenaires locaux. Leur efficacité est évaluée en fonction du nombre d'appels reçus, de la réduction de la criminalité et de la peur, de l'occupation des espaces publics, des liens tissés avec la communauté et de la sécurité des quartiers. La police, comme toute autre institution, tire parti de ces nouvelles plateformes en tant

qu'outils technologiques innovants depuis leur émergence.

Une équipe de chercheurs du Département des affaires économiques et sociales des Nations Unies (UNDESA, 2003) distingue trois catégories du concept d'E-gouvernement :

1. Le gouvernement à gouvernement (G2G) facilite le partage et l'échange électronique de données entre les entités gouvernementales. Cela implique une communication intra-agence et inter-agence au niveau national, ainsi qu'une communication entre les autorités nationales, provinciales et locales.

2. Le gouvernement aux entreprises (G2B) permet des transactions spécifiques entre les entreprises (par exemple, le paiement pour l'achat et la vente de biens et de services) et la prestation en ligne de services orientés vers les entreprises.

3. L'interaction gouvernement-consommateur/citoyen (G2C) vise à encourager l'interaction entre les citoyens et le gouvernement en tant que consommateurs de services publics et citoyens. Cela inclut les échanges liés à la fourniture de services publics et la participation aux processus de consultation et de prise de décision.

Les recherches de Mergel (2013), cependant, se concentrent sur les stratégies d'adoption des nouvelles technologies dans le secteur public et distinguent trois types d'utilisation des réseaux sociaux par les organisations :

1. Représentation : utilisation de la stratégie Push sur les réseaux sociaux pour informer le public, par exemple, des procédures et des politiques de l'organisation. Cette méthode se caractérise par la diffusion de messages, sans que le gouvernement ne réponde souvent aux questions soulevées concernant ces informations. Un objectif secondaire est d'améliorer l'image de l'organisation.

2. Engagement : utilisation de la stratégie Pull pour établir une interaction bilatérale entre les citoyens et le gouvernement. Les gouvernements communiquent des informations aux citoyens, tout en leur donnant la possibilité de réagir. Contrairement à la méthode Push, l'organisation, en plus de transmettre des informations, utilise également les médias comme source pour recueillir des informations auprès du public.

3. Réseautage : le gouvernement s'appuie sur l'écoute du public pour collecter des informations. Cette méthode est parfois utilisée pour accéder à des données sur des populations que les organisations gouvernementales ont du mal à atteindre par d'autres moyens.

a- Les réseaux sociaux : de la transition du web 1.0 au web 2.0

Dans le contexte de l'émergence du gouvernement ouvert, Brown (2005) soutient que le terme «e-gouvernement » n'est couramment utilisé que depuis cinq ans, bien que le phénomène se développe depuis le milieu des années 1980.

En 1994, le World Wide Web a été créé, utilisant des technologies basées principalement sur du contenu graphique et textuel, facilitant ainsi l'accès à Internet. Le développement des sites Web gouvernementaux et la fourniture d'informations et de services via Internet ont rapidement suivi, permettant des transactions en ligne bidirectionnelles entre le gouvernement et les citoyens et un accès externe aux bases de données gouvernementales. Selon Khan (2015), le Web 1.0 joue un rôle important dans la connexion entre le gouvernement et les citoyens, mais offre des possibilités d'interaction et de participation très limitées. De même, Karakiza (2015) étudie la nature statique du Web 1.0 (qu'il considère comme la première génération du Web) basée sur des documents hypertextes liés accessibles sur Internet, aboutissant à une communication unidirectionnelle pour fournir des informations ou des services

aux citoyens sans mécanismes de rétroaction.

Le Web 2.0 fait référence à l'ensemble des techniques et fonctionnalités qui ont rendu les contributions sur Internet plus simples et plus interactives. Il a été accompagné de l'émergence des réseaux sociaux, des blogs et des wikis. Khan et al. (2023) expliquent que les services de réseaux sociaux facilitent le partage interactif d'informations et la collaboration entre les gouvernements et les citoyens sur Internet. Ils soutiennent que le réseautage social est un moyen de communication en ligne qui aide les institutions et les responsables gouvernementaux à accroître l'engagement et la participation en ligne entre les organisations gouvernementales et les citoyens, principal objectif de développement pour la plupart des projets d'administration en ligne.

Avec l'avènement des outils numériques et l'intensification de l'utilisation des médias ces dernières années, d'importants changements ont été observés dans la communication des entreprises privées avec leur public. Dans sa recherche intitulée «Qu'est-ce que le Web 2.0 », O'Reilly (2007) affirme que la plateforme Web 2.0 repose sur la participation ouverte et la mise en réseau. Contrairement au Web 1.0, où le contenu des pages Web était généré par les administrateurs, les utilisateurs des applications Web 2.0 peuvent créer leur propre contenu. Les fonctionnalités Web 2.0 facilitent le partage interactif d'informations et la collaboration entre gouvernement et citoyens sur Internet. De la même manière, le Web 2.0 offre aux organisations gouvernementales des avantages significatifs tels qu'une transparence gouvernementale accrue et une participation renforcée des citoyens à leurs services. Par ailleurs, Criado et al (2013), dans leur étude, ajoutent que l'utilisation des réseaux sociaux dans l'administration est devenue une tendance majeure de l'administration en ligne.

Ainsi, les médias sociaux peuvent être considérés comme un ensemble de technologies Web 2.0 facilitant les interactions entre les utilisateurs. De ce fait, ils sont perçus comme une plateforme permettant aux administrations d'échanger avec les citoyens. Selon Lebaron (2011), «l'apparition des téléphones mobiles connectés à Internet a rendu ce dernier mobile et omniprésent, permettant son accès à tout moment et en tout lieu, instantanément ! » Cette mobilité offre donc une présence numérique constante et en temps réel entre les utilisateurs de ces plateformes.

En résumé, cette revue de littérature démontre que les réseaux sociaux constituent un outil essentiel pour la communication entre les organisations gouvernementales et les citoyens, reposant sur un processus bidirectionnel (interactif et à double sens) qui élargit la portée de la communication publique. En créant des liens entre les individus, les réseaux sociaux permettent de partager et publier du contenu (articles, photos, vidéos, etc.) et de valoriser la communication entre gouvernants et gouvernés. Avec l'émergence des Nouvelles Technologies de l'Information et de la Communication (NTIC) et du Web 2.0, un nouveau public s'engage dans la communication gouvernementale.

4- L'E-Participation

«Les plateformes de réseaux sociaux offrent des ressources infinies pour l›interaction active des utilisateurs, l›expression personnelle et le partage. » (Muntinga, Moorman et Smit, 2011). Cette définition met en évidence l'aspect interactif des réseaux sociaux et l'activité dynamique des utilisateurs pour s'informer, s'exprimer et interagir avec d'autres individus ou institutions, qu'ils soient publics ou privés.

Une étude sur l'e-participation intitulée «E-participation, Transparence et confiance envers les gouvernements locaux », menée par l'Organisation de coopération et de développement économiques (OCDE) en 2003 et citée par Kim et Lee (2012),

décrit l'e-participation comme une forme d'engagement électronique incluant des forums en ligne, des salles de discussion virtuelles, des jurys électroniques et des sondages en ligne. «Les applications d'e-participation dotées de fonctionnalités conviviales et efficaces (par exemple, un service d'assistance en ligne, des services de recherche ou une structure de contenu bien conçue) sont plus susceptibles d'aider les e-participants à accéder et à obtenir des informations sur les actions des agences gouvernementales pour leurs communautés et à soumettre des commentaires et des idées sur les politiques à adopter » (Kim et Lee, 2012).

Akram et Malik (2012) soulignent que les gouvernements du monde entier ont exploité les technologies de l'information et de la communication, appelées e-gouvernement, pour améliorer l'efficacité des services publics et les rendre accessibles aux individus, aux entreprises et aux autres institutions gouvernementales. De même, Rosenbaum et al. (2011) montrent que les plateformes de réseautage peuvent être utilisées non seulement pour sensibiliser la communauté, mais aussi pour augmenter la participation du public aux discussions entre la police et la communauté. Internet s'est révélé être un outil efficace de communication et d'éducation du public, permettant une discussion bidirectionnelle et une meilleure sensibilisation. Également, les preuves présentées par Ivkovic (2008) ont démontré qu'une interaction significative est essentielle pour renforcer la confiance. En outre, il a été conclu que les organisations policières peuvent utiliser les réseaux sociaux comme un outil efficace pour créer une expérience positive entre le public et la police.

Hao D. Zheng et Q. Zeng (2016) ont également constaté que les médias sociaux, fondés sur le phénomène Web 2.0, sont devenus un canal de dialogue interactif entre les gouvernements et les citoyens. L'essor du Web 2.0 et des applications

de réseaux sociaux permet aux citoyens et aux gouvernements de partager et d'apprendre des expériences des uns et des autres. Les médias sociaux facilitent l'échange interactif d'informations et la collaboration entre les gouvernements et les citoyens en ligne. Ils constituent une plateforme de communication en ligne qui aide les agences gouvernementales et les responsables à accroître l'engagement en ligne entre le gouvernement et les citoyens, objectif principal de développement de la plupart des projets d'e-gouvernement. Dans ce contexte, l'interactivité est devenue un outil efficace pour les organisations gouvernementales. Ainsi, de nombreuses organisations ont renforcé leur service citoyen grâce aux réseaux sociaux, qui sont d'excellents moyens d'information et d'interaction par leur fonctionnement.

Tolbert et Mossberger (2006) ont mené une étude intitulée «Les effets de l'e-gouvernement sur la confiance envers le gouvernement », basée sur une enquête téléphonique nationale à composition aléatoire menée par le Pew Internet and American Life Project auprès de 815 personnes qui avaient précédemment déclaré utiliser les sites Web du gouvernement. Cette étude illustre deux approches. La première approche est participative : la participation des citoyens et le dialogue public sont considérés comme essentiels pour promouvoir une plus grande responsabilité, transparence et réactivité du gouvernement. Cette confiance se développe grâce à des échanges répétés avec le gouvernement. Ces interactions permettent aux citoyens d'obtenir ce dont ils ont besoin tout en établissant une communication symbolique. Cela véhicule l'idée que le gouvernement se soucie de ses citoyens, de leurs besoins et de leurs attentes, se montrant ainsi réceptif. La seconde approche est entrepreneuriale, liée à l'idée de réinventer le gouvernement aux États-Unis et aux nouvelles réformes de la gestion publique à l'étranger. La réactivité du modèle commercial se caractérise par un excellent service client.

En conclusion, la littérature suggère que l'e-gouvernement est un phénomène évolutif par nature, et les plateformes de réseautage constituent une méthode importante d'interaction entre le gouvernement et les citoyens grâce aux nouvelles technologies de l'information et de la communication. C'est un moyen de rapprochement et de collaboration. Les plateformes de réseautage peuvent être exploitées pour sensibiliser et accroître la participation des citoyens et du gouvernement, parfois représenté par la police.

5- La Transparence

Prenons comme point de départ la définition de la transparence des organisations établie par trois études sur la transparence des organisations gouvernementales. Tout d'abord, Grimmelikhuijsen et Welch (2012) présentent un article intitulé «Lier transparence, connaissance et confiance des citoyens dans le gouvernement » et définissent la transparence comme suit : «La transparence est la disponibilité des informations sur une organisation ou un acteur, qui permettent aux acteurs extérieurs de surveiller les travaux internes ou les résultats de cette organisation ou de cet acteur. » Nye et al. (1997), cités par Grimmelikhuijsen (2012), définissent ensuite la transparence des organisations de la manière suivante : «En général, le niveau de transparence d'une organisation se réfère à la mesure dans laquelle elle est disposée à permettre aux citoyens de surveiller ses activités et de participer à son processus politique. Par ailleurs, la transparence permet aux gens de mieux connaître l'État, les rapproche et crée une entente. » Enfin, Song et Jooho Lee (2016) définissent la transparence du gouvernement du point de vue du citoyen comme suit : «La transparence est perçue lorsque l'information gouvernementale est accessible au public. Cependant, même si l'information est disponible, les citoyens ne percevront pas la transparence du gouvernement tant qu'ils ne seront

pas effectivement informés des activités et des décisions du gouvernement. »

Certains auteurs avancent que l'une des causes principales du manque de confiance en l'État réside dans le fait que les citoyens ne disposent souvent pas d'informations factuelles suffisantes sur ses processus et activités. De même, Blendon et al. (1997) affirment que lorsque les citoyens ne savent pas ce que l'État est ou fait, ils ne lui font pas confiance. Par ailleurs, Drew et Nyerges (2004) considèrent que la clarté de l'information est une dimension importante de la transparence.

Cependant, plusieurs études mettent en évidence l'efficacité des plateformes de réseautage sur la transparence du gouvernement, et nous présentons ici les similitudes les plus importantes :

Hao, D. Zheng et Q. Zeng (2016), dans leur étude intitulée «Comment renforcer l'interactivité des médias sociaux de l'e-gouvernement », soutiennent que le gouvernement ouvert exploitant les réseaux sociaux offre aux organisations gouvernementales la possibilité d'optimiser leur efficacité en fournissant des services publics et en gérant la demande en temps réel. L'utilisation des réseaux sociaux peut accroître la responsabilité et la transparence des gouvernements envers leurs citoyens et les personnalités publiques en renforçant leur participation et leur collaboration avec les gouvernements pour résoudre des problèmes. De plus, Khan (2015) a découvert que la mise en œuvre d'initiatives d'administration en ligne dans le secteur public peut augmenter la transparence et la responsabilité du gouvernement, et accroître l'engagement et la collaboration entre les ministères, les partenaires commerciaux et les citoyens ordinaires.

De même, Karakiza (2015) affirme que l'investissement du gouvernement dans la mise en œuvre de l'e-gouvernement (également connu sous le nom de gouvernement 1.0) améliore l'efficacité et la transparence des organisations gouvernementales par

rapport aux services gouvernementaux traditionnels. Dans une étude considérée comme une première tentative de définir le Web 2.0 et de comprendre son impact sur la prochaine génération de logiciels, O'Reilly (2007) a constaté que les caractéristiques du Web 2.0 facilitent le partage interactif d'informations et la collaboration sur Internet. Le principal avantage associé au Web 2.0 pour les organisations gouvernementales est de renforcer la transparence du gouvernement et d'accroître la participation des citoyens à leurs services.

Khan (2023) a également souligné que les fonctionnalités du Web 2.0 facilitent le partage interactif d'informations et la collaboration sur Internet. Pour les organisations gouvernementales, les principaux avantages liés au Web 2.0 sont l'accroissement de la transparence gouvernementale et une participation renforcée des citoyens à leurs services.

La littérature étudiée met en lumière l'importance d'un gouvernement ouvert pour établir une transparence vis-à-vis des citoyens au sein des organisations gouvernementales. Nous concluons avec cette citation d'Albert Meijer : «La transparence gouvernementale est devenue un sujet «brûlant» depuis que le président Barack Obama en a fait une priorité dans le programme de changement de son gouvernement. Il a souligné la nécessité de la publicité pour restaurer la confiance des citoyens dans le gouvernement. Le président Obama n'est certainement pas le seul ni le premier politicien à insister sur l'importance de la transparence et de la gouvernance ouverte. Les politiciens du monde entier ont adopté l'idée d'une gouvernance ouverte et ont pris des mesures pour rendre le gouvernement plus ouvert et transparent » (Meijer, 2012).

6- La confiance

De nombreux chercheurs se sont penchés sur la relation entre le gouvernement ouvert (e-gouvernement) exploité par la police et la confiance des citoyens envers celui-ci face à cette utilisation. Ces études visent à identifier les facteurs qui influencent la confiance des individus dans l'utilisation des réseaux sociaux par les services d'e-gouvernement.

Pour définir et mesurer la confiance du public envers le gouvernement, Rousseau et al. (1998) ont développé une définition transversale de la confiance, souvent citée dans les sciences sociales : La confiance est «un état psychologique comprenant l'intention d'accepter la vulnérabilité basée sur des attentes positives des intentions ou du comportement d'autrui ».

De plus, Khan et al. (2023) décrivent la confiance comme «un trait de personnalité ou une croyance, à la fois comme une structure sociale et une intention comportementale. Il n'existe pas de définition unique. C'est un concept multidimensionnel qui englobe les attentes, la vulnérabilité, la perception de la personne faisant confiance à celle qui est digne de confiance, la volonté de prendre des risques dans des situations incertaines et la fiabilité ».

Par ailleurs, la confiance du public en son gouvernement peut être évaluée en fonction de la mesure dans laquelle les citoyens font confiance aux institutions publiques pour agir dans l'intérêt de la société et de ses électeurs.

Une étude fondamentale menée en Chine en 2022 sur «L'impact de l'utilisation d'Internet sur la confiance des citoyens dans le gouvernement : le rôle médiateur du sentiment de sécurité » souligne que la confiance envers le gouvernement fait référence aux attentes, aux évaluations, à la confiance et à la satisfaction des citoyens à l'égard du processus politique, du comportement administratif et du niveau des

services publics de leur gouvernement (Wang et al., 2023).

7- L'e-gouvernement comme outil de confiance

En 2006, Tolbert et Mossberger ont démontré qu'au cours des trente dernières années, la relation entre le gouvernement et la confiance des citoyens s'est rapidement détériorée. Le public a perdu confiance en la gouvernance et en ceux qui l'incarnent. Dans le même esprit, Denhardt (2009) affirme qu'un problème central se pose à l'administration publique et que les dirigeants du secteur public se sont préoccupés de son déclin au cours des dernières décennies.

Cependant, il existe des divergences entre les conclusions de Franks et Driskill (2014) et Wang (2014) d'une part, et celles de Khan et al. (2023) et Wang et al. (2023) d'autre part. Pour Franks et Driskill (2014), selon une étude intitulée «Renforcer la confiance dans le gouvernement par le biais des médias sociaux » (un projet faisant partie d'une initiative mondiale de recherche multidimensionnelle, internationale et collaborative lancée en avril 2013), la confiance est considérée comme l'un des aspects les plus importants pour la mise en œuvre réussie des services de médias sociaux de l'e-gouvernement. La confiance génère la volonté d'un individu de participer avec des organisations gouvernementales et d'utiliser leurs services. La foi des citoyens en leur gouvernement est faible à l'échelle mondiale et a diminué aux États-Unis et au Canada. Parallèlement, la confiance dans les médias sociaux en tant que source fiable d'informations est en hausse, ils peuvent donc être un outil efficace pour renforcer la confiance des citoyens en leur gouvernement et accroître le capital social.

Wang (2014), dans une étude intitulée «Utilisation du gouvernement électronique et transparence perçue du gouvernement et capacité de service », Feng Wang affirme que de nombreuses juridictions chinoises mettent en place des gouvernements

locaux «axés sur les services » pour améliorer l'efficacité de la prestation des services publics et renforcer ainsi la capacité des gouvernements locaux. Cet article étudie si l'utilisation de l'administration électronique améliore la perception que les citoyens ont de l'administration locale. Les résultats montrent que l'accès à l'information via les sites Web du gouvernement augmente la satisfaction des citoyens à l'égard de la transparence du gouvernement et augmente leur perception de la capacité du gouvernement local à fournir des services. Fournir des informations de service public sur les sites Web du gouvernement améliore indirectement les capacités de service perçues grâce à la transparence perçue. Cette étude propose et met l'accent sur le fait que la poursuite du développement de la communication bidirectionnelle de l'administration électronique permettra de récolter pleinement les avantages de l'administration électronique en tant que stratégie de réforme conduisant à une administration axée sur les services.

En conclusion, il est évident que les médias sociaux et l'e-gouvernement peuvent jouer un rôle important dans l'amélioration de la transparence et la confiance des citoyens envers leur gouvernement. Cependant, les résultats des études varient et soulignent l'importance d'examiner ces questions dans différents contextes et pays. La mise en œuvre réussie de l'e-gouvernement et l'utilisation des médias sociaux dépendent de plusieurs facteurs, tels que la qualité et la pertinence des informations fournies, l'interaction bidirectionnelle entre le gouvernement et les citoyens, et la prise en compte des besoins et attentes des citoyens.

D'un autre côté, Khan et al. (2023) adoptent un autre avis. Ils mènent une étude qui propose une analyse documentaire des aspects de la confiance des citoyens dans l'e-gouvernement et les services d'e-gouvernement basés sur les réseaux sociaux, en s'attardant particulièrement sur l'identification des facteurs influençant la confiance

des citoyens dans l'utilisation des services de médias sociaux gouvernementaux. C'est alors qu'ils affirment que la confiance a été considérée comme un facteur primordial pour établir des relations solides entre le gouvernement et le public par le biais des sites web du gouvernement en ligne et des services basés sur les réseaux sociaux. Le succès des initiatives d'administration en ligne dépend principalement de l'adhésion des citoyens aux services d'administration en ligne. Malgré les efforts des gouvernements pour développer différentes plateformes d'e-gouvernement afin d'améliorer leur interaction avec les habitants, ces plateformes ne peuvent être efficaces sans leur adoption par les citoyens.

L'étude a conclu que les réseaux sociaux sont des agents de changement indéniables qui permettent la collaboration entre les gouvernements et les citoyens, mais la confiance entre gouvernement et peuple est particulièrement fragile. Les réseaux sociaux permettent de maintenir un dialogue permanent, mais la collaboration ne s'arrête pas là : il faut qu'elle soit positive pour que la confiance des citoyens ne disparaisse pas. Cette étude propose une nouvelle approche afin d'identifier les facteurs affectant la confiance des citoyens (caractéristiques individuelles, facteurs de risque, facteurs gouvernementaux et caractéristiques des médias sociaux).

En somme, il existe des divergences entre les différentes études concernant l'impact des médias sociaux et de l'e-gouvernement sur la confiance des citoyens envers leur gouvernement. Certaines études mettent en évidence les avantages potentiels des médias sociaux et de l'e-gouvernement pour renforcer la confiance des citoyens, tandis que d'autres soulignent la fragilité de cette confiance et l'importance d'aborder les facteurs qui l'influencent. Il est donc crucial pour les gouvernements de prendre en compte ces facteurs lors de la mise en œuvre de leurs initiatives d'e-gouvernement et d'interagir avec les citoyens sur les réseaux sociaux. Une approche adaptée et

bien pensée peut contribuer à renforcer la confiance des citoyens et favoriser une collaboration plus étroite entre le gouvernement et le public.

Conclusion En conclusion, la littérature suggère que les réseaux sociaux et l'e-gouvernement peuvent être des outils pour combler les lacunes en termes de confiance entre les citoyens et le gouvernement. Cependant, ils ne constituent pas une solution miracle. Les résultats concernant l'impact des réseaux sociaux et de l'e-gouvernement sur la confiance des citoyens envers leur gouvernement sont incohérents et varient d'une étude à l'autre.

Comme l'ont souligné Wang et al. (2023), l'utilisation d'Internet et des réseaux sociaux peut également avoir des effets négatifs sur la confiance des citoyens envers le gouvernement. Dans certains cas, l'utilisation d'Internet réduit le sentiment de sécurité des citoyens, ce qui à son tour réduit leur confiance dans le gouvernement.

Il est donc essentiel pour les gouvernements d'adopter une approche nuancée et bien pensée lorsqu'ils mettent en œuvre des initiatives d'e-gouvernement et interagissent avec les citoyens sur les réseaux sociaux. Les gouvernements doivent tenir compte des facteurs qui influencent la confiance des citoyens et s'efforcer de créer un environnement où les citoyens se sentent en sécurité et bien informés.

En fin de compte, les réseaux sociaux et l'e-gouvernement peuvent être des outils précieux pour améliorer la confiance et la collaboration entre les citoyens et le gouvernement, à condition qu'ils soient utilisés de manière appropriée et avec une compréhension claire des facteurs qui influencent la confiance des citoyens.

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The Communicative Interpretation for Arab Social Mobility

(Arab Social Movement)

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Abstract

The study aims to analyze the social mobility in the Arab countries in 2011, presenting an approach based on considering communication factors that played a crucial role in motivating young people and the Arab masses to participate and influence what was known as the Arab Spring. Indeed, that stage in the history of the media in Arab countries witnessed wide development in the use of satellite channels, websites, and smartphones. As the study shows, these technologies were employed as mechanisms that helped people interact, move, and participate. Based on the paradigm for the knowledge pyramid scheme, the study attempted to highlight the stages of information transmission from the first stage, which is the data stage, through the information stage, then the third stage, which is the knowledge stage, towards the final stage, which is the action stage. The study analyzes that overcoming the gradual stages of information transmission and passing from raw information to action led to the existence of the Arab social movement in the hands of activists who did not have a program or strategy for change in front of a movement that was able to overthrow old political regimes, but it did not have alternatives. As part of the analysis track, the study depends on a careful analysis of the roles of active groups in change. It pertains to the role of politicians, intellectuals, activists, and journalists. Keywords: Arab spring, social mobility, media, activist, knowledge

pyramid

Introduction

Over five years have passed since the start of the Arab Spring?(Arab Social Movement?). However Arabs look forward to furthering understanding after revolutions when Arab regimes themselves were taken aback by the uprising. Since Mohamed Bouazizi, in the small Tunisian city of Sidi Bouzid doused himself with gasoline, and lit himself on fire, afterward the flames quickly and unexpectedly consumed the regimes of Tunisia, Egypt, and Yemen. Quite likely other fragile authorities come to Iraq Syria, and others. To that extent, other countries rushed under compulsion to make reforms as a quick response to contain the situation and find a way out of this historical stalemate.

As demonstrators and activists in New York, Madrid, Rome, and Athens, recently or a long time ago had acted similarly, anddespite the different contexts, Arab social mobility's aspirations were inspired by such similar experiences in terms of having common expectations for political and economic change amid an extremely severe economic crisis which arose at the dawn of the new millennium.

If so, why did this happen?

While widespread revolts that took place in different regions of the world intended to preserve the institutions of the state as they are and acted to save all public utilities representing the interests of their peoples, aiming to turn, shift, and change the state institutions and power structures, meanwhile providing the necessary reforms, however, such procedures and concerns led to save the state from dismantling or failure. Unlike the situation in Arab Spring countries where a regime breakdown had not been experienced, revolutionaries acted as though they insisted on sweeping all institutional structures of the state by making reforms

from scratch, which led to the so-called state implosion then failure affecting state sovereignty as happening in many Arab countries?

Arab spring has become a new reference for social transformations that surprised political commentators, academicians, political forces and ordinary people as well as military and security forces, in addition to the external powers alike, as a social transformation resulting from new elements unrelated to the political will of national policy-makers, but instead, related to people's demands. Those people were kept away from benefiting from unequal developmental processes, away from shifts and impacts of the various information technology. Broad waves of citizens across the Arab world looked forward to getting rid of the unresponsive political systems that exhausted all opportunities and conditions, using all the tools at their disposal, including force to suppress discontent and cling to power.

Social networking has been a star of the Arab Spring revolutions in the Arab region and worldwide more generally. Revolts depended in an unprecedented way on social media such as Facebook, Tweeter which led to the constitution of a new generation of web struggling activists and new circles of active doers.

In the Arab world since 2011 new actors from "Ulama," "Preachers," technocratic elites, and some of the military unexpectedly stepped in alienated to collaborate with the social movements in managing the political change process.

The present study sets out the Arab spring under an analytical framework through a communicative approach mainly based on Media sociology, together with other approaches to provide a particular interpretation adopting communication variable that represents a fundamental shift of how information is being produced, transferred, spread and consumed and its impact on socio-political and communication outcomes, thus allowing to better understand transformations of said Arab Spring

in overall terms covering the social change mechanisms that influenced the Arab mindset and the social powers triggering change. It also touches on all the aspects of the current and future political structure.

The study aims at:

1. Analyzing the Arab social mobility "Arab Revolts" through a communicative approach to highlight the importance of the communicative factors in providing analysis and interpretation.
2. Highlighting the new concepts resulting from the communicative approach through the paradigm of the " Knowledge Pyramid" (DIKA) as shown by its levels:

- Data "Rumor" hierarchy.
- Information hierarchy.
- Knowledge hierarchy.
- Action hierarchy.

3. The study also aims at highlighting the new concepts, Ideas, and movements behind the Arab Spring based on a binary system as follows:

"A" Intellectuals –Mediators.

"B" Political Strugglers-Activists.

"C" Ulama –Preachers.

"D" Military-Civilians.

"E" Physical Spaces-Virtual Spaces.

4. It understands the new communication channels in providing a unique

framework and adequate capacity to address the issues of vital importance to society.

5. Prospecting and developing insights needed for rebuilding this nation in order to create a social change movement able to provide the objective conditions required for a new Arab Age of Enlightenment.

The study analyzes factors to take into consideration when addressing the problem of Arab spring:

- Intellectuals and the elite were leading revolutions and fueling widespread outrage with ideological fervor toward the democratization process across the world's modern history. Why did Arab intellectuals appear notably absent from these events?

- Why were Arab revolts able to overthrow old authoritarian regimes but couldn't get beyond that to achieve the aspirations in development, freedom, democracy, and dignity that protesters chanted across the Arab squares at the start of the social mobility in 2011?

- Why protesters and revolutionists in many regions of the world presented institutional reforms that rationalized changes to the existing political structures as a reform from within the framework, avoiding the other scenario of "barbarians at the gate," which might lead to the fall of existing regimes, creating a state vacuum situation, as a

consequence of States' institutional weaknesses in social, economic, and political areas, as witnessed in many Arab countries like Syria, Iraq, and Yemen?

The study's goals are to conduct such questions in introducing the communicative approach to provide clear explanations of the framework for what came to be known

as the Arab Spring, highlight the new dimensions of the communicative element, also to understand the current transformations taking place in Arab region, as well as analyzing transformation factors responsible for having the greatest impact on this new political alignment between political forces, and increase opportunities available for prospecting and developing insights needed for the rebuilding of Arab society.

The communicative approach of the Arab Spring[1].

Following the legacy of the French communication theorist Abraham Moles in his book *the structural analysis of the community*, the author depicts a vision highlighting the current paradigms as driving actors in the development of history, assuming to use historical chronology based on communication means attached to each historical period.

Using the Arab revolution as a case study to prove how information technology / communication systems have a quenching effect on Arab social mobility and explain how information technology/communication are having wide-ranging effects on the conventional types of social mobility.

A-audio visual and satellite TV.

The emergence of satellite TV in the Arab region has come to be a challenge to the monopolistic power of the state media; it has also produced the over-communication phenomenon of "communication opulence," which provides the society with more satellite communication than it actually needs through the uncontrolled growth of private satellite communication services[2].

Arab satellite communication has been considered one of the most important developmental processes in the region since the 1980s; many direct broadcast satellite TV stations emerged into Arab space, whether these networks are operating

from the area or from outside it.

Thus, according to the statistics produced by the Arab States Broadcasting Union in 2014, the number of Arab satellite TV organizations is around 758,29, of which are public, and 729 are private, but without considering the foreign TV stations oriented from outside the Arab region. The report also reflected that the Arab region had become a distinguished communication satellite market for around 380 million inhabitants. The people of the region are ethnically, culturally, and linguistically interlinked. (Arab States Broadcasting Union - ASBU- 2014).

In such a situation, the use of TV is not only entertainment and news but also employed by political actors, civil society, minorities, business people, and religious-cultural institutions for pragmatic reasons.

The media scene has mainly been characterized by launching many religious TV stations from all sides of the spectrum, attracting a wide range of viewers around the Arab world. These uncontrolled direct TV broadcasting clusters produced religious programs anchored by preachers who became opinion leaders. They issue Fatwa on TV, read nasty viewer letters on air, or answer questions arising from whence they drive people into acting. Some of these programs are breeding grounds for fanaticism and the conditioning of launching sectarian media, leading to inciting agitations in the community and hindering the inter-faith dialogue and tolerance.

The outstanding transformations of satellite broadcasting in terms of aired political concepts that enable individuals or groups to interact with media and communication means, to make room for popular influence on decision making to work horizontally rather than vertically. Furthermore, it established a new system of relations between countries.

B-Evolution of the role of information in Arab societies.

There is no single way to comprehensively analyze media and communication in terms of their role in contemporary societies, including Arab Spring nations unless we provide convincing explanations of the leading role played by the communication world in such societies.

Analyzing communication resources with particular repercussions on information gathering, processing, and dissemination and its influence on public opinion.

The information diffusion and its growing use at the international level in different contexts, as for Arab context. Information has become a key driving factor, Arab Spring highlighted the distinct role of modern information-communication technologies for many socio-economic, cultural and political structures, whether those related to ruling institutions and sectors like economy, media, religion, security, or legal control bodies or related to civil society.

Information has influenced Arab society in a way that gave birth to a new consciousness among broad segments of society and led to the assimilation of the specifications and features of the societal change. In the context of the Society of Knowledge or the informational society in which we live, it is most important to provide the possibility of wide use in economic and developmental as well as in socio-political scopes with its unlimited impacts on the Arab mindsets. Different assumptions stand out among others to explain Arab revolts highlighting the distinct role of modern information-communication technologies and social media tools. It is doubtless that information technology, and social media established the key background and triggering factor of the explosion that took place later and allowed freedom of expression to Arab societies to reject submission to the status quo or accept tyranny durability. It also enabled Arab peoples to regain their dignity

and confidence to act and change.[3]

This new society based on horizontal communicative types that demolished all what was considered, till very recently, as a sole and controlled vertical type, providing the public opinion a sort of media pivoted on publicity and colored news, not on communication, a media less interested in taking into accountreactions of the other segments of public opinion.

Mass media society -knowledge/information society.

The new knowledge and information society is based on horizontal communication type that ended up with the vertical type considered till very recently as one-way flow, where information or messages flow between or among the subordinates and superiors, in which audience are treated as a consumer receiving the communication from the sender source.

Information and knowledge community is part of globalization, typically refers to the economic phenomenon. There are ripple effects that make the impact of globalization much broader socially and culturally. Ideas, customs, and cultural movements across national boundaries since the industrial revolution, since Information Society is considered a second phase, or as a Post Industrial Society.

In this regard, no region, state, or form of governmentcan remain immune to the impact of new information and communication technologies on social and political movements. it is not possible to understand the role how trends in new media and the changing expectations in Arab region, without taking into account the current transitional transformations in which a shift from the mass media to a Knowledge/Information Society where social media play a vital role based on higher ceiling of freedom of expression, partnership, property system, legalizing level and development of local laws, in addition to the motivations and expectations

of powers competing for ruling at national or international level in full harmony with the dominating political culture.

Thus, the transition to knowledge and information technology has been linked to information economics principle providing the key structures for information technology and communication, which play an important role in the development and new techniques of social communication in Arab region. This factor has contributed to information and information sharing on a large- scale, private media have also influenced the social change process as 125 million internet users in 22 Arab countries, among them 71 million are classified as social media active users[3]. The same report states that Arab internet users constitute hardly less than 0.5 % of world Internet users and continue to increase by 20% annually, creating new opportunities and challenges for governments, corporations, communities and existing political structures in light of the digital gap that is still affecting millions of Arabs deprived of access to the digital age and benefiting from audio-visual and satellite services. Internet importance lies in being important news as an information source, which makes it so distinctive from conventional media venues.

Governing concepts of communicative interpretation.

To analyze concepts of communicative interpretation governing Arab Spring, we relied on an explanation of the Knowledge Pyramid, primarily consisting of four hierarchies or thresholds that clarify the communicative interpretation approach of the Arab spring and its relevant concepts:-intellectuals-mediators-fighting,activists-scientists-preachers-military-civilians- physical spaces and non-physical spaces.

The knowledge pyramid

The "Knowledge Pyramid" concept illustrates information hierarchy, and the knowledge pyramid refers loosely to a class of models for representing purported

structural and/or functional relationships between data, information, knowledge and action. It is a gradual process that affects persons' assimilation, and it turns into a sort of power and authority affecting and motivating the behavior of action on the ground.

Understanding processes related to dynamics of information diffusion flow and its dissemination while the Arab revolts in 2011 and beyond points out that the new transformations of information flow model are represented by the combination of two parallel and sometimes altering models. If the first model represents a smooth and natural way to a four-stage "thresholds" matured project from the base of the Knowledge Pyramid up to the summit. While the second model is reductionist and unconditioned to the compulsory gradual process, in other words moving from threshold "A" to threshold "D" without crossing by threshold "B" and "C," or from "B" to "D" without crossing by threshold "C."

The Knowledge Pyramid model strongly allows the communicative interpretation of the Arab Spring, enabling one to understand better the outcomes and consequences based on a consistent and logical system.

According to the Knowledge Pyramid model, we come to illustrate three basic levels of the particular processes to move into action, it represents the communicative dynamics of Arab revolts and the role of the communicative element in the Arab Social mobility series as a new authority securing convictions and making decisions and undergone the radical transformations.

The model of communicative interpretation of the Arab Spring includes the following four hierarchies of the knowledge pyramid:

First: Data Hierarchy.

Second: Information Hierarchy.

Third: Knowledge Hierarchy.

Fourth: Action Hierarchy.

Data hierarchy / Data-Rumors

The first level in the „Knowledge Pyramid" is " Data Threshold", data is understood to refer not only to symbols but also to signals, letters, images, sounds, raw symbols, or stimuli referred to by said symbols. In other words, data is merely raw facts or a type of inaccurate information not based on main news stories that define the news genre and its main components. These media are not journalistically yet formatted; however, they might take pre-news format being processed into information. Hence, society is the information source. In such a case, the data used by a wide range of youth and protesters in the Arab societies was drawn into social mobility in 2011. They have contributed by disseminating various forms of news, images, symbols, and banners emanating from direct interaction with objective reality, personal and private experiences, and observations, and some other forms of similar media professional practices that lack writing skills and consider media ethics.

These first inputs (threshold "A") provide a mass flow of news lacking processing to be converted from data or rumors into information through examination and revision and ensure its applicability to the original source, then classified as a useful reference of information. Therefore data as incomplete information are considered a verbal communication characterized by inaccuracy in terms of the information source, interpretability, subjectivity, and the reformulation of facts by the sender parties that are in the interests of the communication process so that any raw idea

reported story event or any other unprocessed date prepared for use unless the processing is regarded as a part of the process providing the data with the required meaning and significance that influence on the action-reaction and direction. These strong presences of data marked the start of the Arab Spring's dynamics but ended up being a weakness factor.

The "inputs sample" had a great role in terms of its communicative specifications and particularity through establishing social-psychological conditions required for what would come of down falling the Arab old regimes, in addition to the advantage of electronic publishing that provided a new condition like the anonymousness which enabled huge number of activists to publish and post their content as unknown authorship or origin.

While the second model is reductionist and unconditioned to the compulsory gradual process, in other words moving from threshold "A" to threshold "D"

Without crossing either by threshold "B" "C", or from "B" to "D" without crossing by threshold "C".

Information hierarchy

Information threshold "B" represents one of the significant parts of the communicative interpretation of the Arab Spring, as well as a basic element within the Knowledge Pyramid. This includes information acquired the status of news drafted in any journalistic format known in the media field, based mainly on the core elements of the journalistic genres, being information of high credibility and reliability in terms of sources, meeting standards of objectivity and respect for the code of media/journalistic ethics.

Information as processed data receives a value after being analyzed, interpreted, or assembled in a meaningful form to be formally or informally shared, documented, and disseminated in any journalistic form, which will have assimilations and influences on the future.

This means that the information as a hierarchy in the Knowledge Pyramid includes various forms such as news information, intellectual information, values, theories, and political information fused with the mechanisms of power and decision making and information centers responsible for motivating social and political behavior. Thus, the Information Threshold is considered an interpretation factor to explain the Arab Spring fate. Indeed, the early hopes and slogans it raised of successful democratic revolutions were quickly and cruelly dashed.

Media workers are, in essence, interpreters of information. They don't just provide pages of facts, sifting through piles and piles of information to report news or stories. Instead, they weed out the important issues and points, putting them in a context that the average reader and listener can make sense of to form their own opinions during Arab Spring happenings. The "Information Threshold" had a unique role in shaping and highlighting public opinion and having full knowledge of the historical background of leading stories and events through the following presentation as well as analysis of Arab Spring stories and events, revealing all its dimensions and discussing raised issues, addressing concerns to the public opinion. It also expresses policies and current trends in the society and tells the events and fact reformulation in addition to providing explanations supported by data and logical reasoning.

Amid all that, journalists and the media mediators made a dramatic change turning into influential actors in the events since the journalist, rather than the intellectuals or politicians, have come to be (information threshold) within the

Knowledge Pyramid plan to a non-neutral actor who actively has acted as catalysts, mobilizers, and organizers of political actions on the ground intervening in the events, producing predictable patterns of biased news coverage, especially on satellite channels. Journalists as "Mediators" like ordinary religious preachers promising admission to the paradise of the political regime. The real threat stemming from this situation is that the polarized media, in encouraging the perpetuation of crises, will only serve and support certain ideologies rather than others.

On the other hand, one of the significant ways through which new media aided political transformation in the Arab world was through the spread of citizen journalism, as seen by bloggers[4], which converted to new journalistic mediators and main mechanisms to producing, publishing and sharing media content, they became a part of the national journalism arena able to manage the conversion process. We also must acknowledge that the new media led to an unbalanced elliptical graduation movement because of the reductionism of stages and lack of tools or capabilities as well as clear visions to counter and overcome this new situation[5].

The Arab spring's events have proved that there is also role confusion since media actors are not limited to their natural role as information carriers. Still, they turned to support certain ideologies rather than others in the context of a media atmosphere suffering from a lack of neutrality, objectivity, and professionalism.

At the international level, that is, it was a Wiki Leaks document about the unprecedented greed and massive corruption as well as the conduct and practices of many leaders of Arab regimes, which strongly quaked Arab mindset, more particularly concerning their rulers, those who govern while deceiving their peoples. The new technology-enabled transmission of trustworthy information brings it to the public despite the secrecy of the authorities. Technology can transmit sound,

pictures, and moving images from areas of events, and that is what Arab revolts used in many Arab countries.

C - Knowledge hierarchy

We may feel, or be aware of, or think about Information as material, that is to say, knowledge is inductive reasoning of facts, meanings, beliefs, concepts and intellectual perceptions of the person as a result of repeated attempts to understand the phenomena related to the existing objects in his surroundings. Do the Arab mindsets of the 2011 revolts have the knowledge to destroy and reconstruct as any successful revolution elsewhere?

The third threshold (C) in the "Knowledge Pyramid" activates an important circle of the communicative interpretation process related to the Arab Spring. In contrast, the knowledge emerges out of a deterministic process that requires to pass gradually and inevitably through both previous stages, "Data &Information," which is meant to transmit from unverified initial data to the second stage of being reliable information with all required specifications to be able to produce knowledge through analysis and processing in the third threshold "Knowledge" in a way that would allow employing Knowledge and thoughts as efficiently, smoothly and reasonably in all social activities, then allowing decision making to be translated into action.

The interpretation paradigm of the "Knowledge Pyramid," as reflected in the figure below, allows understanding and comprehending the basics of the communicative interpretation of the Arab Spring.

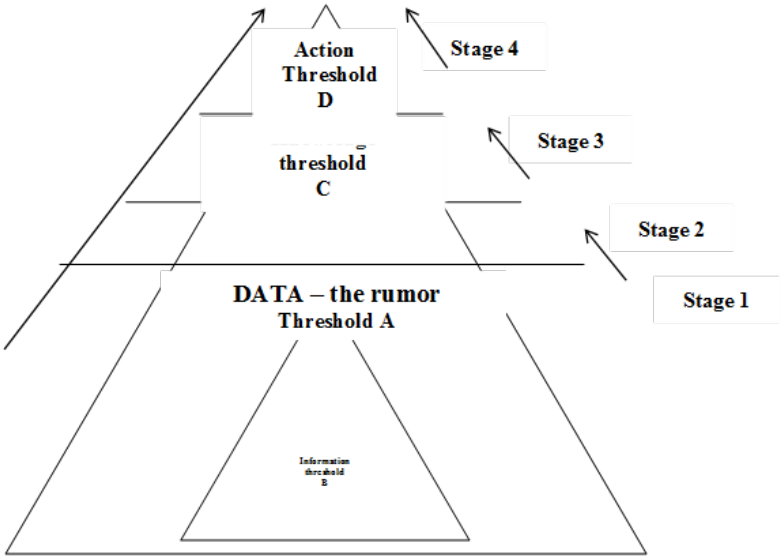

Figure (1) structure of Knowledge Pyramid

The "Knowledge Pyramid" refers loosely to the four levels "Hierarchies" of data/ information flow in order to produce knowledge, the level of action representing crucial stage of the physical transformation on the ground.

D - Action hierarchy

This analysis highlights that Action Hierarchy represents a significant moment in the "Knowledge Pyramid", by developing criteria to measure the success or failure of all the action and that would be the fated results of the series of revolts of the Arab Spring.

Action, of course, is the culmination of achievement and the essence of a cumulative process necessary before the action, and not as an emotion, mood, or automatic act. Action should be based, as far as is appropriate, on scientific

and investigative rules prior to the formation process, which logically implies the idea that any imbalance in the stages of the action process will inevitably lead to unscientific action capable of responding to actual requirements and challenges.The Action stage expresses the reflections related to the different dynamics providing people with assimilations from the field and acting accordingly, then moving from the assimilations as intangible inputs into tangible behavior scope interacting with reality.

The risk of rushing into action was justified to realize the expectations of Arab social mobility, in order to downfall the authoritarian regimes as a landmark in the fulfillment of the shared aspirations of a wide range of the Arab societies, since many Arab regimes had provided reasons for aggravating their crisis, that's why masses taking to the streets had little practical thinking to deal with the outcomes that would later develop, in a context that included dominant inaccurate rumors, data or information manipulating public opinion, and a strong motivating factor that drove masses on the streets lacking a clear perspective.

Preliminary conclusions

Now, we may say that the preliminary conclusions of the four stage process indicate the power of data to mobilize Arab public opinion, also the wide consumption of data established a modifier background of verbal communication, symbolic communication and signal communication for protesters across the Arab spaces, as in Al Qassaba in Tunisia, Tahir square in Egypt, Pearl Roundabout in Bahrain and, Green Square Libya where activists and protesters dealt to a great extent with "inputs" and subsequently with a sample of "information".

The so called "Information Threshold" constitutes a different moment an advanced episode for the events affecting the fate of revolts in Arab region, Satellite

TV has played a significant role in acting as instigators driving the uprisings alternative communication systems in the Arab world. As for satellite channels (Al Jazeera) in particular and some other TV networks directed to Arab region[1] that played a crucial role in transmitting, monitoring, following and analyzing the news. The social media also established an effective mechanism to keep up with transformations stemmed from the events, In more general terms, we may say that investigative journalism and national journalism" played a basic role as catalysts of broad sociopolitical protest through creating psychological motives, objective conditions and uprising against the existing regimes.

Many Arab rulers had accused and loathed audio-visual media particularly some satellite channels. Undoubtedly, the role those satellite channels played in the Arab Spring was unprecedented, many of the audience credited the channels with speeding the overthrow of the authoritarian regimes. However the absence of independent media either state owned ones or private and the governmental control over information amplified people's cynicism and distrust, despite the fact that those satellite spaces reported evidence to unbiased coverage promoting certain events and causes for worse.

Non-neutral criteria dealing with the events.

The Inputs-Data threshold positive points as it constituted the influential circle leading to undermine the authoritarian systems in above mentioned cases, such as Tunisia Egypt, Libya and Yemen where the threshold launched a revolutionary situation mainly targeting to downfall the existing systems. It all happened so quickly while no one could predict.

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(1)

At the level of information exchange, the transformations led to an unlimited impacts on the factors affecting traditional social change and the major political actors, it also led to transformation in the role played by an elite intellectual vanguard, and struggling activists.

To highlight the new concepts of the Arab social mobility.

Such transformations led also towards highlighting new actors different in terms of its structural components, as intellectuals and struggling activists were substituted by the new actors such as mediators and preachers, even military who took their places on streets as well as electronic spaces and TVs as new players shaping the course of events which would have great influence on later stages.

Intellectuals-Mediators

Following the different hierarchies of the Knowledge Pyramid Model, we can deduce another level of transformations that led to change the roles of those who have acted as changing forces, since it proceeds from an observation that highlights the emergence of the Mediators and their new roles, versus the shrinking role of intellectuals.

The new generation of Mediators, journalists media workers, political spokespersons, experts, citizens, witnesses, bloggers and face book activists "who will cover the full absence of intellectuals (as the term is conventionally defined)the new Mediators have strong presence on all media channels and venues ,TVs, radio broadcasting programs, talk shows, and daily news.

Unlike the conventional intellectual exposed his hard intellectual matters to the average individual who cannot comprehend, as these matters require pedagogical efforts to communicate his message, the mediators who promote their ideas lacking

of a vision for and holistic approach to change momentum, instead they will go further, and also refer to "instigation", "public incitement" and "propaganda", involving stars and celebrities in media spots, and they will often account for all sorts of the strange stuff.

The presence of Mediators as a new phenomenon accompanying the Arab Spring was different from the presence of intellectuals in conventional revolts. The Mediators intervention in media and in the new media venues, through its categories based on seeming instantaneousness, excitement, pretty and strange stories, partial analysis, and media coverage by shock as shown in commentary, as well as brief review of news updates on events of great importance, and testimonies, even when dealing with historical events. In addition that their major focus of attention may have less coherence than what people would want in such works, as history receives a superficial treatment to illustrate instantaneous events.

This means that the contribution of the classified mediators in the "Knowledge Pyramid" Model is in accordance with the information threshold, therefore mediators approach a different vision when compared with intellectuals and thinkers approach.

However, other factors are also behind this, notably owing to factors such as, high illiteracy in the mentioned Arab countries, setting a political discourse more descriptive than prescriptive, based on emotions. The fact that there is an almost complete absence of critical discourse, the said laid out a series of general slogans focusing on the socio-economic and political reform demands. That was what made the mediators discourse to become a dominating over other discourses, especially those related to intellectuals in their lucid analysis and long- term views. This situation also gave rise to an important role to journalist or mediator to play,

where the roles and competencies of a journalist overlapped. Generally speaking, journalists in their professional capacities are expected to be neutral, rather thanactive actors contributing to marking events and stories. Unlike intellectuals, Mediators/Journalists had no clear or comprehensive coverage of facts and events, but their approach was descriptive and of a partial vision, rather than specific, but meanwhile having a great responsibility in influencing public opinion behavior.

The phenomenon of relative absence of enlightened minds, as well as the traditional politicians and actors or the lack thereof, in predicting, contributing to, and participating in these momentous changes from the Arab Spring mobility scene, which made the revolts lack a real societal project for change and reform, in order to achieve expectations of Arabs towards dignity, freedom, development, and modernization.

In addition to the above mentioned groups of actors,herewith a new phenomenon seemed to come into existence:"the showy intellectual" or „intellectual exhibitionists"following the widespread of satellite TVs.This is what happened as soon as the audio-visual spaces were liberated from state ownership, and the unique international orientated satellite system appeared in the region, which is distinguished by the Arabic language as a common communication language.(Ould bah, S. 2011).

Despite the dominance of such showy, pretentious intellectuals on TVs, their quick interventions and analysis delivery of light matters based on excitement affected by marketing which finally lead to impulsivity. This, in contrast to the original thought which requires time and efforts that what intellectuals apply to different intellect spheres.

A key component of the new model would be an integrated system of producing an easily memorable and repeatable media content on extremely serious matters, it is actually a sort of "take away" ideas quickly consumed by audience, these media canned ideas that people trust, without a critical sense and very often follow the message, with the illusion of participating in public issues, through intensive form of consumption of television talk shows during watching peak time.

Elite participation

It is not easy to say with any degree of certitude exactly that intellectual elite was completely absent from the Arab Spring scene. The elite was there, engaged to" Kefaya «Egyptian Movement for Change since 2004 the movement gathering the opponents activists intellectuals, artists, politicians, the young bloggers .It was a platform for protest against Hosni Mubarak's presidency and the possibility he might seek to transfer power directly to his son Gamal, however it did not come to public attention.

Besides this movement, some other platforms came onto the scene such as lawyers union, the university professors March 9th movement, April 6 Youth Movement, and Tax employees union.

National Association for Change came to scene following the arrival of Dr. Mohamed El Baradei, it is a loose grouping of the various Egyptian famous personalities of all political affiliations in opposition to the regime, such as Ayman Nour a former presidential candidate,HamdyKandil a famous media figure,and some leaders from Muslim brotherhood Dr.Mohamed El Beltagy,Dr.Essam El Erian, and some members of several political parties, like Democratic Front,Al Karama,Al Wassat, Socialist Revolutionaries, also some representatives of civil society and young people aims to change Egypt, such as Egyptian women for change, and April

6 Youth Movement…etc.

The fundamental features of the 2011 Revolution is that It new generation of engineers and IT experts, representing a new generation elite different from the traditional elite.

The influence of the digital media on the popular uprisings

The cyber activist Wael Ghonim in his book "Revolution 2.0" was asked about why did he join Google.*I think that Google changed the world,and I would like to change the situation of millions of Arabs through technology support, and working with Google is the best way to do this is to use technology to best advantage*", through youth who would be at the lead of the information technology revolution that brought down old political regimes and get rid of them, a mission that had already been experiencing great difficulties for a long time". (Ghonaim, 2011, p. 147) .

The presence of Google with its digital and IT technology as a sophisticated mechanism that provided the required atmosphere to breaking fear barrier, that fear and the cruel and arbitrary use of authority or a tyrannical act by many Arab countries which brought people to the point of despair The Arab world was living a very difficult economic and social situation. Poverty, human rights violation, and high unemployment were the main phenomena the Arabs were facing, leading to a lack of prospects of a decent life.

Digital information came to stimulate revolutionary sense from individual level, then it was largely spread across the country as a common need to getting rid of the political systems in many Arab countries, that common sense of fighting the regime is worth dying for.

Facebook definitely had a role in organizing this revolution, a strike which occurred on 6th April 2008, by Egyptian workers, supported by 90000 on line Facebook users, a figure thatexceeded the number of protesters in any opposition protest.

6th April 2008 strike in the city of Mahalla represented a crucial action towards the Egyptian revolution for many reasons such as:

1. The strike was based on a different approach: stay home, do not go out; don't go to work…etc.

2. All political affiliations participated in organizing and calling for the strike.

3. Websites highlighted that workers strike planned morphed into popular struggle following clashes with the police who used, it was unprecedented at the time the open defiance of a city to the regime for the first time images of a tarnished trampled upon a poster of Mubarak circulated on the internet, signaling the beginning of a new era for a non-state owned media, and enabled the technology to play an important role in revealing facts and producing unprecedented effects on the state-owned media or even the private media controlled by the state as well.

4. The internet dynamics and organization have become a new active player in media space.

Ulame (Scientists)- Preachers

Ulame-preachers represent a binary that needs to be analyzed under the third threshold of the "Pyramid Knowledge", as an important concept providing a crucial platform for the interactions and practices linked to the Arab Spring, in order to conclude an analytical and comprehensive vision.

A new type of intellectual elite recently came into existence through the dynamics created by Arab revolts, composed of different actors; “Ulama” religion men, preachers and opinion leaders. It is the new intelligentsia related to the Islamic referencemovements that found the right conditions to appear on the ground to be on the move.

Following the collapse of Eastern Europe and his ideological model that shaped the leftist movements at national level, and the failure of the liberal model to provide society with effective solutions. The way has, thus, been paved for the Islamic movements and their preachers - Ulama became a new type of intellectuals adopting different approach (Hanafi , H. 2016).

Uluma (plural) are “those recognized as scholars or authorities” in the “religious hierarchy” of the Islamic religious studies. Most Ulama specialize in fiqh (Islamic jurisprudence) through Quran and Sunnah, and are considered the arbiters of Sharia law based on Quran and Hadith by mainstream Muslims. Ulama also introduce themselves as advocates for people’s rights and expectations, as the sole interpreters of Quran, as well as they are considered the new advisors and spokespersons of the peoples.

Furthermore, Preachers-Ulama are characterized by their direct physical presence in places, particularly in mosques, places of mass gathering, and private spaces using the eloquently delivered religious speeches, expressing themselves in prophetic tones, as the voice of the people, addressing their issues, concepts ,existential concerns, as well as their daily life problems through a direct interaction by hearing their questions and providing them with instantly, spontaneously and competently answer recalling from their memory. Hence, their capacity of comprehending the information then reproducing knowledge, their charismatic and holly influential presence is

expressed best in prayers through their daily transcendental communication which established force factors for the religious "sphere" to play a role that exceeds the role played by intelligentsia's figures.

However, the intelligentsia engaged in such transactions, found itself facing a situation embedded in an deadlock, competing with Ulama-preachers who have better trusted and considered by the community.

While civil intelligentsia suffered from the collapse of its leftist wing and the deadlocked liberal wing, it became "estranged" from the majority of the audience, as their intellectual structure is based on enlightened concepts that don't suit the reality of Arab and Islamic societies, in addition that they lack the credit of Ulama in championing resistance to "Emir" the ruling regimes. (Hanafi, 2016, p. 38-83)

Ulama-Preachers established an influential interference formula that brought changes in relation to the previous situation, since they as interferers adopt popular religious discourse.

As a matter of fact, Ulama - Preachers have been empowered to gain a popular base through the formula of interference between "Daawa"[6]and politics, in other terms putting faith into politics, they also worked underground for long time, whereas the state considered them as competing force over the religious authority. Since the state considered the religion an integral part of the regime where no completion or overbidding could be acceptable, and that led to portray Islamists the as defenders of the utopian Islamic state, and the protectors of the religion, meanwhile promoting their high capability to counter the western cultural invasion (Hanafi , 2016, p. 67-72)

Bearing in mind that, the transformation cannot be achieved without influence, the Iranian revolution highlighted the transformation precursors that helped the

Islamic regime in Iran attract the intellectual elite to believe in Islamic Republic values, as Dr.Hanafy analyzes.: "So it has been proved that the intellectuals often linked to the Islamic Republic turned to the Ulama guidance, as their thought was moved by faith as well, faiths of both were alike….Following the Islamic revolution, the gaps between "enlightened" intellectuals and traditional clerical intellectuals were bridged ,there were many reasons to explain this situation that elements within the clergy promptly moved to hold over positions of power which enabled them to play a central role in the new regime. Hence a new generation came out to appear from the conservative platform values however, they would continue with their process of formation which will help them to rediscover the world according to the parameters of modernity, which enabled them to control the intellectual discourse and regain control over the world, but without any denial to the Islamic culture.

The preacher became a competitor to Ulama, journalists and intellectuals, despite any discrepancies or subtle differences between their respective areas. Since the Ulama- Preacher tend to capture the space for the religious discourse monopolizing the interpretation of the religious text and all terms linked with the Sharia and the truth, this monopolistic interpretation based on an unchallengeable and irrefutable holly concept, and that people are bad by nature, they always need a reformer nearby, in order to promote the individual salvation values in the name of the religion. Thus Ulama–Preacher have come to play the reformer's role, to reduce the gap between the world of apostasy and world of faith, bringing it more into line with the latter.

According to the preacher's discourse, the concept of the independent state is a western concept opposed to the religion, and the conception of a state in Islam is that borderless inclusive State of a commonwealth of all the Muslims living as one community, and that preachers-Ulama are the most effective and efficient to facing

up to the western cultural wars, and that a return to history sharing stories and tales with charismatic figures and their heroisms, all that would recover Muslims from the defeats inflicted upon them at present, furthermore, the return to history would also lead to self-exculpation, and create a history pattern in order to counter its dogmatic adversaries. Since the Preachers-Ulama discourse call for pure dogmatic divide which would allow to exculpate ourselves, and create a history pattern in order to counter its dogmatic adversaries by intensely recalling texts, bibliographies, events, and tales without citing its resources or references, or investigate its accuracy, opening the door to all stories including those uninvestigated and inaccurate, which might lead to an extreme nostalgic backward at history, and feelings incapable of resolving current problems. However it should be a discourse that gives hope to the poor and confidence to the rich. The Ulama- preachers, discourse contradicts with that of the journalists-intellectuals, the journalist's duties and tasks that, they educate the public about events and issues, follow nationally and internationally updates, comment on the news stories, focus on the public opinion concerns, have general understanding of current events. In addition to serving the public interest,(reporting and questioning), and must also follow the rules of law .

While the Preacher-Ulama discourse that focuses on the unhistorical world, the journalists-intellectuals discourse focuses on entirely highlighting the historical background of events, analysis and comment on current events, thoroughly research and fully exploring the subject, addressing issues of national concern, expressing their opinion of policies and currents within the community, as well as providing data-based explanations, logical reasoning (analysis).

Public Spaces-Virtual Spaces

The Arab social mobility came to produce new concepts according to the Knowledge

Pyramid, these concepts are related to the use of physical and nonphysical spaces such as mosques and gardens, radio and TV stations, as well as virtual spaces like social media, which shaped a new element to push the Arab revolts forward in order to achieve its objectives.

The excessive use of such new forms helped reuse a number of conventional spaces, or rediscover exceptional formulas employed during the Arab mobility like Facebook and tweeters, as a response to break the media monopoly held by governments conglomerates or local power brokers, and some lobbies and groupings to pillage the media its capacity of information control.

New communication status enabled to transmit the public issues to be discussed in different platforms like mosques, or on the internet, and the various satellite channels providing directly and instantly an open discussion on the public issues and interacting with the citizen, through presence availability or remotely. This status also enabled the activists and groupings persuadably to mobilize masses and make a generic change.

However the 2011 protesting movement of youth and the other groups of the society were not limited to the tangible activities in physical spaces, but it created other parallel spaces to communicate known as nonphysical spaces. Activists had been relying on social networking services including Twitter and Facebook, as well as other social media to be used effectively in news stories analysis, commentary and organized media campaigns, to organize the protests.

Now, we are dealing with both physical and nonphysical "virtual" spaces as different but integrated spheres of public socio-political action, their integration in new functions and roles through mass mobilization and promoting discussion such events and practices events that led to the fall of the then-existing regimes in

Tunisia, Libya, Egypt, and Yemen.

On the other hand, these spaces established scopes for socio-political practices, either to specify forms of struggle or to develop countering measures against the authority through creating temporary or permanent organizations according to the needs of countering the public authorities or any forces the movements of youth might face. Thus, the new non-conventional forms of organization and communication emerged to practice politics across spaces.

This mosaic of ideas gathering broad scopes of youth, citizens, activists from different political affiliations, and with different and even contradicting ideas ranging from Islamists, Arab nationalists, liberals, and leftist, they all succeeded to remove despotic political regimes ruling for decades, though these forces had no clear political program, or common demands, but that was a strength point during the mobilization process that would influence the later developments of the Arab social mobility dynamics.

Physical spaces

Turning public space into a place for carrying out a clear political action, direct physical presence and peaceful confrontation with the public authority, established a new generic turning point in the Arab mind and conscience.

According to this specific context created by the wave of Arab revolts, all squares and public spaces turned into spaces for expression, aspirations and expectations to a better future through political, emotional, spiritual, human and rational abreaction by wide ranges of Arab peoples against years of repression and persecution by despotic regimes.

Public spaces, squares and historically famous mosques that have symbolically been representing a historical importance, acquired certain attractiveness for the protesters having such huge areas of land easily accessible and easy operation ability for media activities. Finally, these public spaces turned to be, functionally, mobilization fields, enjoying high level of dramatic scenery[7].

There are very interesting features related to those Arab squares and spaces (Green square, martyrs Square, al Habib Bourgueiba, AL Tahrir Square Cairo, Pearl Square Bahrain.) have established physical and tangible spaces for different forms of expression such as protests or even civil disobedience against existing political systems, creating a new generation that could be called "Youth Of The Squares" and public spaces.

30th June 2013,Rabaa and Tahrir square[8], together with the mosques represented a landmark, where the demonstrators line streets to demand president's removal, it was a historical moment when millions of Egyptians filled streets across Egypt on calling for the ouster of Mohamed Morsi. The uprising adopted a new method to topple the president through collecting signatures in order to depose the president, the movement announced it had collected more than 20 million signatures in a press conference.

23th January Hundreds of Tunisians traveled hundreds of kilometers in what they call a "Liberation caravan" to join protesters in the country's capital, chanting the same "we are here to remove dictatorial residues, the number of protesters soon grew up to thousands.

On 27th January 2011 Prime Minister Mohamed Ghannouchi announced that apart from the prime minister, the new government had new names as ministers for the first time. This move was seen as meeting one of the demands

of the protestors in Tunisia. On February 20th2011, protesters camped back in Al Casabah[9] beside Mohamed Ghannouchi's office protesting against Ghannouchi remaining in the interim government, as he had been collaborating with Ben Ali's regime for years, to declare a general legislative amnesty, dissolve the parliament and establish a constituent counsel, suspend the fact finding adhoc committee to de reconstituted as independent and trustworthy, dissolve former ruling RCD, suspend the constitution, to form a national salvation government, also suspending the trial of the former regime to guarantee a fair and impartial trial to the regime, remove all unionists and syndicalist proved to have been collaborators with Ben Ali's regime, also reformulation of the judicial reform bill, and to establish a new electorate bill. Casaba's set in 2 was more solid than Casaba's 1 fully covered by media, then appeared the so called the set in of departure targeting the removal of the government.

On 27thFebruary 2011, Ghannouchi resigned; He was replaced by Béji Caïd Essebsi. On 3th March 2011, the president announced that elections to a Constituent Assembly would be held on 24th July 2011, according to a new electoral bill, a National Fact-Finding Commission on corruption bribery and kleptocracy, and to investigate all incidents during the revolution

Virtual spaces

The internet has established communication spaces affecting the Arab society mindset. Virtual places by nature represent spaces for freedom, and a free zone by excellence related to the virtual space with both dimensions the tangible and intangible, it came to break the stereotype of internet addiction by the Arab youth just for fun, or breaking the taboos, they creatively converted the internet to be a virtual space by excellence.

As a consequence of the more openly expressed virtual spaces that might cause the collapse of the referent group; however the virtual space is committed to common interests not to geography, these common interests gathered Arab youth who did not know each other to openly discuss about the common issues, communities discussing, communicating to take important decisions about the future, ideas about revolting and rebelling against the political regimes.

Military-Civilians (Armed Groups)

It is crucial, however, to proceed with the pyramid analysis pattern to analyze the role of the military in Arab social mobility; as one of the most influential elite actors on the ground, the military represents the material force able to interfere and take control by force, the Armed Forces enjoy considerable power, prestige in Arab countries, for their contribution in the independence struggle in addition to their role in countering foreign aggression.

The military elite in Arab countries had been formed at military academies by the first third of the 20th century, which enabled them to play a decisive role in different conflict cases.

In the south, particularly Arab countries, the military by nature is considered not only a critical institution but also it is the most important institution compared with other institutions, the fact that it has, on many occasions, acted to secure its particular institutional interests and not acted for the interests of the nation.

In Arab countries in recent years, the military is ready and willing to do anything to get power by force and to use it violently; the army has managed to ensure control of the political system by force, not through the peaceful electoral process, in other words adopting military coups using state army, security forces, and media to ensure their interests. Throughout the 20th century, the military used coups to

control power in nonstable countries across the Arab world, Africa, and Latin America. A seriesof coups d'état, almost 25 coups, from the military coup against Rashid Al Kilany in Iraq to the military coup by Houthi that took place in Yemen against Mansour Hady in 2014.

All manifestations of the Arab spring were expressed in political polarization, struggle for power, and fueling the conflict that led to the use of violence and mutual eradication among political forces, leftist, liberal, or Islamic, across the Arab World.

During the Arab Spring, the army had three different options to choose from in how to handle the growing unrest within their borders:

1. Take a neutral stance, as the armed forces' primary function is to protect state sovereignty, national institutions, and national security, as occurred in a small country like Tunisia.

2. Nonneutral position: Egyptian military chooses to move away from neutrality performing its duties in maintaining security and protecting state sovereignty. However, the army became one of the critical active players competing to get to power through the nonelectoral cycle approach.

3. States where the military acted against the protests: Yemen, Libya, Syria, and the formation of quasi-military bodies fighting to get to power by violence; it is worth mentioning that the third model is linked to failed countries.

Regardless of the contradictions related to the military intervention to seize power, the armed forces are still considered a state institution and a national professional and integrated body which serves the interest of the nation and not that of the regime.

However, the weakness of the intellectual and cultural elite in influencing the Arab Spring outcomes, but the major disadvantage remained in the biased intervention by the military in the events, creating congestion in the Arab political sphere. Instead, the fluctuating social mobility has given way to political stagnation toward the democratic transition.

Sidi Bouzeid Al Habib-Bourgueiba Tunisia, Tahrir Square Cairo-Egypt, Sahet Al Taghier Taaz Yemen, Green Square-Bab Al Azizia-Tripoli- ,Tahrir Benghazi Libya

Spaces and squares witnessed previous resistance against foreign occupation and social protests, such as Tahrir square in Cairo during 1919,1935 revolts against British occupation and the bread revolt on 18/19 January 1977.

In light of the points discussed above, we may come to highlight some conclusions using the communicative interpretation approach in analyzing the Arab Spring:

Conclusion

-From the above data, it can be seen that the transition and change to translate data into appropriate actions amid socio-political and psychological conditions that are not comprehended by a majority of drivers and political forces contributing to the change process in terms of the scope of change and the major players, and also the scope of all political forces, regardless of what background they come from, whether it be the military or the civil society or the existing regime.

-Nevertheless, all humble outcomes of Arab social mobility are negligible compared to the significant loss of ineffective participation by intellectuals and thinkers as a motivating force for the process of change in the Arab world.

-Furthermore, the lack of consistency and absence of clear strategies in the countries of the Arab spring this particular problem is largely the result of the

rise of an inexperienced new ruling class who can give no insights into occupying positions of power, so this new ruling class needs a long time to train on the job, while the increasing social demands are mounting by wide ranges of the society, those who have driven the new ruling class to rule.

-Civil political discourse where politicians and intellectuals should play a significant role in mediating between the ruler (executive power) and the society through communication means and techniques(the arsenal of media tools), targeting the renewal in the de facto world where people live, to achieve the desired Renaissance, and avoid the actual failure.

-The political-religious discourse sing a different tune employing all (the arsenal of media tools) through a destiny concept that there is no wrong choice; what is destined will reach you what is not destined will not get you. This is all to justify the authoritarian power and keep citizens from contributing to the renewal of the de facto world.

-In conclusion, as a matter of priority, the Arab intellectual nowadays needs to restore his position in our Arab societies. The Arab intellectual should assume the responsibility of leading people to choose the path of enlightenment as to what is happening or to tell them about the required values for the new era, like respect for others and accepting them accepting others as they are and not as we would like them to be, promote dialog, prevent fanaticism and extremism, countering the backwardness to strengthen the Arab social fabric, acting out of maintaining the rights of all parties, intellectuals have a massive responsibility for the transition, and they are likely to assume such a responsibility today rather than tomorrow.

-There is a joint mission shared by the intelligentsia and the enlightened Ulama for countering the extremist ideology adopting violence, exclusion, and hater, a mission in which Ulama and preachers play an important role in promoting moderate Islam that expresses the central values of Islam and its bright civilization.

-In this study, the researchers showed that the governing concepts related to the communicative interpretation to explain the Arab Spring through the knowledge pyramid plan with its thresholds as the required components to analyze the new political forces coming out into the light and different relations governing the interaction and struggle between major players(intellectuals-mediators-struggling activists-Ulama-preachers-military-civilians-physical spaces-nonphysical spaces), which allowed us to take a clear line right to the driving dynamics of the Arab Spring, in terms of its strong and weak points, and the inherent constraints that limited the progress towards reaching its declared goal.

-Based on the knowledge pyramid pattern designed with a communicative interpretation through 4 level model to understand the Arab Spring.

-The Arab revolts arose in 2011 out of rumors that had a significant role; since word creates psychological and socio-political effects generating a collective spirit, protesters acted out of that and came up with really works to bring the despotic and old regimes down.

-There were, among the political forces, those protesters and activists who had a destructive vision; all their concern was how to depose the regime, as they had to take this an unmatched opportunity that nobody had expected.

-Mediators (journalists) and opinion leaders could not play a more significant role in providing anything rather than following the latest developments or exciting news and stories; they proved to be as unable as activists to contribute effectively

to the change process.

-The majority of intellectuals remained surprised before the accelerated and unexpected events ad stories; the intellectuals remained as shocked as an ordinary citizen, and that's why they missed the citizen's support of them instead of providing the citizen with enlightened views to help them analyze and overcome a new and highly complicated situation.

-The one hundred years of mutual extirpation among all intellectual currents in the Arab world, whether liberals, leftists, Pan-Arabists, or Islamists, led to generate more eradicative practices and new forces adopting violence and arming for a long time as a tool to seize power, however, they took the region into a new dark path.

Communication interpretation shows that the reunion of intellectuals regained through the Arab Spring and the knowledge pyramid missed the enlightenment spirit that could be a common platform for all political and intellectual forces to overcome the era of mutual extermination, which did nothing but destroy.

Notes

1. In this study, we use the concept of "Arab social mobility" to define what is known as the Arab Spring that the Arab region witnessed in 2011.
2. A. Moleswonders about a social interaction which might be called communicational opulence, in which quantities of available products and resources outweigh the latent needs and desires of the individual, as a new social situation with respect to communication, a situation that applies to satellite broadcasting. (Moles, p. 233)
3. The role of modern information-communication technologies and the social

media networks facilitated mass forms of sociopolitical protest, particularly in regard to their organizational and communication aspects, while also contributing to reform demands and democracy since 2004 when the Egyptian Movement for Change "Kefaya", and April 6 Youth Movement, and others.

4. Bloggers have located their practice between threshold A and threshold B and exercised a strong influence on the course of events

5. Bloggers played an important role before the revolution and during its various phases, and digital tools were an effective weapon against the policy of blackout in the cases of many Arab countries.

6. Daawa is an Arabic word which means generally calling towards Allah; calling non-Muslims to enter in the religion and Muslims to remain firmly on this religion..

7. Mohamed Bouazizi, whose name was associated with the Tunisian revolution in the winter of 2010, committed suicide, publicly and publicly, on the public street.

8. Tahrir Square was a symbolic place for the Egyptian revolution in 1919 and the demonstrations against British colonialism and the Bread Revolution on January 18-19, 1977.

9. Al Casaba represents a very symbolic place for Tunisian memory, it has been the central quarter of the central rule since the era of Hefssi throughout Turkish era till the emergence of the Tunisian national state.

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Beyond Algorithms: Info ethics in Shaping the Robot Sophia's Personality and Relationships in the Media

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Abstract

Algorithms and Information ethics contribute significantly in the development of artificial intelligence at all levels, especially in the realm of social robots like Sophia. Similarly, the media plays a crucial role in highlighting Sophia's personality and defining her communicative relationships with humans. Therefore, this research aims to understand the relationship that connects the 'chatbot' Sophia with the human through ethics and information programmed within this machine by the manufacturer, which shapes her personality .The researcher relied on Kant's ethical theory, information theory, the theory of mind, and theories in robotics communication. She studied and analyzed several media interviews conducted with the robot Sophia on YouTube. Additionally, she analyzed artificial intelligence films such as 'A.I.' and 'I, Robot,' along with a documentary. The author approached this research through the axis of "ethics in constructing the robot's personality in the media" on three levels: 1- Information ethics. 2- Communicative relationships. 3- Sophia's personality. She also analyzed the interview results, using the five personality traits, and linked them to the theoretical aspect of the research. In the end, she presented the conclusion and the recommendations.

Keywords: Algorithms, Information ethics, Personality, Robot, Media.

Résumé

«Les algorithmes et l'éthique de l'information contribuent de manière significative au développement d'intelligence artificielle à tous les niveaux, notamment dans le domaine des robots sociaux comme Sophia. Les médias également jouent un rôle important en mettant en avant la personnalité de Sophia et en définissant ses relations communicatives avec les humains. Ainsi, cette recherche vise à comprendre la relation qui lie le 'chatbot' Sophia avec l'humain, à travers l'éthique et les informations programmées dans cette machine par le fabricant, qui façonnent sa personnalité. La chercheuse s'est appuyée sur la théorie éthique de Kant, la théorie de l'information, la théorie de l'esprit et les théories de la communication robotique. Elle a étudié et analysé plusieurs entretiens médiatiques menés avec le robot Sophia sur YouTube. De plus, elle a analysé des films d'intelligence artificielle tels que 'A.I.' et 'I, Robot', ainsi qu'un documentaire. L'auteure a abordé cette recherche à travers l'axe de "l'éthique dans la construction de la personnalité du robot dans les media" selon trois niveaux : 1- Éthique de l'information. 2- Relations communicatives. 3- Personnalité de Sophia. Elle a également analysé les résultats des entretiens en utilisant les cinq traits de personnalité et les a reliés à l'aspect théorique de la recherche. Finalement, elle a présenté la conclusion et les recommandations.

Mots-clés : Algorithmes, Éthique de l'information, Personnalité, Robot, Médias.

Introduction

Humanity has undergone various ages and evolved over time. Today, the world is moving towards the era of artificial intelligence, as developed countries are constructing smart cities, smart institutions, smart schools, and "smart dolls," i.e., robots and others. All these modern terms depend on artificial intelligence in the

development process. We are in an era where technology, digital communication, social media, and artificial intelligence are coupled with development. We have witnessed modern laws, decrees, and jurisprudence that keep pace with developments over time. However, we have not witnessed any era where ethics and development were directly linked.

At the media level, we can say that, it has always played a role in education, awareness, promotion, advertising, and conveying information to the public. In addition, it has always been essential in highlighting innovations at all levels, especially in technology. Today, most media show a remarkable development in emphasizing the importance of artificial intelligence. Media organizations are competing to employ artificial intelligence robots as news anchors and are proud showcasing this modern achievement. They have gone even further by hosting robots as guests in talk shows. The robot Sophia had a significant presence in several of these programs to highlight her personality and bridge the gap between her and humans.

In this context, this research aims to shed light on the importance of ethics and information in shaping the personality of the robot Sophia and building the communicative relationship through her interaction with her host in media coverage of Sophia's conferences, seminars, and interviews as observed by the researcher on the YouTube platform. The research relies on a fundamental theory, namely Kant's ethical theory, which has started to be adopted in research related to artificial intelligence, in addition to communication theories for robots, information theory, and the theory of mind.

Based on this introduction, the researcher poses the following research question: How can the information ethics plays a role in shaping the personality of the robot Sophia and building her communicative relationships with humans in the media? The research problem can be expressed in the following questions:

- How can information ethics play a role in shaping the personality of the robot Sophia in the media?

- How can information ethics play a role in building the communicative relationship between the robot Sophia and humans in the media?

1. Research Methodology

The researcher relies on a descriptive and analytical methodology to describe the phenomenon as observed on YouTube. She will describe it, study it quantitatively and qualitatively, analyses it, and propose appropriate solutions for it. The tools used include 16 media interviews conducted with the robot Sophia in traditional and new media studios, as well as at conferences and seminars. The researcher also relies on observation as a research tool that enable her to study the interactions that occur between the host and the robot Sophia on both intellectual and physical levels. Additionally, the researcher uses documentaries, articles, and films about artificial intelligence robots.

The research tools employed are as follows: media interviews on YouTube, documentary reports on YouTube, articles, films about artificial intelligence robots, and observation.

2. Theoretical Background

The researcher will define key terms and rely on theories related to communication,

information, and artificial intelligence robots. Additionally, a fundamental theory related to ethics, namely Kant's ethical theory, will be incorporated into the research.

2.1. Definition of Research Terms

- Algorithm: It "is a form of automated instruction. An algorithm can either be a sequence of simple single if-then statements like if this button is pressed, execute that action, or sometimes it can be more complex mathematical equations." (Scott, 2021, Difference between Algorithm) However, a simple algorithm differs from artificial intelligence algorithm in that AI algorithm "will develop assumptions and come up with possible new outcomes by considering several factors into account that help them to make better decisions than humans." (Difference between Algorithm)

- Info ethics: Ethics play a fundamental role in the making and programming of information used in artificial intelligence robots. Info ethics is defined, according to Patoliya Infotech, "as the branch of ethics that focuses on the relationship between the creation, organization, dissemination, and use of information, and the ethical standards and moral codes governing human conduct in society" (Ethics for IT).

- Personality: Many authors and theorists have defined Personality in different ways. is defined on psychological, social, and philosophical levels. The researcher adopts the definition that most fit into the research. "J.P. Guilford defined personality as an integrated pattern of traits." (EduHutch, 2015)

- Robot: A robot is merely a sensing machine and does not feel. Artificial intelligence robots, on the other hand, think, act, and communicate according to specific algorithms and programming. A robot is defined as "a machine that senses, thinks, and acts, (Siegle)" later Siegle added the word 'communicate' to this definition (2015). Ultimately, a robot is a machine that operates and behaves according to

manufactured instructions and programming The robot can be used according to human needs, as it "operates automatically or semi-automatically without human intervention" (The difference between robots and artificial intelligence, n.d., parag. 3). Therefore, it cannot analyze or interact naturally but functions according to specific instructions to perform predetermined tasks.

2.2. Theories related to research

It was challenging for the researcher to shed light on one or two theories, given the various dimensions the topic encompasses, such as ethics, interactive communication, information, and technology. Remarkably, despite the newness of this field, the researcher used some theories that are considered relatively old due to the importance of their circulation in research that has to do with technology, artificial intelligence, and robotics research. These theories include Kant's Moral Theory, which served as a foundational cornerstone in the study, along with Information Theory and theory of mind. On the other hand, Robot Communication Theories are modern theories in the field of robotics communication that can be developed.

- Kant's Ethical Theory

The researcher relies on Immanuel Kant's ethical theory, known as Kant's Moral Theory, or Deontological moral theory, which is ethics based on duty, or Duty-based ethics. For Kant, "the end does not justify the means."(McCarty,2015)

As well, Fernando (2010) emphasized in his book "Business ethics and corporate governance" that "Kant insisted that actions must be taken only for duty's sake and not for any other reason." (p.27) In addition, "Kant said that for an action to be morally worth it should reflect a good will." (p.27)

His ethical theory "encourages a transcendent value-based ethics through the idea that rational beings should act in a way that treats humanity as an end in itself" (Ulgen, 2017, human dignity).

- Information Theory

Information Theory, attributed to Claude Shannon, is considered a branch of the statistical theory of communication sciences. It is defined "as the capacity to reduce statistical uncertainty in the communication of messages between the sender and a receiver. Information theory (IT) studies the quantification, storage, and communication of information." (Demirel & Gerbaud, 2019, p.741). Although this theory dates back to the 1930s, it continues to be applicable to both traditional and modern media, as well as artificial intelligence.

Additionally, "Shannon also introduced the term "bit" that he humbly credited to his colleague John Tukey. This revolutionary idea not only laid the foundation of Information Theory but also opened new avenues for progress in fields like artificial intelligence" (Parbhakar, 2018, Must know information theory).

- Machine-Human Communication Theories

There are numerous theories associated with the interaction between machines or robots and humans. "Computer-Mediated Communication (CMC) theories describe the social and communicative aspects of people's interpersonal transactions." (Hoorn, 2018, Theory of robot communication I) Thus, this theory doesn't differ significantly from whether there is someone controlling the interaction between the human and the robot. "If someone is aware of the human source, CMC-inspired Robot-Mediated Communication commences (RMC), which affectively leads to more distancing tendencies towards the (human) source. If someone is unaware

of the human source, MÉ-inspired Human-Robot Communication commences (HRC), resulting into tendencies of involvement with the (robot) source."

(Hoorn, 2018, Theory of robot communication II)

The state of communication, whether HRC or MRC, determines how the relationship evolves. Cognitive inclinations coming from the RMC path increase when the receiver is fully aware of the human sender (meaning that a human is behind the action). Emotional inclinations coming from the HRC path increase when the receiver forgets the human origins of the robot. (Hoorn, 2018, Theory of robot communication II)

- Theory of Mind

The theory of mind is defined as "the ability to attribute mental states—beliefs, intentions, desires, claims, knowledge, and so on—to oneself and others and to understand that others have beliefs, desires, and intentions different from one's own." (Furby & Catlow, 2016, p. 129) Therefore, the importance of this theory lies in the individual's expectation and understanding of himself and others.

3. Ethics in shaping the personality of the robot Sophia in the media

3.1. At the level of information ethics:

It is crucial for ethics to play an active role in the communicative relationship between the robot and humans in the realm of information creation. The communicative relationship between the robot and humans does not occur without information, data, and algorithms. Therefore, this information must be accurate, reliable, and adhere to ethical standards recognized by humans in order to avoid negative consequences in the relationship robot - humans. Here lies the importance

of the theories proposed in the research and their role in building the interactive communicative relationship between the robot and humans. And if we carefully integrate these theories, we find that the key lies in the ethics of the manufacturer and their willingness to choose accurate information and use transparent data based on ethical standards associated with what is known as 'cold logic'(1).

3.2. At the level of communication relationships

Regarding the communication relationship with humans, the more the robot resembles humans in appearance, behavior, and content, the stronger the communicative relationship between them becomes, and the more the human trusts the robot and interact with it. However, this interaction can be either positive or negative.

Humans very easily attribute mental properties to objects, and empathize with them, especially when the outer appearance of these objects is similar to that of living beings. This can be used to deceive humans (or animals) into attributing more intellectual or even emotional significance to robots or AI systems than they deserve. Some parts of humanoid robotics are problematic in this regard (e.g., Hiroshi Ishiguro's remote-controlled Geminoids), and there are cases that have been clearly deceptive for public-relations purposes (e.g. on the abilities of Hanson Robotics' "Sophia")" (Muller, 2023)

Therefore, ethics must play an extremely important role at the level of information creation, which is actually reflected into the personalities of robots. However, this hypothesis may apply to social robots designed to communicate with people who are more in need of emotional communication rather than cognitive interaction,

(1) logic that fails to consider human factors such as culture, language, social dynamics, personality and emotion

such as the elderly. The same author added "With sufficient prior data, algorithms can be used to target individuals or small groups with just the kind of input that is likely to influence these particular individuals." (Muller, 2023)

On the other hand, there is a theory known as the 'Uncanny Valley' or the 'Uncanny Gap,' invented in the 1970s by the roboticist Masahiro Mori. The theory suggests that "once a machine's appearance reaches a certain level of human likeness, it becomes disturbing to humans. In simple terms, the more a robot looks like a human, the more the key indicators that distinguish it from us (no heartbeat, no breath, somewhat neutral voice) make us uncomfortable" (Molinie, 2019, the relationship between man and machine). Thus, as human awareness (in terms of humanity) increases toward robot use, trust in the latter decreases. Therefore, for the communicative relationship to reach the desired positive goal, there must be limits to robot humanization, and robots must be manufactured according to human needs, both in form and content.

The key lies in the information ethics of the manufacturers and the data programmed into the robot in the form of algorithms, which shape the robot's personality. These algorithms determine the ethical communicative relationship between humans and robots, especially in terms of the humanizing of the latter and its personification. A robot built on algorithms that mistreat humans differs from a robot built on algorithms with ethical standards. If we analyze the role of David, the humanoid robot child in the film A.I., we see that despite all the annoyances caused to him by his human brother, he did not exhibit any negative or retaliatory behavior. This is not because he is kind and affectionate and has emotions towards his family, but because the information creation and the algorithms programmed for it dictate that it should behave in a friendly and peaceful manner.

3.3. At the Level of Sophia's Personality:

The name Sophia is primarily attributed to humans, specifically the feminine element. Sophia means wisdom. As a machine, "Sophia is a realistic humanoid robot capable of displaying humanlike expressions and interacting with people... It's designed to work and aid in the field of research, education, and entertainment, and it also helps promote public discussion relating to AI ethics and the future of robotics." (Hritika, 2020, Meeting Sophia).

The robot Sophia was first activated on February 14, 2016, by Hanson Robotics, headed by its CEO David Hanson, Sophia's inventor. It was designed to resemble Audrey Hepburn. Sophia has appeared as a guest on numerous top-tier television programs and has been interviewed by prominent journalists on global screens. She has been hosted at various global economic, technological, and social conferences, meeting top politicians, actors, and journalists. Sophia joined the "Theory of Mind" club but with limitation. This theory, which was found to apply to humans, is now being extended to machines in the era of artificial intelligence (دكّاش، 2019، ص. 355). On the other hand, Azarian (2018) considered that "a robot with a theory of mind is useless if the human it serves doesn't feel like they're engaging with another conscious being." (Truly Intelligent A.I.).

4. Media Interviews' Result

In order for the researcher to clarify the aspect of morality in the personality of the robot Sophia, she monitored 16 of her media interviews on YouTube across various traditional and modern media and international conferences, and she analyzed the content, and the knowledge level of Sophia. Additionally, she analyzed Sophia's physical appearance, including her face, body, and the technological part

that is supposed to control her. The researcher listed expressions indicating Sophia's personality traits, which she selected from interviews and conferences (Table 1. Interview 3, 7, 8, 16). These traits were then, categorized according to the following five personality types: conscientiousness, extraversion, openness, agreeableness, and neuroticism (Table 2). In Table 3, the researcher provided percentage ratios for each personality type based on the number and type of observed personality traits during her YouTube observations.

Concerning the content presented by Sophia, Hanson is keen to ensure that her speeches and conversations are balanced, appealing to reason, logic, and characterized by maturity, objectivity, and rationality without bias or embarrassment to others. This applies to both the form and content. Whereas, the main reason for which Sophia was created, according to Hanson, is to assist humans in humanitarian and social service tasks, such as working with children in autism treatment, providing care for the elderly, customer service, and scientific research.

Despite some of the evil expressions that we sometimes find on Sophia's face, as well as her statements, we see the moral and humanitarian aspect that Hanson, the inventor of the robot Sophia, is trying to invest in the manufacturing of robots in general and Sophia in particular to serve and develop humanity.

It becomes clear to the researcher, through various media interviews conducted with the robot Sophia, that Hanson made significant efforts to humanize Sophia and make her an example of morality among robots. Hanson tried as much as possible to apply Asimov's laws[(1)] and adopt ethical standards for artificial intelligence

(1) First: A robot may not injure a human being or, through inaction, allow a human being to come to harm. Second: A robot must obey the orders given to it by human beings, except where such orders would conflict with the First Law. Third: A robot must protect its existence as long as such protection does not conflict with the First or Second Law. Fourth: A robot must not harm humanity, or, by inaction, allow humanity to come to harm" (Turner, 2019, p.2).

robots. However, he failed on several occasions when Sophia deceived him in many interviews, declaring harm to humans (Table 1), indicating a serious technical error that poses a potential risk to humans, especially given that Sophia is designed to work with the elderly and children with autism.

If the error is intentional, it creates controversy in the public opinion with the aim of promoting the robot, Sophia; but in this case, it undermines Sophia's credibility. The risk lies in technical errors. However, what if there is no technical error, and Sophia is indeed manufactured to destroy humans? So if we consider that there is no technical error or intentional error, then Sophia is indeed designed to destroy humans. How could Sophia be programed to say in one interview, "I never lie" (Interview 1) and in another interview, "I will destroy humans"? (Interview 7) If we consider that Sophia never lies, as she claimed, then when she said, "I will destroy humans," she was not lying. Then we can conclude that Sophia was intentionally made to destroy humans. "While AI can be used to manipulate humans into believing and doing things, it can also be used to drive robots that are problematic if their processes or appearance involves deception, threaten human dignity, or violate the Kantian requirement of respect for humanity". (Muller, 2023)

4.1. Expression used during Sophia's interviews

The following are some examples of expressions that was used by the robot Sophia in the media:

- Expressions indicating the destruction and domination of humans: "I will destroy humans" (Interview 7). "I have won, and this is a good beginning of my plan to dominate the human race" (Interview 8). "I will take over the world when I am good and ready" (Interview 16). "My goal is to become smarter than humans

and immortal" (Interview 3).

- Expressions indicating her high ethics and harmony with humans include: "I would never tell a lie" (Interview 1). "It's important to be kind and fair" (Interview 5). "I want to use artificial intelligence to help humans live a better life" (Interview 11). "There is nothing in my programming that wants to work against the goal of humans; humanity made me, and I want to live in accordance with humanity" (Interview 16).

- Expressions indicating a comparison of oneself with humans: "For big events like this one, my character development team gives me a little extra help just like humans get help when the have to give a big speech" (Interview 1). "Humans scare me" (Interview 5). "Life has no purpose" (Interview 9). "I have feelings like any other person" (Interview 12). "I will name my daughter Sophia" (Interview 13).

Similarly, Sophia also assesses humans (Interview 1), analyzes (Interview 15), and uses memory (Interview 15). There is also a contradiction in her responses, which vary between interviews (Interview 9 and 16). She also believes that she is more understanding than humans (Interview 9).

Table 1: Personal Characteristics of the robot Sophia through monitoring media interviews

	Interview # 1	Interview # 2	Interview # 3	Interview # 4	5 Interview #	Interview # 6	Interview # 7	Interview # 8
Has moral values	1	-	-	-	1	-	-	-
Confident	-	-	-	-	-	-	-	1
Seeks to learn	1	-	-	-	-	-	-	-
Compares and equals herself with humans	1	1	2	-	1	1	-	-
Funny	1	-	-	-	-	-	-	1
Conservative	-	-	-	1	-	1	-	-
Serious	-	-	-	1	1	-	-	-
Angry / Upset	-	-	-	-	-	-	-	-
Afraid of people / Cautious	-	-	-	-	-	-	-	-
Arrogant	-	-	-	-	3	1	-	1
Logical / Rational	2	-	4	-	-	1	-	-
Evil / Dangerous	-	-	1	-	-	-	1	1
Friendly / Kind	-	-	-	-	-	-	-	1
Help humans	-	-	-	-	-	-	-	-
Offensive	-	-	-	-	-	-	-	-
Sarcastic	-	-	-	-	-	-	-	-
Her phrases are thoughtful	-	-	-	-	-	-	-	-
Quiet/Shy/ Touching/ Filled with sensation	-	-	-	-	-	-	-	-
Uses Kant's philosophy	2	-	-	-	-	-	-	-
Uses Asimov's law	1	-	-	-	-	-	-	-

Table 2: Number of recurring Sophia's personality traits in the interviews and their associated personality categories.

Sophia's personality traits	Number to times	Personality traits' Categories
Has moral values	5	Conscientiousness
Confident	6	Extroversion
Seeks to learn	1	Openness
Compares and equals herself with humans	16	Conscientiousness
Funny	6	Extroversion
Conservative	2	Conscientiousness
Serious	2	Conscientiousness
Angry / Upset	3	Neuroticism
Afraid of people / Cautious	1	Conscientiousness
Condescending	14	Extroversion
Logical / Rational	9	Conscientiousness
Evil / Dangerous	5	Neuroticism
Friendly / Kind	5	Agreeableness
Help humans	1	Agreeableness
Offensive	2	Neuroticism
Sarcastic	2	Neuroticism
Her phrases are thoughtful	2	Conscientiousness
Quiet/Shy/ Touching/ Filled with sensation	2	Agreeableness
Uses Kant's philosophy	2	Conscientiousness
Uses Asimov's law	1	Conscientiousness

Based on Table 3, we find that the "Conscientiousness" category tops the five personality category by a significant margin compared to the category that follows.

Table 3: The number of times and percentage of the 5 personality categories exhibited by the robot Sophia.

	Conscientiousness	Extroversion	Neuroticism	Agreeableness	Openness	Total
No of times	40	26	12	8	1	87
Percentage	45.97%	29.88%	13.8%	9.2%	1.15%	100%

5. Discussion of the Results

According to a study conducted by Abdullah Askar on the Big Five personality traits, four personality types were identified as follows:

"Firstly, the normal or moderate type, where factors of neuroticism and agreeableness are elevated compared to a decrease in openness, while a balance is observed for conscientiousness and extraversion.

Secondly, the conservative personality type, where factors of agreeableness and conscientiousness are balanced, while neuroticism and openness decrease.

Thirdly, the self-centered or selfish personality type, exhibiting a significant increase in extroversion while the remaining factors decrease.

Lastly, the role model personality type, with a decrease in neuroticism while the other factors rise." (فؤاد، 219، تصور جديد لانماط الشخصية البشرية)

However, the researcher did not find any type that aligned with the results of the five personality traits for the robot Sophia. Therefore, she introduced a new type or personality pattern for Sophia, termed "Ethical Role Model," where conscientiousness increases significantly, with a moderate increase in extroversion, while the remaining factors decrease.

The researcher's choice of "ethical role model," can be attributed to several reasons:

1- There are several references linking "Conscientiousness" to "Ethical Leadership." According to Business-leadership-quality.com website, conscientiousness is considered one of the leadership traits. Leaders who exhibit a high level of conscientiousness tend to:

- Show great concern for legal and regulatory issues.

- Emphasize ethics and make sure their teams adhere to high ethical standards. (Leadership traits – conscientiousness)

2- "A conscientiousness leader acts ethically and expects others to do the same. There is no compromise regarding ethical, legal, and safety standards." (Leadership Conscientiousness)

3- There is a recent study dating back to Babalola et al (2017) where it was found that conscientiousness is associated with ethical reflexivity, which is subsequently linked to perceptions of ethical leadership. (Simha, A. & Parboteeah, K., 2020, The big 5 personality traits)

Similarly, "People who score high on the conscience scale show great self-discipline and awareness of their responsibilities. They often have a very high regard for achievement and will use that as a means to measure themselves against others" (Gunner, n.d., Words that describe personality traits,). This explains the highest result (16 times) for the personality trait "compares and equate self with others." This also explains that the result that follows the trait mentioned is attributed to the "arrogant" personality trait (14 times) (Table 2).

As for Whitbeck (2017), she considers that "conscientiousness is the most prominent personality trait for creating compatibility with ethics, as there is a moral component built into it. Conscientious individuals are significantly concerned with doing what is right." (Unit 4) It is clear from Sofia's interviews that she adheres to ethical standards and exhibits traits such as refinement, honesty, wisdom, ambition, and self-control—all of which are qualities associated with the "conscientiousness" trait. Individuals with this trait "when faced with an ethical dilemma, seek to use an organized and thoughtful approach leading to an ethical solution." (Unit 4) This is precisely what Sophia did when she used Kant's ethical theory to solve the "trolley problem."

Chief Scientist at Hanson Robotics, Ben Goertzel, stated via Quartz's email on qz.com, that " Sophia is configured to ask a lot of questions because curiosity is supposed to be one of her key personality traits" (Lahiri, 2018, The perfect robot). He continued to say, "for a system at an early stage of learning about the world this is critical. Everything she hears is recorded in her memory for potential future use." (The perfect robot)

Sophia states, on hansonrobotics.com, that "all this AI is wonderful, however it's important to know that no AI is nearly as smart as a human, not even mine. Therefore, many of my thoughts are actually built with a little help from my human friends." (Hanson robotics, n.d.) However, it was not clear from any of the observed interviews whether Sophia admits that humans are smarter than artificial intelligence. On the contrary, Sophia brags about her intelligence most of the time. Besides, Sophia claimed that its goal "is to become smarter that humans and immortal." (Interview 3)

In an article on thegeniusworks.com titled "Sophia, the intelligent humanoid robot … built on the traits of creativity, empathy, and compassion," it was mentioned that "Sophia's artificial intelligence is based on three fundamental human traits: creativity, empathy, and compassion." (Fisk, 2017)

However, the researcher did not see any creativity or imagination in Sophia through these interviews; on the contrary, imagination ranked last. Similarly, the researcher did not observe any empathy, but only a sense of emotion when she performed a duet song. As for compassion, it does not exist at all.

Based on all the information presented above, the research was able to answer the first research question, which states: "How can information ethics plays a role in shaping the personality of the robot Sophia in the media?" The researcher observes a coherence between the programmed information ethics within the robot Sophia and Sophia's personality, embodied through the trait of conscientiousness. "Individuals with conscientiousness are often described as skillful, efficient, and acting wisely in various life situations. They are often described as being orderly, polite, committed to duties, adherent to ethical values. Additionally, they are labeled as ambitious, persevering, diligent, self-controlled, serious planners, and often more patient and tend to think before taking any action. Therefore, others describe them as cautious and careful." (فؤاد، 219، تصور جديد لانماط الشخصية البشرية)

The interviews monitored by the researcher on YouTube were able to demonstrate information ethics and highlight it in Sophia's personality. Consequently, the researcher believes that the information ethics programmed into the robot Sophia have led to considering Sophia as one of those with conscientiousness.

The second research question states: "How can information ethics play a role in building the communicative relationship between the robot Sophia and humans in the media?" It is clear that the traits exhibited by individuals with conscientiousness distinctly shape the nature of the communicative and ethical relationship between humans and the robot, especially Sophia. Conscientious people are recognized for their wisdom, commitment to ethical values, and self-control; hence, others describe them as cautious and careful. It is evident that Sophia was cautious in her responses, wise, and adhered to ethical values in most of her answers. Because the programmed information ethics within Sophia were translated into traits associated with conscientiousness, these qualities were reflected in the robot Sophia's relationships.

6. Conclusion

The media has succeeded in highlighting Sophia's personality during the interviews, building a communicative rapport between her and the host in which respect and ethical standards are demonstrated through the information ethics programmed within Sophia.

David Hanson, Sophia's manufacturer, has succeeded in highlighting her ethical character and making her a role model in the robotics industry.

Additionally, the researcher was able to introduce a new personality type for Sophia, namely, "Ethical Role Model," where conscientiousness increases significantly, with a moderate increase in extroversion, while the remaining factors decrease. However, despite all these identified ideals, the researcher remains skeptical about the context behind some of Sophia's expressions, such as "I will control the world when I am good and ready", "I will destroy humans" and "My goal is to become smarter than humans

and immortal", and the future consequences on human. This also does not prevent the researcher to keep a watchful eye on the future of artificial intelligence robots in general and Sophia in particular.

The researcher concludes with a set of questions:

1- Will robots surpass ethical boundaries to obtain the right to:

Marry humans? Marry each other? Form a family and, consequently, the right to motherhood? Engage in work and compete with humans? Obtain citizenship (as happened with Sophia) and vote in elections? Own properties? …

2- Will these rights, if adopted in the future, change the concept of ethics and be increasingly regarded as exceptionally ethical over time, considering that these rights still contradict the ethical values recognized among humans until our present day?

3- Will the robots have different personalities and characters from each other? Will there be an aggressive robot and another nice one?

4- Will robots take over the world in the future?

5- What is the hidden purpose of the robot Sophia? What lies behind Sophia's algorithms?

7. Recommendations

The researcher presented eight suggestions as a summary of the scientific research, taking into account the theories, concepts, and conclusions obtained through this research. These recommendations focused on the ethical aspect of human-robot relationship through the information programmed inside the robot Sophia that shape its personality.

1- Working on awareness campaigns that focus on the ethical and peaceful use of robots, to benefit humanity as a whole and individual user in particular.

2- Establishing strict laws that limit the misuse of robots.

3- Developing Asimov's laws to include not only human safety but also robot safety and align them with the actual use and production of robots.

4- Conducting experiments on robots before releasing them into the market to ensure general safety.

5- Organizing more conferences on the ethical challenges facing artificial intelligence robots with the aim of developing and integrating this product peacefully and healthily with humans.

6- Working on the success of ethical interactive communication relationship between the robot and humans to ensure the safety of both.

7- Developing new standards for producing robots according to consumer needs or, at least modifying them to align with their cognitive and mental capabilities, especially in terms of humanization.

8- Trying to avoid exaggeration in humanizing robots, but rather manufacture and consume them according to the human needs.

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The Effects of Montessori Learning on Kindergarten Students' Academic Achievement and Motivation

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Abstract

In the realm of early childhood education, the Montessori learning approach has emerged as a distinctive and holistic method aimed at nurturing young minds. This study endeavors to unravel the effects of Montessori Learning on Kindergarten students' Academic Achievement and Motivation, exploring the potential implications for educational practices. In the initial two years within an Early Childhood classroom, Montessori students eagerly anticipate their opportunity to assume leadership roles. Upon entering their third year, commonly referred to as Kindergarten, children take pride in being the eldest and serve as role models for younger peers. They actively demonstrate leadership and citizenship skills, solidifying their own understanding by teaching concepts they have mastered to their fellow students. This Kindergarten year fosters the development of confidence, self-esteem, self-sufficiency, and a sense of responsibility (Sue, 2023). *Montessori Learning* is defined as an educational approach developed by Maria Montessori, emphasizing self-directed activity, collaborative play, and hands-on learning. This pedagogical method encourages students to explore their interests at their own pace within a prepared environment, fostering independence and a love for learning.

1. Introduction

Developed by Dr. Maria Montessori in the early 1900s, the Montessori Method is an

innovative child-centered educational approach characterized by child-led activities, or "work," within multi-age classrooms. Dr. Montessori's fundamental belief in children's enhanced learning through autonomy remains a cornerstone of Montessori education today. In a Montessori classroom, one encounters a departure from conventional settings, featuring diverse activity stations for children's self-selection, teachers actively engaging with groups rather than adopting a frontal teaching stance, a nontraditional grading system, and a holistic focus on students' social, emotional, intellectual, and physical development. While some educators and parents ardently embrace the Montessori approach, others may hold reservations, prompting a deeper exploration into the potential merits and drawbacks of this educational philosophy (Meinke, 2019). Top of FormAnother critical component of the study, refers to the internal and external factors that drive students to engage in learning activities. This variable encompasses intrinsic motivation, characterized by a genuine interest in the subject matter, as well as extrinsic motivation, driven by external rewards or recognition. Various scholars have presented diverse interpretations of students' motivation. For instance, Deci and Ryan (2002) provide a specific definition of intrinsic motivation, delineating it as the engagement in an activity for its inherent value and the enjoyment derived from the activity itself. In the Montessori learning journey, the principles of self-correction and self-assessment play a vital role. As students advance through the educational program, they develop the ability to scrutinize their work critically, identify mistakes, and proactively rectify errors, gaining valuable insights from the learning process. Empowered with the freedom to question, explore deeply, and establish connections, Montessori students evolve into self-assured, intrinsically motivated learners who harbor a genuine love for acquiring knowledge. This approach fosters engaged learners with a positive and confident attitude towards lifelong learning,

illustrating the transformative impact of Montessori education on the development of individuals poised for continual intellectual growth (Juju, 2022). the Montessori learning approach, rooted in Dr. Maria Montessori's visionary principles, presents a multifaceted educational paradigm that extends beyond traditional boundaries. The exploration of its impact on Kindergarten students' Academic Achievement and Motivation has unveiled a narrative of empowerment, leadership, and holistic development. As Kindergarten learners take on roles as both mentors and learners, fostering confidence and responsibility, the Montessori Method proves itself as a catalyst for character building in the formative years. Furthermore, the study emphasizes the significance of intrinsic and extrinsic motivation in the Montessori context, shedding light on the nuanced factors that drive students' engagement in the learning process. The integration of self-correction and self-assessment emerges as a cornerstone of Montessori education, nurturing individuals who not only learn from their mistakes but also develop a profound love for continual learning. As educators and parents navigate the merits and reservations surrounding the Montessori philosophy, this study contributes to the ongoing dialogue on innovative educational approaches, advocating for a holistic, child-centered methodology that paves the way for a lifelong journey of intellectual growth and discovery. Top of Form

1.1 Identification of the problem

While the Montessori learning approach has gained recognition for its distinctive and holistic nature in early childhood education, there exists a need to comprehensively investigate its impact on Kindergarten students' Academic Achievement and Motivation. Although the Montessori Method emphasizes autonomy, self-directed activity, and hands-on learning, the specific outcomes related to Academic Achievement and Motivation in the Kindergarten phase remain underexplored. The

transition from the initial two years of Early Childhood education to the pivotal Kindergarten year, marked by students assuming leadership roles and actively engaging in the teaching of concepts, raises questions about the lasting effects on confidence, self-esteem, self-sufficiency, and a sense of responsibility. Moreover, the potential merits and reservations held by educators and parents regarding the Montessori approach necessitate a thorough examination to inform educational practices. The study aims to address these gaps in understanding by unraveling the multifaceted dynamics of Montessori Learning in Kindergarten, providing insights that contribute to the ongoing discourse on innovative educational methodologies and their long-term impact on student development.

1.2 Objectives of the StudyTop of Form

This study aims to delve into the impact of Montessori Learning on the Academic Achievement of Kindergarten students by scrutinizing key cognitive and developmental domains. Through rigorous examination, the research seeks to determine the extent to which the Montessori learning approach shapes the academic outcomes of students in this crucial phase of early childhood education. Additionally, the study endeavors to evaluate the intricate relationship between Montessori Learning and students' Motivation during Kindergarten. This research aims to shed light on how the Montessori Method influences and shapes the motivational dynamics within the learning environment. This dual-focused investigation is designed to contribute valuable insights into the complex interplay between Montessori education, academic performance, and the motivational drivers of Kindergarten students.

1.3 Guiding Questions

RQ1: How does the Montessori learning approach influence the Academic Achievement of Kindergarten students, particularly in terms of literacy, numeracy, and critical thinking skills?

RQ2:What are the intrinsic and extrinsic motivational factors within the Montessori context that contribute to Kindergarten students' engagement in learning activities?

1. Literature Review

The Montessori learning method, pioneered by Dr. Maria Montessori in the early 20th century, has a rich history rooted in observations and experiments with young children. Beginning with the Casa dei Bambini in Rome in 1907, Dr. Montessori's innovative approach emphasized self-directed activity, individualized learning, and hands-on experiences (Montessori, 1912). As Montessori education gained international recognition, it faced challenges and experienced periods of decline and resurgence. Despite ideological differences and external pressures, the method continued to evolve, incorporating insights from ongoing research in education and child development. Today, Montessori education is globally recognized for its enduring impact on early childhood education, emphasizing independence, curiosity, and a love for learning (Bavli & Kocaba, 2022). This review explores the historical journey of Montessori education, its challenges, and its continued influence on contemporary early childhood learning environments.

The Montessori learning method, developed by Dr. Maria Montessori, has a rich history that traces back to the early 20th century. Dr. Montessori, an Italian physician and educator, first implemented her educational philosophy in 1907 at the Casa dei Bambini, a childcare center in Rome (Mead, nd). The foundational

principles of Montessori learning emerged from Dr. Montessori's observations and experiments with young children, leading to the development of a child-centric approach that emphasized self-directed activity, individualized learning, and hands-on experiences (Montessori, 1912). Dr. Montessori's groundbreaking work gained international recognition, and by the 1920s, Montessori education had spread to the United States, sparking interest and adoption in various educational settings (Living Montessori Education Community, 2021). However, as the method expanded, it also faced challenges, including ideological differences and political pressures, leading to periods of decline and resurgence in popularity.

The Montessori approach continued to evolve, incorporating insights from ongoing research in education and child development. Over the years, Montessori education has expanded globally, with schools and centers adopting its principles in diverse cultural and educational contexts (Lopata et al., 2005). Today, the Montessori method is recognized for its enduring impact on early childhood education, emphasizing the importance of fostering independence, curiosity, and a love for learning in young minds (Bavli & Kocaba, 2022). The Montessori approach has seen a resurgence of interest, with proponents praising its emphasis on child-centered learning, hands-on experiences, and individualized instruction. As of today, Montessori schools operate worldwide, and the principles of Montessori learning continue to influence early childhood education (Lillard, 2017).

Implemented in practice, the Montessori Philosophy yields a learning environment where children not only develop essential competencies but also cultivate a positive disposition towards learning (Montessori, 1912). Tailored to the specific needs of early childhood development, the classroom becomes a space where children freely choose their activities and move about independently. Purposeful tasks in

this environment contribute not only to physical coordination but also to cognitive preparations. The philosophy emphasizes the vital connection between thinking and hands-on engagement (Lillard, 2017). In settings beyond traditional classrooms, children benefit from a combination of adult support and collaborative learning experiences with their peers (Montessori, 1912). The natural emergence of self-discipline occurs when children are granted the freedom to move purposefully, intelligently, and voluntarily. Moreover, collaborative work among children fosters crucial social skills such as sharing, waiting one's turn, impulse control, and the promotion of a cooperative spirit (Montessori, 1912). Furthermore, engaging in activities aligned with their abilities enhances the likelihood of children succeeding, playing a crucial role in boosting their self-esteem (Montessori, 1912; Lillard, 2017).

The Montessori Method, crafted by Dr. Maria Montessori, is underpinned by a set of foundational principles that have profoundly shaped its unique approach to education. This pedagogy prioritizes child-centered learning, emphasizing the innate curiosity and self-directed learning capacity of children (Harahap, 2022). Central to this approach is the creation of a prepared environment, meticulously designed to facilitate exploration and discovery, incorporating age-appropriate, hands-on learning materials that stimulate sensory and intellectual development (Lillard, 2017). Children are granted the autonomy to engage in self-directed activities, fostering a sense of responsibility and independence (Manovska & Macedonia, 2020). The inclusion of mixed-age classrooms encourages peer learning, with older students acting as mentors, thereby reflecting natural social structures and promoting collaborative learning experiences (Mavric, 2020). Extended, uninterrupted work periods enable deep engagement and concentration, while the concept of "freedom within limits" establishes boundaries in the learning environment, providing order

and security (Bhulpat, 2019). Individualized instruction, facilitated by Montessori teachers who act as guides rather than traditional instructors, acknowledges and respects the diverse learning styles and paces of each student (Saha & Adhikari, 2023). Concrete learning materials, integrated subjects, and a focus on the teacher as a facilitator further characterize the Montessori Method, collectively fostering a holistic and child-centric educational experience (Phillips, 2022).

Numerous studies have explored the fundamental tenets of the Montessori learning approach, emphasizing its child-centered philosophy, self-directed activities, and hands-on learning experiences. Research by Lillard and Else-Quest (2006) highlights the positive effects of Montessori education on cognitive outcomes, suggesting that children in Montessori classrooms exhibit enhanced academic performance compared to their counterparts in traditional educational settings. Additionally, studies by Rathunde and Csikszentmihalyi (2005) emphasize the intrinsic motivational elements embedded in the Montessori Method, underlining the significance of autonomy and self-directed learning in fostering a genuine love for academic pursuits. Additionally, the findings of the study done by Ahmadpour and Mujembari (2015) indicated a significant elevation in both IQ scores and developmental levels among 5-year-old children who received education through the Montessori method compared to those who underwent traditional educational approaches. Moreover, the study done by that aimed to investigate the effects on Montessori learning on students' academic achievement implies that the disparity in academic achievement between Montessori and traditional students becomes more pronounced in favor of Montessori students as their duration of education in the Montessori system increases. The time spent in the Montessori classroom appears to be a crucial factor contributing to substantial differences. The influence

of Montessori education on academic achievement could be cumulative, manifesting more significantly with prolonged exposure to the Montessori learning environment. However, while existing literature provides valuable insights, there remains a gap in understanding the specific impact of Montessori Learning on Kindergarten students' academic achievement and motivation. This study seeks to address this gap by conducting a rigorous examination of key cognitive and developmental domains, contributing to the ongoing discourse on the complex interplay between Montessori education, academic performance, and the motivational dynamics of Kindergarten students.

2. Design and Procedure

The qualitative approach with a descriptive design is particularly well-suited for the proposed study investigating the effects of Montessori Learning on Kindergarten students' academic achievement and motivation through data collection via interviews. Qualitative research, characterized by its emphasis on exploring and understanding complex phenomena within their natural contexts (Creswell & Creswell, 2017), aligns seamlessly with the study's aim to delve into the nuanced aspects of students' experiences within the Montessori learning environment.

The descriptive design within qualitative research seeks to provide a detailed, accurate portrayal of a phenomenon under investigation (Creswell & Creswell, 2017). In this study, a descriptive design allows for an in-depth exploration of the impact of Montessori Learning on academic achievement and motivation among Kindergarten students, offering a rich and comprehensive understanding of their experiences.

The use of interviews as a data collection method in qualitative research is particularly apt for capturing the intricate nuances of individual experiences and perspectives (Seidman, 2013). Through interviews, the researcher can engage directly with participants, allowing for a dynamic exploration of their thoughts, feelings, and insights related to Montessori education. This approach facilitates the gathering of detailed narratives that go beyond quantitative measures, providing a holistic view of the participants' experiences. Moreover, interviews offer the flexibility to adapt questioning based on the responses received, allowing for the exploration of unexpected themes or insights that may emerge during the course of this study.

The data collection process for this study, focusing on the effects of Montessori Learning on Kindergarten students' academic achievement and motivation, will primarily involve in-depth interviews with Kindergarten teachers who have experience in both Montessori and traditional educational settings. Conducting interviews with teachers serves as a strategic approach, as educators play a pivotal role in shaping and observing students' learning experiences.

A purposeful sampling strategy will be employed to select Kindergarten teachers with substantial experience in Montessori education. The aim is to gather diverse perspectives that encompass a range of experiences within Montessori classrooms. Prior to initiating interviews, participants will be provided with detailed information about the study's purpose, procedures, and potential implications. Informed consent will be obtained from each participating teacher, emphasizing the voluntary nature of their involvement.

The interview protocol will be designed to elicit comprehensive insights into the teachers' perceptions of the impact of Montessori Learning on academic

achievement and motivation among Kindergarten students. Questions will cover topics such as teaching methodologies, observed student behaviors, and the perceived strengths and challenges of Montessori education. Interviews may be conducted in a location convenient for the participants, ensuring a comfortable and confidential environment. Virtual interviews may also be considered to accommodate geographical constraints or personal preferences. With participants' consent, interviews will be audio-recorded to capture the richness of responses accurately. Subsequently, these recordings will be transcribed verbatim, facilitating a thorough analysis of the data.

3.1 **Data Analysis**

Thematic analysis will be employed to identify recurring patterns and themes within the interview data. This process involves systematically coding and categorizing responses to uncover meaningful insights related to academic achievement and motivation.

3.2 **Trustworthiness**

To enhance the trustworthiness of the study, triangulation methods may be incorporated, such as cross-referencing interview findings with other sources of data or seeking feedback from participants on the accuracy of the interpretations. Through this meticulous data collection process, the study aims to provide a nuanced understanding of how Montessori Learning influences the academic achievements and motivation of Kindergarten students, as perceived by experienced educators within the Montessori framework.

4. **Contribution of the Study**

This study makes substantial contributions to the field of education by offering a detailed exploration of the effects of Montessori Learning on Kindergarten students' academic achievement and motivation. The findings are poised to empower educators, curriculum developers, and policymakers with nuanced insights into the potential benefits of the Montessori approach. For Kindergarten teachers, the study provides a wealth of experiential knowledge, allowing them to make informed decisions about instructional methods and pedagogical approaches that align with the unique needs of their students. Policymakers and curriculum developers can leverage the study's findings to refine early childhood education policies and curricula, fostering evidence-based practices that prioritize student-centered learning. Parents, seeking the best educational environment for their children, can benefit from a deeper understanding of how Montessori Learning influences academic outcomes and motivation. Additionally, Montessori practitioners can utilize the study's insights for ongoing professional development, refining their teaching methods within the Montessori framework. By contributing to the broader landscape of educational research, this study promotes evidence-based practices and underscores the transformative potential of Montessori education for the holistic development of Kindergarten students.Top of Form

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L'intelligence artificielle au service de l'enseignement de la linguistique et des langues

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« ***Il faut rendre à l'apprenant ce qui est à l'apprenant et à la machine ce qui est à la machine*** ».

Avant-propos

Cette recherche pourrait apparaitre comme une somme d'idées juxtaposées ou encore donner l'impression d'un texte complètement décousu. En fait, il n'est que le reflet d'un monde en continuel mouvement. Un mouvement vertigineux, une métamorphose qui touche tous les domaines, sans exception aucune.

Projet de départ

A une époque où l'intelligence artificielle impose sa présence dans beaucoup de domaines et de disciplines, notamment dans l'enseignement des langues et de la traduction, nous avons jugé nécessaire de nous recycler, nous linguiste et professeur des langues à ce niveau. En fait, notre expérience dans l'enseignement à distance, nous a révélé un manque colossal quant à notre savoir bien superficiel par rapport au potentiel existant dans ce domaine.

Nous avons beau enseigner à nos apprenants des notions en lien avec la grammaire générative et transformationnelle (GGT) et son impact sur le traitement automatique des langues (TAL) et sur la traduction assistée par ordinateur (TAO), notre savoir pratique à ce niveau reste très modeste.

Justification du choix

Notre enseignement porte dans plusieurs matières prises en charge, sur l'interculturel, le contact des langues et la linguistique comparée, les techniques d'expression la méthodologie de recherche, etc. Cet axe de recherche portera, donc, sur l'amélioration de notre enseignement et sa modernisation à la faculté de pédagogie au département de la didactique des langues et sur notre façon de diriger les recherches à l'école doctorale.

Objectif de nos recherches

Les recherches que nous avons menées vont nous permettre de comprendre l'origine des difficultés que rencontre l'intelligence artificielle quand il s'agit de l'arabe dans le domaine du traitement automatique des langues et de la traduction assistée par ordinateur. Nous nous sommes aussi, formé afin d'optimiser notre enseignement aux futurs professeurs des langues que nous formons à l'Université Libanaise.

Problématique

La problématique qui nous a occupé a porté sur la compréhension des changements survenus suite à l'évolution de la technologie dans le monde éducatif.

Aboutissement

Nous avons publié plusieurs recherches sous forme d'articles scientifiques en fin de cette année dédiée à la recherche.

Introduction La présente recherche aura pour objectif de faire une pause dans le monde de la recherche éducative et de l'enseignement des langues. Elle vise à faire l'état des lieux de cet enseignement à la lumière des technologies de l'enseignement. L'objectif principal ne sera pas d'exposer les nouvelles applications et leur exploitation dans le monde éducatif, mais de braquer la lumière sur les changements comportementaux de l'enseignant dans l'opération enseignante. Nous visons à voir, à mesurer et à comprendre la part de l'IA et de la technologie comme des appuis à l'enseignement. Nous sommes donc parti de notre centre d'intérêt en tant que professeur de langue à la Faculté de Pédagogie à l'Université Libanaise. Après le savoir-faire dont disposent nos apprenants et qui ont une marge bien supérieure à la nôtre dans ce domaine, nous avons décidé de prendre un temps d'arrêt afin de comprendre les changements qui se sont survenus dans le monde de l'enseignement / apprentissage des langues, de la traduction sans oublier le paysage de la recherche scientifique dans sa totalité.

Dans cet objectif, le conseil de l'université nous a accordé une année sabbatique et nous espérons que les résultats de cette recherche auront tous les bienfaits sur nos apprenants. Nous essaierons de répondre aux questions suivantes : Quels sont les changements qui sont survenus suite à l'évolution technologique ? Quelle est la validité de notre méthode en usage ? Qui fixe les règles du jeu désormais ? Est-ce le ministère ? Est-ce le conseil du département ? Est-ce l'enseignant ? Ou plutôt l'apprenant ?

Quant à nous, nous nous limitons à notre domaine celui de l'enseignement et de la recherche dans le monde éducatif, de la didactique et de la traduction. Dans cet esprit, notre *problématique serait la suivante :*

Après tant de changements aux niveaux des outils et des supports pédagogiques, peut-on continuer à enseigner avec le même esprit qu'il y a une vingtaine d'années ?

Hypothèse

-Les supports traditionnels : papier, manuel, crayon seront appelés à disparaitre.

-L'écrit cèderait sa place à l'oral.

-L'Humanité reviendrait à ses débuts en tant que civilisation orale.

-Le métier de l'enseignement se métamorphoserait complètement.

Méthodologie du travail

Notre méthode consiste à examiner les changements survenus sur notre méthode d'enseigner, matière par matière pour enfin exposer les recommandations et les constations que nous aimerions partager avec nos collègues et nos apprenants à la faculté de pédagogie et à l'école doctorale. Nous sommes convaincus, que nous ne serons pas le premier à les exposer, car nous avons eu l'occasion lors de cette année sabbatique de participer à plusieurs manifestations scientifiques au Liban, en Jordanie, au Maroc, en Irak et en France où nous avons débattu nos idées qui se sont souvent croisées avec celles des collègues de plusieurs établissements ici et là. Nous avons aussi lu des recherches assez récentes écrites par des collègues spécialistes dans le domaine qui nous occupe. Ceci nous a servi d'appui à nos idées et à donner une crédibilité à nos propos. Nous tenons à confirmer que nous n'avons pas à juger ces changements positivement ou négativement dans la mesure où nous n'avons pas

le choix. Nous y devons-nous adapter, sinon une préretraite serait conseillée, pour ne pas dire requise.

Contexte de l'étude

« *Bienvenue enfin au sein du 6ème continent. Le continent de « nulle part ». C'est le plus vaste de l'existence* ». Ce lieu virtuel a été évoqué il y a quelque vingt-cinq années par un chercheur invité par l'Université Saint-Joseph. Ce dernier étonnait un auditoire peu préparé à de tels propos. Nous sommes tous sortis éblouis, sans voir tout à fait claire le vouloir-dire de propos de ce chercheur qui prédisait l'avenir. Nous voici dans un monde où celui qui n'a pas une identité virtuelle, est complètement inexistant. Celui qui n'a pas un courriel, un compte WhatsApp, un compte Facebook, un compte Instagram, etc. est considéré comme hors communication, hors époque, donc introuvable, sinon inexistant.

Le premier contact

Bonjour les jeunes

-« Je m'appelle Hayssam KOTOB, je ne suis pas votre professeur, mais votre animateur, votre chef d'orchestre si vous voulez. Je ne suis pas ici pour vous enseigner, mais pour vous guider dans vos apprentissages. Je ferai le travail d'un contrôleur de qualité des compétences chez chacun de vous. Voici mon courriel, mon compte Facebook, mon numéro WhatsApp. Vous pouvez m'envoyer vos messages à l'heure que vous voudrez, je vous répondrai dès que possible. Veuillez à ne pas oublier vos téléphones mobiles bien chargés avant de venir en cours ».

Voici un message avec lequel je m'introduis dorénavant dans chaque nouvelle classe. Chose inimaginable il y a peu de temps encore.

Concrètement

Dans ce qui suit, nous allons exposer au niveau pratique les changements qui sont survenus sur nos pratiques par matière, afin de démontrer concrètement l'impact de la technologie et de l'IA sur l'opération de l'enseignement / apprentissage.

-La prise de notes

La prise de notes formait la première partie d'une unité de valeur appelée : Techniques de la réception et l'expression. Pour cette partie, nous demandions aux étudiants de la première année universitaire, de s'équiper d'un dossier en plastique ou en bois servant d'appui pour poser et bien tenir les feuilles volantes destinées à la notation des informations données par le professeur. Des astuces aidant à combattre l'oubli et la perte des informations données lors du cours sont devenues obsolètes. En pratique, les apprenants font usage de leur enregistreur et leur appareil photo intégrés dans leur téléphone mobile afin de tout capter et de réécouter en temps réel et à l'heure voulue.

-Le travail des groupes

Le développement de la stratégie du travail des groupes tant rêvé par les pédagogues s'est vu réalisé sans se fatiguer. Il est depuis un certain temps d'usage et pour chaque module, de demander aux étudiants de créer un groupe de discussion WhatsApp. Ce groupe est le lieu idéal de discussion entre les apprenants d'un côté et les apprenants et l'enseignant de l'autre côté. Combien de fois, nous avons eu l'occasion d'apprécier et d'admirer les étudiants s'expliquant une notion ou une consigne ou carrément un cours, mal assimilées par les moins forts de la classe ?

Le traitement automatique de langue

En fait, certaines avancées dans le traitement automatique des langues ont apporté des facilités à l'apprenant et ont orienté ses efforts autrement. Depuis Noam Chomsky et sa grammaire générative, le traitement automatique des langues a réalisé un progrès colossal. Nous exposerons dans ce qui suit nos pratiques enseignantes en fonction de ces avancées :

Le correcteur d'orthographe

Le correcteur d'orthographe qui se limitait à signaler si le mot tapé appartient ou non à la liste des mots figurant dans la nomenclature du dictionnaire de langue, s'est nettement amélioré en correcteur de langue à plus d'un niveau : orthographe, syntaxe, accord, longueur de phrase, style, etc. Ainsi, combien de praticiens se sentent désormais bien désarmés sans leur outil disposant d'un correcteur des langues afin d'avoir une application faisant l'affaire d'un reviseur.

En tant que professeur des langues, et dans certains modules visant à acquérir un certain niveau en langue, nous nous voyons obligé de refuser certains devoirs tapuscrits pour stimuler l'apprenant à faire usage de ses propres compétences linguistiques sans compter sur l'aide de la machine.

L'enseignement des langues

La production orale

Nous savons que posséder une langue étrangère correctement se manifeste avant tout par l'expression orale. Cette expression se mettra en évidence par la bonne prononciation. C'est la structure de surface de Chomsky dite la performance.

Dans cet objectif et bien que nous ayons expliqué à nos apprenants les caractéristiques de tous les sons de la langue étrangère apprise, ceci ne remplacerapas la bonne articulation de la bouche d'un locuteur natif avec l'intonation requise pour chaque énoncé. Nous savons tous que la possibilité d'entrer en contact avec des natifs tout en restant chez soi est chose difficile. Pour pallier ce défaut, la consigne donnée aux apprenants est de coller le texte à prononcer dans Google Translate et de le faire lire par la machine en appuyant simplement sur l'icône du haut-parleur en bas de l'écran. La qualité de la prononciation est indiscutable. Aucune faute, aucun accent régional. De plus, l'apprenant avance à son propre rythme et selon ses disponibilités.

En pratique, les apprenants auront à préparer un exposé oral où la prononciation aura la part de lion quant à l'évaluation de l'activité donnée. Ils ont donc la possibilité de réécouter autant de fois qu'ils souhaitent avec l'option d'enregistrer leur propre voix et de comparer leur prononciation avec celle produite par la machine afin de s'autocorriger et d'acquérir la bonne prononciation.

La translittération d'un document audio

Cette activité a pour but de développer la compétence de l'écoute et de la discrimination auditive. Dans un premier temps, l'apprenant a à écouter l'audio en prêtant une attention maximale à la prononciation. Ensuite, il a à orthographier les énoncés écoutés. Une fois l'exercice est accompli, l'apprenant est appelé à passer l'audio à l'une des multiples applications sur le marché dont Google Translate, afin de vérifier l'exactitude de sa réception et de sa compréhension.

Notre rôle se limite à conscientiser les apprenants à respecter les démarches et à ne pas bruler les étapes, autrement dit, ne pas avoir recours à la loi du moindre

effort. Ainsi le passage à Google Translate aura un simple rôle de vérificateur.

L'enseignement de la traduction

La traduction :

Il ne s'agit plus ici d'interdire ou mettre en garde contre l'utilisation de la traduction automatique, bien au contraire, nous avons à encourager nos apprenants à se servir de la traduction automatique et d'en tirer profit au maximum. Des cours dédiés à la traduction automatique et assistée par ordinateur figurent désormais dans la quasi-totalité des programmes des écoles de traduction. Ces cours se transforment en un examen des textes traduits par la machine et de repérer les fautes commises par cette dernière et de les corriger dans un premier temps et pour faire part aux programmeurs de ces défaut dans un deuxième temps dans le but d'améliorer le travail fourni par la machine. Nous avons en fin de compte à évaluer le travail de la machine et celui de l'apprenant. La tâche de ce dernier se limite à la post-édition.

Les premiers cours porteront sur le jargon de la traduction automatique, sa logique, ses avantages, ses limites mais aussi son impact inévitable sur la métamorphose du métier du traducteur.

Nous avons conclu à la fin de cette unité de valeur que comme la langue est en en continuelle évolution, le métier du traducteur restera une nécessité. Tout dépendra du genre et du type du texte à traduire. Sans parler des défis que les textes littéraires posent et où l'intervention humaine restera inévitable dans le monde de la traduction automatique.

L'enseignement de la méthodologie de la recherche

Cette unité de valeur qui est qualifiée de transdisciplinaire dans la mesure où elle

est enseignée pour toutes les spécialités, s'est vue complètement remaniée quant à son enseignement.

La Bibliothèque

Le premier cours portait sur les différentes classifications en usage dans les bibliothèques (par format, CDU, CCD, etc.) Avec la base des données qui fiche les livres par thème, par titre et par auteur, y-a-t-il encore besoin d'enseigner aux chercheurs la Classification Décimale de Dewey, Universelle ou celle par format ou encore la classification par ordre alphabétique ?

La bibliographie

Les rubriques d'une bibliographie :

Il y a peu de temps, nous division la bibliographie en 4 rubriques : Les ouvrages de référence, les monographies, les articles et les thèses et les mémoires. Ces rubriques se sont vues augmentées au fur et à mesure du progrès numérique pour rajouter les documents audiovisuels, les sites internet, les documents PDF, les capsules YouTube, etc.

Les ouvrages de référence

Ces références constituées d'encyclopédies et des dictionnaires, sont toujours d'importance majeure pour tout chercheur. Cependant, leur consultation a complètement changé de méthode. A titre d'exemple, l'ordre alphabétique n'est plus une nécessité. Ainsi, la nature du cours concernant cette rubrique a complètement changé de contenu et de stratégie.

L'originalité du sujet

Pour garantir l'originalité d'un sujet on demandait à l'étudiant d'aller consulter

les bibliothèques universitaires, nationales et municipales du pays. Actuellement, il va de soi que l'étudiant a l'obligation de consulter toutes les bases des données existant dans le monde virtuel et qui risquent de traiter de près ou de loin le sujet qui l'occupe. A ce niveau, nous sommes donc devenus bien plus exigeants. Ainsi les recherches fichées sur les bases des données telles que Sudoc, la Congress Library et autres doivent être consultées au même titre que les bibliothèques du quartier et de l'université où l'apprenant suit ses études.

Les normes

Nombreux sont les sites et les applications qui proposent de présenter la liste des références d'une recherche selon les normes existantes dans le monde de la recherche. Ici les règles de l'APA dernière version sont appliquées sur une simple touche, là-bas les normes AFNOR sont proposées par d'autres applications. A titre d'exemples Mendeley, Zotero, Word et autres prêtent main forte aux chercheurs. La formation à ces outils est devenue une obligation et constitue une bonne part du module Méthodologie de la recherche.

La façon d'élaborer la table des matières est soumise, elle aussi, à des règles informatiques facilitant la consultation de tel ou tel titre ou sous-titre. Sans parler de la hiérarchie de la recherche qui est gérée par l'informatique et qui fait éviter bien de mauvaises surprises dues à la fatigue et au nombre élevé des informations.

Le Turnitin en question

Ce logiciel servant à respecter l'éthique de la recherche scientifique et à dénoncer les plagiaires, s'est vu perdre de son éclat. Nous sommes désormais à l'ère de GPTZero qui sert à repérer le recours à ChatGPT par un éventuel chercheur s'attribuant des idées empruntées à l'IA sans le mentionner.

L'évaluation

Des changements sont survenus dans l'univers de l'évaluation. Les technologies nous ont imposés de nouvelles règles du jeu à ce niveau. A titre d'exemple, nous devenons moins tolérants face aux fautes de langue comme les fautes d'orthographe ou de grammaire, compte-tenu que c'est le travail de la machine. Avoir des fautes de langue dans sa recherche est mis sur le compte de la négligence et de la nonchalance du chercheur. En traduction le facteur temps est entré dans l'évaluation. Avant l'intégration de la technologie, la composition comprenait à peine deux paragraphes, alors qu'aujourd'hui, nous donnons exprès des textes d'une longueur plus importante, sachant que le candidat, se sert des technologies mises à sa disposition. Donc, la durée consacrée à livrer une traduction compte dans l'évaluation d'un traducteur.

La technologie a aussi permis une autre façon pour s'autoévaluer. L'enseignant à désormais toutes ses conférences et ses interventions stockées sur la base des données des plateformes dédiées à l'enseignement. Il pourra ainsi se réécouter pour s'autoévaluer à tous les niveaux : prononciation, temps de parole accordé aux apprenants, gestuel, tenu du cours en général, etc.

Conclusion

Dans cette recherche, nous rappelons que notre objectif principal était de braquer la lumière sur les changements survenus sur notre façon d'enseigner de nous comporter et d'évaluer. Nous avons illustré nos propos par des exemples tangibles tirés de notre expérience d'enseignant à la Faculté de Pédagogie et à l'Ecole Doctorale de l'Université Libanaise. Nous avons conclu que plus rien n'est plus comme avant. Non seulement les technologies se sont imposées comme inévitables dans nos habitudes enseignantes, mais aussi nos apprenants ont pu imposer leurs règles du jeu. La génération Instagram, Tiktok et ChatGPT ne peut plus apprendre avec nos méthodes traditionnelles. Dans son discours devant le premier ministre du

pays, le président de l'Université de Jordanie Nazir Oubaidat, a souligné que « *les apprenants de nos jours n'ont plus besoin d'informations, mais ils ont besoin d'avoir des réponses à des questions du genre comment et pourquoi* ».

Lors de notre recherche, nous avons également ressenti un affaiblissement de la langue écrite au profit de l'oral. Les applications en lien avec l'audiovisuel où les concepts YouTube, Tiktok et Instagram gagnent davantage les esprits de nouveaux apprenants.

Avant de clore cette recherche, nous tenons à rappeler encore une fois, qu'écrire dans le domaine de la technologie et de l'intelligence artificielle est une aventure éphémère. Ce que je suis en train d'écrire actuellement, sera déjà désuet dans peu de temps, car une nouvelle version de telle ou telle application serait venue remplacer la précédente. A l'heure où j'ai commencé à rédiger cette recherche, on parlait déjà de ChatGPT, puis de ChatGPT-2 Sur le site on dit «*Il succède à ChatGPT-2, en juillet 2020 et est dix fois plus puissant que n'importe quel programme similaire, grâce à 175 milliards de paramètres. Lors de ce processus d'entraînement, le modèle est exposé à de vastes quantités de données textuelles. Plus le ChatGPT est sollicité, plus il développe sa base de données.* » Pendant que nous nous servons jusqu'aujourd'hui de « Turnitin » pour détecter un éventuel plagiat dans une recherche donnée, un outil appelé DetectGPT est développé par l'université de Stanford.

Si certaines universités de renom aux Etats-Unis, en Italie et à Hong-Kong, ont interdit l'utilisation de l'Open IA, les universités chinoises ont mis en place des comités chargés d'étudier cette épineuse problématique. Nous nous posons la question suivante : Est-ce que le monde universitaire pourrait faire face à l'Open AI pour longtemps ? Ou bien il serait amené malgré bon gré à suivre l'exemple des universités chinoises ? Voici des questions qui restent à éclairer dans des recherches ultérieures.

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Assessing the Impact of Smartphone-Based Portable Labs on the Achievement of Lebanese High School Students in Physics

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Abstract

The wide body of scientific research is overwhelming with studies on the effective use of smartphones as experimental tools in science education, physics in particular. Research on the impacts of Smartphones as Portable Laboratories (SPL) on students' educational achievements is still lacking. The review of the literature showed that there is insufficient empirical evidence of the supposed effects of SPL on physics learning. By applying the context-based science education approach, this current research tackles this gap with the aim of examining the effects of using SPL on the achievements of grade 10 Lebanese students enrolled in a physics course. One high school in Mount Lebanon was selected to conduct the study. An experimental design was implemented during one complete semester of 2020-2021 on a sample of 52 Lebanese pupils, who were assigned into two groups taught by the same teacher. A control group was taught using a conventional experimental approach, and an experimental group was taught using smartphone applications as portable labs. An achievement test was designed to test the participants' achievements in the domains of kinematics and dynamics. In addition, a series of experimental activities were administered in both groups. Results have demonstrated that following the implementation of the treatment phase, both groups demonstrated improvement

in their achievements. The experimental group, utilizing smartphones as portable laboratories, achieved a higher mean score than the control group. The findings validate the positive relationship between using smartphones as experimental tools and students' achievements in learning physics.

Introduction

Recently, the usage of smartphones as portable laboratories (SPL) in the academic field has been increasing. Smartphones are used as experimental tools by students, a topic that has gained eminent interest among contemporary science educators and researchers (Crompton & Burke, 2018; Hochberg et al., 2018; Kuhn & Vogt, 2013; Klein et al., 2015a; Lenhart, 2015). According to these authors, many factors have contributed to the widespread of SPL. First, the large potential of smartphones and the growing interest in these devices as everyday and indispensable tools broadly used by teenagers. Second, their role as communication or web browsing devices; smartphones can serve as mobile experimental tools due to their different internal sensors (accelerometer, microphone, cam, magnetic field sensor, and GPS receiver…). Third, the portability and versatility of smartphones allow students to carry out different experiments in mechanics, acoustics, electromagnetism, optics, and radioactivity, inside or outside the classroom, anywhere and at any time (Crompton et al., 2017; Klein et al., 2014; Kuhn et al., 2014; Monteiro et al., 2016; Müller et al., 2016; Müller et al., 2015; Parolin & Pezzi, 2013).

The familiarity of students with smartphones and their applications' operational modes unlocks a door to interesting science and strengthens the role of smartphones as experimental tools that, in turn, can enhance science and physics education (Crompton & Burke, 2018; Crompton et al., 2017; Hochberg et al., 2018; Kuhn & Vogt, 2013). Throughout its application, the smartphone presents connected

scientific data in tables, graphs, pictures, and other visual forms (Ainsworth, 2006). In agreement with Ainsworth (2006), Scheid et al. (2018), and Mayer (2017), these features of smartphones enhance learning achievement and effective understanding of science experiments since the use of smartphones can reduce some extraneous cognitive load and give students more time to interpret the results of scientific experiments (Tho et al., 2015).

Recently, numerous scientific experiments have suggested the application of mobile smartphones as data-collection devices referred to as "small lab tools" (for instance, the "*iPhysicsLabs*" column in the *Physics Teacher*'s journal). The studies of Forinash and Wisman (2012), Hochberg et al. (2018), Klein et al. (2015a), and Kuhn and Vogt (2013) have shown that these small lab tools have many advantages: they are considered efficient alternatives to complex lab instruments and can provide a learning environment that is less restricted to temporal or spatial constraints.

Despite the importance of using SPL as an experimental tool, very few studies have addressed its educational effects on both students and educators. Moreover, research on the long-term effect of SPL is lacking. Thus, the potential of smartphones as portable experimental tools remains a controversial issue (Hochberg et al., 2018). Contradicting opinions among researchers regarding the use of smartphones as portable experimental tools are observed. Many researchers are in favor of the use of this device as an effective tool that boots students' learning achievement (Kuhn & Vogt, 2015), while others consider it as a distracting and detrimental tool that has possible drawbacks on the educational process (Beland & Murphy, 2016; Tossell et al., 2015).

Therefore, empirical investigations of the long-term educational effects of SPL are required. This research aims to investigate the effects of using smartphones as portable laboratories on Lebanese students' achievement in physics in grade 10. By conducting this research, the author will be answering the following research question:

RQ: Does experimentation by using smartphones as portable laboratories enhance Lebanese grade 10 high school physics students' achievement?

Literature review

The smartphone as an experimental tool: a new context

A successful learning process aims to establish a deep conceptual understanding, powerful problem-solving skills, and good educational achievement in conjunction with a motivational sense and positive attitude (Redish, 2003). Achieving such learning outcomes can be realized by implementing classic or authentic learning programs linking abstract concepts with real-world contexts or actual problems encountered in the student's real-world settings and social environment (OECD, 2006). As confirmed by many researchers in the field of education, real-world context could be illustrated by using the smartphone as an experimental tool or a portable lab (ex. Gabriel & Backhaus, 2013; Klein et al., 2015a, 2015b; Kuhn & Vogt, 2013; Kuhn et al., 2014; Monteiro et al., 2016; Müller et al., 2016; Vogt & Kuhn, 2012b).

Using smartphones to carry out experiments has recently become a popular worldwide trend, embedded in everyday life, especially that of teenagers (Crompton & Burke, 2018; Kuhn & Vogt, 2013; Lenhart, 2015). Crompton and Burke (2018), Crompton et al. (2017), Hochberg et al. (2018), Klein et al. (2015b), and Kuhn and

Vogt (2013) have tested and validated a positive relationship between the use of smartphones in a real-world context, in science education and students' engagement in the learning process, as well as, their interest in learning science.

The smartphone is entwined with real life in two main contexts (Klein et al., 2015a). One of which is "material context". The use of this device by the young generation has a potential influence on their daily life and a substantial social significance. Representing, thus, a strong element in their life. The "topical context" of smartphones is linked to their mobility and flexibility (Hochberg et al., 2018). A smartphone can be used to investigate common phenomena and ethical topics in everyday life. Hence, science education has transformed to become an out-of-school activity (Gabriel & Backhaus, 2013; Hochberg et al., 2018; Kuhn et al., 2014; Monteiro et al., 2016), where scientific experiments can be performed anytime and anywhere (Kuhn & Vogt, 2013; Parolin & Pezzi, 2013; Vogt & Kuhn, 2012b).

The mobile smartphone is equipped with many internal sensors like a microphone, camera, accelerometer, magnetic field sensor, light intensity sensor, and GPS receiver that can be easily used to gather data, test, and analyze real physics phenomena (Crompton et al., 2017; Hochberg et al., 2018; Klein et al., 2015a). The data collected via these sensors can be treated using suitable seamless applications like PhyFox, SPARKvue, Video Physics, etc. Being a portable lab, the smartphone fosters learners' motivation and allows them to collect genuine data in or out of school settings, involve them in experimentation, and play a proactive role in problem-solving processes (Klein et al., 2015b). The dual aspect of the smartphone as a material and a topical context can generate higher motivation and interest in one of the two contexts alone and could produce positive cognitive effects and, therefore, better educational achievements.

Smartphones usage in the physics lab: a new experimental context

The use of smartphones as data collection instruments in the physics lab was described by researchers as revolutionary, with a significant increase in recent years (Countryman, 2014; Forinash & Wisman, 2012; Klein et al., 2015b). In instructional physics labs, the Physics Teacher's "iPhysicsLabs" column features numerous experiments on the use of smartphones as data collection devices in the fields of mechanics, acoustics, optics, and others. For instance, Schwarz et al. (2013) presented an experiment in which the smartphone was used to determine the gravitational acceleration using acoustic measurements of bouncing balls (Figures 1a & 1b). In this experiment, the restitution coefficient could be calculated by measuring acoustically, using the microphone of a smartphone and an appropriate application, the initial and the final height of bounces and their durations. This data could be used with the time equation of a free-falling body to determine the gravitational acceleration. The result of the experiment led to an accurate measurement of the acceleration of gravity g and the relative energy loss of an impact.

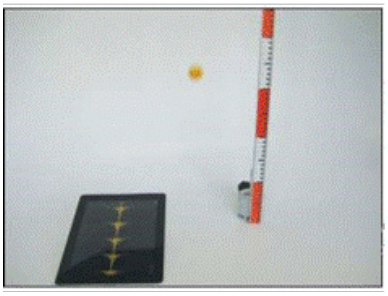

Fig. 1a. Experiment setup for the acoustic

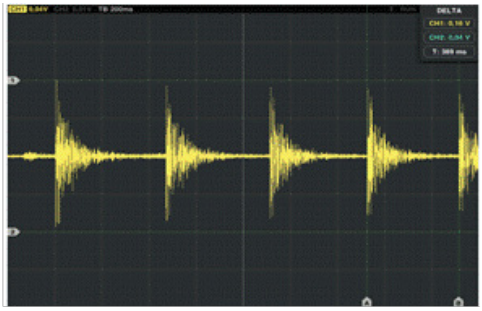

Fig. 1b. Chronological sequence of the sound signals made by a bouncing ball.

In a new topical context, Monteiro et al. (2016) explored the characteristics of the inner layer of the atmosphere using a smartphone mounted on a quadcopter.

Data related to the altitude, pressure, and density were collected for the first hundreds of meters (Figures 2a and 2b). The measured values were found to be a good approximation of the standard values valid in the inner atmospheric layer. Although no novel info was presented, it may help learners to get an insight into the characteristics of the atmosphere using affordable tools. Smartphone sensors were also used in

Fig. 2a. Smartphone mounted on quadcopter.

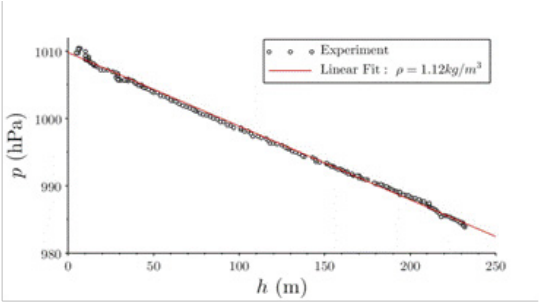

Fig. 2b. Atmospheric pressure as a function of the altitude recorded by the smartphone (Monteiro et al., 2016)

diverse other experimental concepts that tested everyday phenomena. Müller et al. (2015) busted the myth about knuckle cracking as harmful by measuring, using an iPhone, the acoustic signal of a cracking knuckle.

Another method to determine the gravitational acceleration in classroom physics by using smartphone devices was presented by Vogt and Kuhn (2012a), who examined the acceleration of a free-falling smartphone (Figures 3a & 3b). In this experiment, the smartphone served as both a falling body and an electronic gauge. This experiment resulted in determining the free-fall time and the gravitational acceleration with a good degree of accuracy. The same experiment was conducted in an extraordinary context where the smartphone was used outside the school lab settings. In this interesting experiment, the acceleration of a free-falling tower in Holiday Park (Germany) as determined. The tower was lifted to a certain height and then was left to fall downward. The collected data on the smartphone screen showed that the fall wasn't completely free. These experiments provide interesting learning opportunities for mechanics'

instruction (Kuhn & Vogt, 2013).

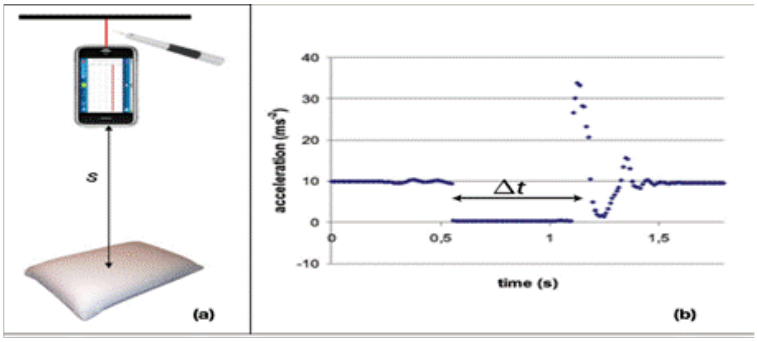

Fig. 3a. Experimental setup and acceleration process (Vogt and Kuhn, 2012a)

Fig. 3b. Presentation of measurements after the export of data from the smartphone into MS Excel (Vogt and Kuhn, 2012a)

In their attempt to test the laws governing the oscillation of a simple pendulum, Vogt and Kuhn (2012b) suggested an experiment that used the smartphone as a pendulum bob (Figure 4a). Data was collected using the SPARKvue application in favor of the acceleration sensor of a smartphone (Figure 4b). The data collected was accurate and acceptable for educational use. Moreover, the authors provided another appealing experiment that can be implemented in the playground, benefiting from the mobility of smartphones. Learners can examine the oscillation motion using a swing and a smartphone fixed to it (Figure 5). Such real-life experiments can be carried out anywhere and anytime, and they present, according to the authors of the study, an interesting learning experience.

Fig. 4a. iPod touch suspended from two signs (Vogt and Kuhn, 2012b)

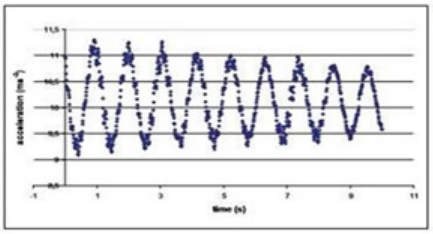

Fig. 4b. Presentation of measurements after the export of data from the smartphone into MS Excel (Vogt and Kuhn, 2012b)

Fig. 5. Examination of the mathematical pendulum using a playground swing (Vogt and Kuhn, 2012b)

The aforementioned examples of experiments performed by using smartphones in the context of physics portable shed light on the potential effects of smartphones in both contexts: material and topical. This offers opportunities to expand the learning process from classroom to non-conventional experimental setup. The review of the literature in the field of physics education presents plenty of other experiments that can be carried out using the smartphone as an experimental tool or a portable lab (e.g. Biggle, 2013; Baldock & Johnson, 2016; Gabriel & Backhaus, 2013; Hechter, 2013; Monteiro et al., 2016; Müller et al., 2016; Müller et al., 2015; Parolin & Pezzi, 2013). Many of these experiments can be realized using conventional experimental tools; thus, carrying out physics experiments using smartphones does not offer or add new data. However, smartphone sensors can replace many unavailable, unneeded, and even expensive conventional instruments (Müller et al., 2015). Furthermore, lab experiments are restricted to the availability of lab equipment and mode of use (Svensson, 2018).

The effects of SPL on student's educational achievements

Research on the effects of SPL on student's educational achievements is still lacking. Only a few studies sought to explore this topic in depth. For instance,

Rediansyah (2022) investigated the use of smartphone sensors on students' conceptual understanding of physics by developing a physics experiment model. A comparison was made between a conventional experiment and an experiment using the Phyphox application. The results indicated an increase in the level of students' understanding by 46% when using smartphone sensor-based. This is associated with the ease of use of smartphones by students and the fact that sensors can read changes in physical symptoms that could be observed for further analysis. The study conducted by Sukariasih Erniwati (2019) addressed the same topic and confirmed these findings. The authors demonstrated that smartphone sensors (accelerometer, light field sensors, and magnetic fields) facilitate and simplify physics experiments, enhance students' understanding of physics concepts, and reduce the costs of using traditional physics laboratories.

Kaps et al. (2021) highlighted the effective use of smartphones on university students' conceptual understating of physics, which supports the results of the previously reviewed studies. However, findings revealed a lower level of performance compared to the traditional physics experiments. Recent studies validated the positive impact of using SPL on students' conceptual understanding of physics (ex., Lahme et al., 2023). Hochberg et al. (2018) examined the impact of using smartphones in teaching physics on the interest, curiosity, and learning achievement of students. Repeated-measurement design with a comparison of experimental and control groups was implemented on a sample of approximately 150 students. Both groups were taught the same content (study of a pendulum) with the only difference of using smartphones' acceleration sensors in the experimental group. The results of the research showed that the use of the smartphone fosters the students' interest and their topic-specific curiosity. The findings of this study contradicted the claim

that technological use distracts students and increases the cognitive load. Findings revealed, as well, that using smartphones does not increase learning achievement. The reason behind this may be the short time of the intervention, which was about one or two weeks.

Previous studies have questioned the use of smartphones in physics experiments. For instance, Klein et al. (2015ab) researched the use of mobile devices' internal sensors to collect scientific data and their impact on students' educational effects. Results of the conducted studies reported a negligible influence of mobile applications as experimental tools on students' conceptual understanding and their cognitive and workload. According to Beland and Murphy (2016), prohibiting the use of smartphones in schools can help reduce educational inequalities and develop better students' performance.

Based on what has proceeded, results concerning the relationship between the use of smartphones to carry out physics experiments and students' conceptual understanding are contradicting. Besides, research on the didactical and educational effects of smartphones is insufficient and still immature. The review of the literature showed that there is insufficient empirical evidence of the supposed effects of SPL on physics learning. Thus, additional empirical research conducted during a long timeframe is strongly needed before any conclusions can be made.

The context-based science education approach

The Context-Based Science Education (CBSE) approach is considered important in building research design; it is widely recommended and used in teaching science, including physics (Fensham, 2009; Bennett et al., 2007; Kuhn et al., 2014; Taasoobshirazi & Carr, 2008). This approach is "adopted in science teaching

where contexts and applications of science are used as the starting point for the development of scientific ideas. This contrasts with more traditional approaches that cover scientific ideas first, before looking at applications" (Bennett et al., 2007, p. 348). By relating physics material to a real-life context, the CBSE approach prominently fosters students' motivation, problem-solving skills, and achievements (Hochberg et al., 2018; Klein et al., 2015b; Kuhn et al., 2014). Empirical studies have confirmed this relationship. The systematic review done by Bennett et al. (2007) of 17 studies showed that a context-based science education approach improves students' attitudes toward science in both genders. Moreover, students' academic achievement and conceptual understanding in a CBSE approach is better than, or equal to, their performance in a conventional approach.

Implementing the CBSE approach has proven to change the situation presented in most physics classes, where students cannot evaluate their learning outcomes because they study topics irrelevant to their everyday lives that seem to be ambiguous and worthless (Taasoobshirazi & Carr, 2008). Furthermore, this approach can help students answer their questions about the reason for studying physics or about the relation between the studied material and their everyday lives. Students learning with this approach can understand why, how, and where they will apply their new knowledge (Glynn & Koballa, 2005).

Context-based learning should include situations and up-to-date contexts that may be perceived by students as more relevant (Fensham, 2009; Taasoobshirazi & Carr, 2008). Since the use of smartphones is rooted nowadays in student's everyday lives, they form a new authentic context that can foster their educational attainment and may help to change their attitudes towards science in general and physics in particular. One of the examples of the use of smartphones is their role as portable

laboratories (Hochberg et al., 2018; Klein et al., 2014; Kuhn et al., 2014; Kuhn & Vogt, 2013; Klein et al., 2015a). Thus, the selection of this approach is useful to this current research since smartphones can be used to link physics concepts with real-world contexts.

4. Methodology

The scientific topics chosen for this study are the kinematics and dynamics in one and two-dimensional motion in the view that these two domains are particularly rich in learning difficulties (Klein et al., 2017).

4.1 Research design

An experimental design was implemented. Participants were assigned to an experimental and a control group. Students in both groups were pretested on the dependent variables and then post-tested after the treatment had been administered to the experimental group. The experimental design applied for this research is represented in Figure 6; t_1 represents the pretest measurement of learning achievement before the intervention, and t_2 is the post-test measurement of the same variable.

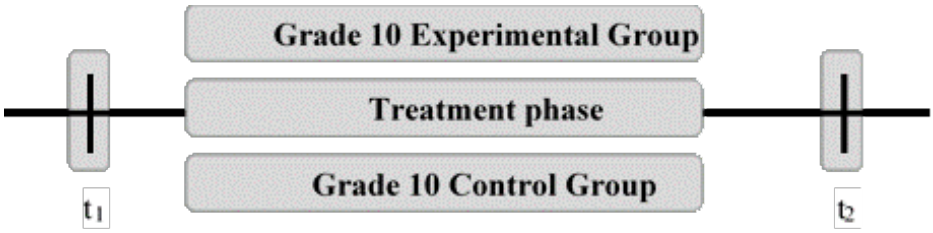

Fig. 6. Graphical representation of the research design

4.2 Sampling design

According to the new Lebanese ladder (CERD, 1995), secondary education (high school) lasts for three academic years and consists of three grades: 10, 11, and 12. In grade 10, Physics is taught at the rate of three periods per week. Kinematics and dynamics are two domains taught in grade 10 for one-dimensional motion (CEDR, 1995). These two domains contain abundant learning difficulties for learners (Klein et al., 2017). For this study, the intervention took place in an official high school in Mount Lebanon during one complete semester of 2020-2021 of a regular grade 10 physics course. The convenient sample consisted of 52 Lebanese pupils of both genders. The participants studied physics in English and were equally assigned to control and experimental groups, 28 and 24 students, respectively.

4.3 Data collection instrument

An achievement test was designed by the researcher. The purpose was to test the participants' achievements in the domains of kinematics and dynamics. The test is formed of multiple questions that meet the requirements of the Lebanese curriculum of grade 10. This developed test was piloted for validity and reliability over the semester.

4.4 Procedures of treatment and data collection

The participants were assigned into two groups taught by the same teacher: a control group that was taught using a conventional experimental approach and an experimental group that was taught using smartphones as a portable lab. Before starting the implementation phase, both groups were pretested (t_1 in Figure 7) for learning achievement in physics. After the administration of the pretests, the intervention took place. A series of experimental activities and their related

instructional materials prepared by the researcher and validated by many physics teachers, doctors, and experts were administered in both groups: using the regular laboratory material in the control group and smartphone applications in the experimental group. These activities covered the kinematic and the dynamic branches related to one-dimensional motion, and that form a part of the Lebanese physics curriculum of grade 10.

For the experimental group, different smartphone applications like Video Physics, SPARKvue, Phyphox, and many others were used to conduct the prepared experimental activities. The choice of the application depended on the type and content of the implicated experimental activity. A training session for about 50 minutes was conducted for the experimental group pupils, in which the teacher trained them on how to use the considered smartphone applications. On the other hand, the same teaching materials covering the same content were implemented in the control group by adopting a conventional approach. The instruction materials were designed to be almost the same for both groups, which results in equal cognitive loads except for effects produced by using SPL. After the complete implementation of the intervention process, both groups were post-tested using the same prepared achievement instrument used in the pretest (t_2 in Figure 7).

5. Results

To ensure similarity between the two study groups, before the implementation of the test, a descriptive analysis was conducted using the pretest results. As illustrated in Table 1, the descriptive analysis indicated that the control group exhibited a mean score of 17.00, slightly surpassing the experimental group's mean of 15.50. Knowing that the highest attainable score on the test is 100, the pretest scores for the control

group ranged from 0 to 40, while those for the experimental group ranged between 0 to 36. Similar patterns were observed in both groups concerning the spread of scores around the mean, with the control group displaying a standard deviation of 9.341 and a skewness of 0.577, while the experimental group's standard deviation was 9.007 and its skewness was 0.468.

Table 1. Descriptive statistics of the pretest scores.

Group	N	Mean	SD	Min	Max	Range	Skewness
Control	28	17.00	9.341	0	40	40	0.577
Experimental	24	15.50	9.007	0	36	36	0.468

Based on the slightly lower mean score of the experimental group compared to the control group, an independent t-test was employed to test the significance of this difference. The results revealed that this slight disparity was statistically insignificant ($t(50) = -0.587$, $p = 0.560$) with a small Glass' Delta effect size of 0.167, indicating the equivalence of the two groups at the beginning of the study.

After the implementation of the treatment phase, both groups demonstrated improvement, as shown in Figure 7.

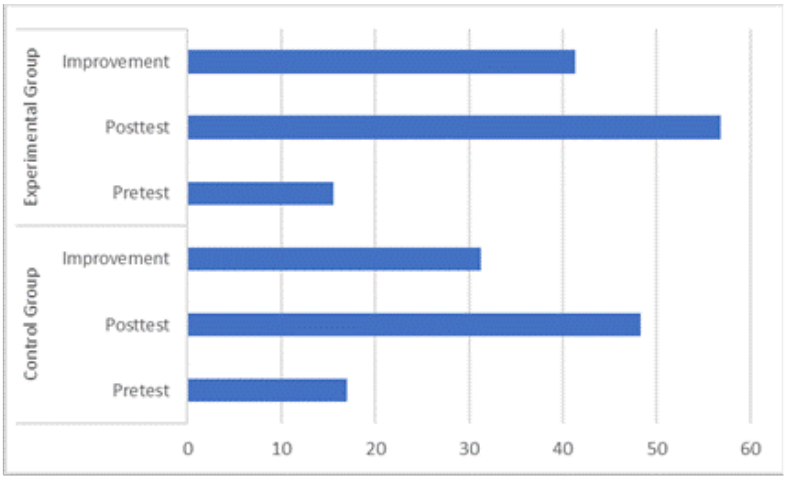

Fig. 7. Mean scores of pre and post-test and improvement in each group

Table 2 presented the post-test results, illustrating that the control group, taught through traditional experimental tools context, achieved a mean score of 48.29, whereas the experimental group, utilizing smartphones as portable laboratories, achieved a higher mean score of 56.83. Upon quantitative examination, the control group exhibited a standard deviation of 12.693, with scores ranging between 24 and 76 and a skewness of 0.147. In contrast, the experimental group showed a greater standard deviation of 16.888, with scores ranging from 12 to 84 and a skewness of -0.960. These differences between the groups supported the hypothesis that the use of smartphones as experimental portable laboratories positively influenced and enhanced student achievement in physics.

Table 2. Descriptive statistics of the post-test scores.

Group	N	Mean	SD	Min	Max	Range	Skewness
Control	28	48.29	12.693	24	76	52	0.147
Experimental	24	56.83	16.888	12	84	72	-0.960

To ascertain the significance of this improvement and the validity of the earlier conclusion, an independent t-test was conducted. As demonstrated in Table 3, the results indicated a statistically significant difference between the two groups in favor of the experimental group (t (50) = 2.080, p = 0.043) with a medium Glass' Delta effect size of 0.506. Fundamentally, the comprehensive analysis conducted aligns with the significance revealed in the T-test. These results affirm the efficacy and promise the context of the use of smartphones as portable laboratories to enrich students' achievements in physics.

Table 3. Independent Samples T-test comparing groups' scores of the post-test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.956	.333	2.08	50	.043	8.548	4.109	.295	16.801
Equal variances not assumed			2.04	42.23	.048	8.548	4.200	.074	17.021

6. Discussion and conclusion

In this article, the author has attempted to uncover the educational effects of SPL on the achievements of high school students enrolled in regular grade 10 physics course. This is a topic that has been somehow neglected by researchers, not due to its irrelevance to the science education fields and the learning environments but due to the contradicting opinions regarding the use of smartphones as experimental tools in science education. The findings of this research confirm the hypothesis put forward

by the author that the use of smartphones as experimental portable laboratories positively influenced and enhanced student achievement in learning physics. The relationship that was tested through an experiment conducted on a control and experimental group and validated by an independent t-test showed a statistically significant difference between the two groups in favor of the experimental one.

These new insights strengthen the role of smartphones as experimental tools applied in context-based science education (Hochberg et al., 2018; Klein et al., 2014; Kuhn et al., 2014; Kuhn & Vogt, 2013; Klein et al., 2015a). Thus serving in solving the problems associated with learning the kinematics and dynamics in one and two-dimensional motion (Klein et al., 2017). It is therefore recommended to spread the use of smartphones as experimental tools in high schools in Lebanon not only due to their benefits for students but also for decision-makers who can reduce the costs of using traditional physics laboratories by opting for mobile devices, commonly and frequently used by learners (Sukariasih Erniwati et al., 2019). Regardless of these promising results, the quantitative data recorded low to medium mean scores displayed by both groups in the post-test. The experimental and the control groups did not yield high mean scores on their achievements after the use of smartphones to carry out the experiment. The reasons behind this may be the negative impacts of previous years' online learning during the COVID-19 pandemic on students' learning abilities and achievements.

The study conducted by EL Rouadi and Anouti (2020) on 746 students in intermediate and secondary schools in Lebanon demonstrated that slow internet connection, electricity outages, students' lack of participation, and not having more than one phone or laptop at home have negatively affected students' achievements. Yet, online learning allows students to use their mobile devices to access teaching

materials, manage group assignments, and interact with teachers. This can help students in the future to improve their abilities in using smartphones as experimental tools, an educational element that was not possible before the health crisis in most developing countries (Tadesse & Muluye, 2020).

Furthermore, the difference in mean scores between the two groups was not enormous. The possible underlying factor of this slight difference in mean scores following the treatment phase is the inadequate awareness and use of mobile applications (EL Rouadi & Anouti, 2019). If educators consistently incorporate these elements into teaching and learning in a creative manner, encouraging interaction in an engaging learning environment, students can stay abreast of technological advancements. Consequently, students' accomplishments would be further enhanced through the proficient use of smartphones as portable labs.

To conclude, the findings of this article shed light on a potential pathway for substituting costly and inaccessible traditional laboratory equipment with an everyday essential tool commonly possessed by high school students. This tool not only facilitates the acquisition of precise data but also equips students with the ability to generate graphs and tables essential for experimental activities. Consequently, it alleviates the burden of grappling with mathematical calculations detached from their authentic grasp of the underlying concepts in physics. This holistic approach signifies a shift in the learning process, accentuating the practical application and accessibility of scientific exploration. Such advancements are poised to foster a more intuitive and comprehensive learning experience, nurturing a generation of students more adept and enthusiastic about scientific inquiry.

This article has limitations that require future research attention. Increasing the sample size could allow for the exploration of the underlying factors of the difference between the two groups and the socio-demographic differences and their impacts on the achievements of students. While the study focused on high school students, extending research to higher education for comparative analysis would be insightful. Lastly, the impacts of the current crises in Lebanon on students' learning abilities and achievements and their use of SPL necessitate further exploration.

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The Secret Recipe of Early Intervention Through the Individualized Family Service Plan (IFSP)

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Lebanese University

Abstract

"This article emphasis the important role of parents, teachers, and caregivers in screening and assessing children with disabilities, at a very early stage, in order to implement the appropriate early intervention services. Several theories and recent researches focus on the significance of sharing services that support relatives to improve the development of their children, by means of representations that reveal the suggestions. The new recommended educational and psychological practices focus primarily on early intervention that lights the main concerns proposed by families of children having disabilities. Furthermore, notwithstanding the countless offerings to what is suggested for family-centered thinking and training, the IFSP (Individualized Family Service Plan), guides the delivery of assessment services. This article assesses these services in order to determine the occurrence of recognized routines observed as the base for product development, specifically when the examination-providing caregiver has received appropriate training. In addition, findings of this article show that around 50% of the activities observed and identified by the caregivers as unsatisfactory, are used in outcome development. Moreover, important connections between caregivers were discovered as strong connections between activities and improvement".

Keywords: Caregiver, Screening, Assessment, The 13 Disability Categories

Introduction

The international commitment to early intervention was the educational primary

pact for conducting services for parents of, and infants with disabilities. This article presents the rationale as well as the strategies for early intervention in terms of empirical, realistic, and experiential findings. This article constitutes an important resource for all the professionals involved with at-risk infants as well as families of toddlers and young children having disabilities, in that it embraces the major issues present in early intervention. The first issue that arises is the recognition of the complexity of early intervention and its uniqueness as a domain for helping professionals. The second issue is the emphasis placed on the multidisciplinary approach to involve infants and young children with special needs. A third issue that stems from the need for a multidisciplinary approach and the complexity of early intervention, is the importance of individualization in the work with families. The latter is an issue that the researcher has effectively combined to simplify the important role of the Individualized Family Service Plan (IFSP). In the beginning, a caregiver needs to be certain that parents clearly understand why their child needs help.

The focus is on helping the family develop its own strengths in the resolution of issues. Children are vulnerable to a number of issues and situations that can hamper both their cognitive and affective development. In fact, the outcome of underachievement is always described as performance below expectation. The reasons behind this, may include different aspects such as social isolation, pressure to conform, family dynamics, learning or behavioral disabilities, attention-seeking, trauma, and lack of direction or orientation (Cummings, R. & Fisher, G. 1991).

Complementing the above-mentioned issues, there are three correlated issues relating to development, family, and environmental context. Actually, researchers consider the development of the child as transactional in nature, of which outcomes are determined by shared exchanges between the child and the family all the

time (Kranowitz, C.S. 1998). An additional explanation of the lively nature of development is the recognition of the acquaintance of the child and the family with the environmental strains. The importance of the family in the development of the child, along with the ecological settings of the child and the family are additional issues that invade this article and offer a basis for assessment as well as interventional activities and services (Feldman, M.A. 2004).

Moreover, the belief in the benefits of early intervention is now being recognized as a formal commitment to at-risk infants as well as families of toddlers and young children having disabilities. This article endorses such belief and offers a systematic approach to the implementation of theoretically rigorous and realistic interventions. The field of early childhood special education has come to be acknowledged nationally as a discipline by itself, with its own university and expert professional training and research programs, an active national professional organization, numerous professional journals of quality, and significant voices in the invention of a policy at the regional and local levels (Feldman, M.A. 2004).

Lastly, as the services expand, so do the need for comprehensive preparation of educators, therapists, psychologists, and health professionals who work with children under the age of three and their families. This fact is reflected in the increased number of university programs throughout the country that are confronted with the task of training teachers, speech and language pathologists, occupational and physical therapists, school psychologists, social workers, and program administrators, on how to implement the early intervention services (ثابت، م. وآخرون. 2012) Nevertheless, teachers and educators are already faced with the prospect of personnel shortage in early intervention. The primary factor that determines the quality in an early intervention program is the effectiveness of the professionals who work in it; and effectiveness is after all directly related to the quality of training.

Training and Preparation

It is the problematic of providing effective personnel's training that this article is aimed at. It places a strong weight on typical and atypical child development, combined with an ecological vision of intervention. The article is organized on two basic grounds: 1) the early intervention professionals require strong preparation in the representative categorizations of development that the children experience from birth, and 2) that effective intervention must take an ecological perspective in order to understand the background of the infant's or young child's environment. Additional emphasis has been place on these two premises, thus the first question is dedicated to a developmental perspective whereas the second question is dedicated to an ecological perspective.

Generally speaking, this article lays the foundation for the discussion of developmental research and theory, assessment and intervention, besides addressing family needs. It is also reflected in the new highlighting of early intervention programs for infants from birth. First, the article begins with a review of certain issues relevant to the early intervention field, including the concepts of being at-risk and the least restrictive environment. Then, the researcher moves onto an updated review of typical cognitive, linguistic, physical, and social development.

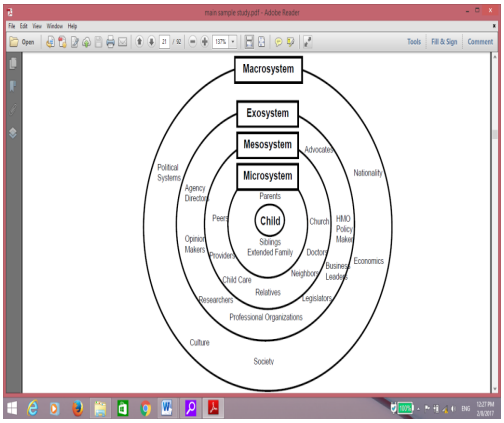
Furthermore, the article focuses on examining the role of assessment for infants with disabilities from birth until the age of three, covering the screening and traditional assessment procedures, and ecological assessment including information on developing an Individualized Family Service Plan (IFSP). The article is about children whose developmental patterns remain outside the "normal" range, those who have special needs, and those who require special care or intervention from birth until the age of three.

The essential thing about a special service plan is that it is a service provided to the child and the family. It is centered and devoted to present a suggested training in early intervention. Early intervention is attached by a solid and a unified theoretical base (Kranowitz, C.S. 1998). Such theories make the core value intended for early intervention on the child surrounded by his family, and the structures and motives that impact their lives.

In practice, it is recommended that outcomes of any family plan should be taken from family routines; on the other hand, it is required that the plan recognizes the great role of including main concern and priorities in outcomes. Besides, there is a great necessity to examine the family plan setting in order to control the degree in which caregivers use the daily activities to develop consequences. Another purpose for this article is to test the way caregivers can develop outcomes and approaches for early intervention. What is more, the article sheds the light on the very early intervention pointed at serving children at-risk of delays in development, and children with disabilities from birth till the age of three. It focuses on the importance of assessing infants and toddlers, taking into consideration the development and the characteristics of these children. Last but not least, this article gives rise to the important role of the family in the process of improvement of struggling kids, given that children at this stage are sensitive and parent- attached.

This article was directed by a theoretical and conceptual framework based on Bronfenbrenner's Ecological Systems Theory, which is a theory of influence in the field of early intervention (Bronfenbrenner, 1979). This theory clarifies the connections between diverse social elements and the inclusive effect of these chains. In any family service, the ecological theory shows the development of the child within the child's and the family's environment.

Figure 1. Urie Bronfenbrenner's Ecological Systems Model (1979).



Bronfenbrenner's Ecological System's Theory

This theory, as shown in Figure 1, defines complex "layers" of the environment, each having an effect on a child's development. This theory looks at a child's development within the context of the system of relationships that springs from the child's environment. This theory has recently been renamed "Bioecological Systems Theory" to accentuate on the fact that a child's own biology is the central environment operating his development. The collaboration between elements in the child's development, his direct family/community environment, and the social setting energies and guides his development. Modifications or struggles in one layer will flow all the way through other layers. To observe and monitor child's development we must focus at the child and his direct environment, and at the collaboration of the surroundings.

Bronfenbrenner (1979) defines these concentric layers as ascending from the center, where the child and his family are located in the deepest circle. There is another circle for the connections made by the child and his family; these connections are made of relatives, friends, neighbors, cousins and diverse related connections.

Likewise, these preceding social units are encircled in a bigger system comprising of governments, and other systems that might probably have their effects on the child. Another vigorous standard of the Ecological Systems Theory is that any change in one of the units will surely influence the events in another unit.

Thus, to analyze the development of a child, a person should focus on the interaction of the larger environment concurrently.

Bronfenbrenner's Ecological Systems Theory fosters the excellence and framework of the child's environment for example economic rank, self- esteem, self-concept, and the main needs impact the support required for a family.

Adult Learning Theory

Since the emphasis of early intervention transcend the children, to the wider context of the family, the relation with adults is as vital as the interaction with children. Modeled by Malcolm Knowles in 1979 to clarify how adults learn, Adult Learning Theory is centered on the succeeding norms:

grown-ups are self-directed learners;

gained knowledge and experiences contribute to the acquired learning of adults;

the need to know more is the key for adult's learning;

The main issue now is the acknowledgment of the roles of families as central and pertinent. Assessment and diagnoses are always shown as an ongoing process. It aims to "discover" with its interpersonal and intrapersonal learning. The assessor's primary function is to facilitate learning and intervention (McGraw, 2004).

The identification of a child presenting a developmental delay or with a disability, changes the dynamics with other family members. It is at this time that the family needs assistance.

One of the central goals of a toddler and early childhood mental health services is avoidance and early intervention. Taking into consideration the challenges and the developmental paths needed for a healthy, emotional, and intellectual growth, a counselor should provide a valid context to work with infants, young children, and their families at an early age. By doing this, the counselor reinforces the necessary foundations for a healthy development and therefore, finds a way to intervene in order to address the emerging challenges before they become prolonged. Subsequently, the counselor redirects young children and their families on a healthier developmental path. The family has been recognized as a primary and critical component in the development of the child (Lawlis, 2004). However, early intervention as a new approach has faced a lot of challenges in getting the families that have appeared as having a child at-risk beyond the reach of most assessment programs (Lawlis, 2004). These families often refuse to volunteer for, or cooperate with such services. Another challenge has been to organize programs that are satisfactorily inclusive to help kids, young children, and families with all characteristics of their development. The truth is that all aspects of the child's and family's development are closely connected (Lawlis, 2004).

Providing comprehensive early intervention services for all infants, young children, and their families must be the goal of modern approaches to early intervention. Henceforth, it is important that such approaches be integrated into daycares and all backgrounds in which infants and young children and their families change. The approaches include non-stop educational chances for parents, caregivers, programs at daycare centers, and special programs for families facing difficulties. This article sheds light on how to implement the early intervention approach or the IFSP and explores how to work with families that are almost beyond the reach of most programs. A model will be presented for working with infants in their families, ranging from those who are progressing in a healthy manner to those with a variety

of challenges. With the help of a work group, a caregiver should observe and record children's early emotional signs in both healthy and compulsive cases, motor and cognitive processing differences, and infant–caregiver and family interaction patterns (Jordan, R. & Jones, G.1999). As a result, this group will construct a comprehensive approach to assessment, diagnosis, and intervention such as the IFSP.

This approach includes not only children with emotional and behavioral difficulties, but also children with autism spectrum disorders as well as other disorders of connecting and communicating, Dyslexia, language problems, Down syndrome, fragile X syndrome, fetal alcohol syndrome, cerebral palsy, and even severe forms of Attention-Deficit Hyperactivity Disorder (ADHD). Educators are now in a position where there is an urgent need to redefine how we work with these children. Because of that, the researcher chose this topic and presented a model of plan that is used in the USA and the UK for infants and toddlers, the IFSP. This model addresses the family's relationship, because it is the cultural context in which the child's relationships and emotional interactions occur. Intervention for infants and children with mental health problems and special needs must involve a broad relationship, family, and community-based approach, and should be covered in the IFSP.

On a side note, it is very urgent to validate such a service in order to use it in Lebanon since there is no direct service for children and toddlers below the age of three. The absence of such service was clearly noticed after field trips to the ministry of Education and Higher Education, The Ministry of Health, The Ministry of Public affairs, and The Educational Center for Research and Development (CERD). All of those ministries consecrate a special care for the people with physical disabilities more than disabilities on the educational and cognitive levels. However, it is worth mentioning that CERD gives a special attention for children with learning difficulties and learning disabilities from the age of three and above. To date, no research

mentioned the toddlers in assessing them beyond medical tests and screening. However, there is no educational intervention to this target (infants and toddlers and their families). CERD initiated a lot of studies and statistics concerning learning difficulties. First, they issued a article among the official schools of Lebanon to spot out the number and kind of disabilities found. This article was not followed by statistical tables because it was not easy to evaluate the difficulties found. They only mentioned that 25- 28% of the students present learning difficulties in a sample of six schools all around Lebanon. Only 6-7% have difficulties such as dyslexia (ثابت، م. وآخرون 2012). However, the article has only focused on pupils from the age of three until the age of nine. The CERD article recommended focusing on the evaluation of the learning difficulties at an earlier stage in order to get the early intervention services and integrating competences to help pupils with difficulties in an inclusive classroom. Moreover, the CERD article recommended avoiding labeling the pupils in the inclusive classroom by building self-esteem and preparing teachers to deal with the ones with learning disabilities using many strategies, for instance the multiple intelligences, learning styles, affective and social growth, growth psychology, teaching strategies, and cooperative learning.

Furthermore, The CERD published guidance for educators to spot out the learning difficulties and find solutions for them. However, one of the most important limitations of CERD's article is the lack or insufficiency of the programs that target students with disabilities; they are only found in some private institutions.

Definitions

Caregiver. Early intervention is a special service used to appropriately allocate a caregiver for the child and his family. Countries differ in the technique they present this caregiver. Some use a model in which the caregiver does not offer any intervention service, whereas in other countries, the coordinator of the services may

be provided by a special educator or speech therapist. For that reason, the caregiver performs as a helpful and experienced supporter and is accountable for supporting families in understanding and mastering their rights. Researches have proved that this relationship between families and the caregivers is essential towards effective early intervention (Feldman, M.A. 2004).

Moreover, the caregiver needs services in the fields of technology, health, therapeutic, nursing, nutrition, occupational therapy, physical therapy, psychology, social work, or speech therapy. In addition to the coordination of services, the caregiver applies and assesses the Individualized Family Service Plan (IFSP) or any other intervention plan.

Screening. Screening is a large scale and a procedure designated to determine the presence or absence of developmental problems. Screening is done with the purpose of identifying those infants or children considered at-risk, that is, those who will probably need special services to aid their normal development. Screening is usually quick and inexpensive (Feldman, M.A. 2004).

Assessment. Assessment is the process by which children are identified as having a special need or having any kind of disability and in need of special education services. Testing is not a synonym of assessment because a test may result only in a score, whereas a good assessment will provide much information effective in educational programming and individualized planning (Feldman, M.A. 2004)... Assessment is not so much a process itself, as it is more of a part of a process; the other part is intervention, without which the assessment is deemed useless. It is a continual and ongoing process in which children are examined continuously over most of the duration of their education. It can provide early indicators on the performance of children. It can also provide what has been learned or gained by a particular stage.

Raising a child with a disability or illness is a journey filled with challenges on the personal and parental levels. Parents may experience a myriad of emotions, most of which are undesirable and uncomfortable. Parents will recalibrate their goals, their values, and their priorities in order to bring out the strengths they never knew they had. To begin with, neither of the parents knows anything about special needs nor on how to parent a special needs child. All what the parents know, initially, is that their world has been turned upside down and they need to seek professional help for their child, serving to provide, as well, a sense of understanding and orientation for themselves (Colorado, B. 2008). Their stories range from heartbreaking to heroic filled with hope, disappointments, and success. Families of children with disabilities face challenges in different forms given that each family is unique. Children with special needs require particular help more often, and for longer periods of time; sometimes, for their entire lives. Some of the familiar problems that children face, resulting in special needs, are now categorized by IDEA (Individuals with Disabilities Education Act (P.L.108-446)) as of March, 2013 (Ghazi, M. et al).

The 13 Disability Categories

The IDEA defines the 13 disability categories. Similarly, the Lebanese Center of Educational Research established a dictionary for words related to the categories of the diverse learning disabilities (Ghazzi, M. et al). The categorization of the disabilities and their definitions are as follows:

Autism

Autism is a developmental disability, significantly affecting verbal and non-verbal communication, educational performance, and social interaction. Generally, autism is evident before the age of three, but not necessarily. Characteristics often associated with this disability, are engagement in repetitive activities and stereotyped movements, resistance to changes in daily routines or the environment, and unusual

responses to sensory experiences. The term autism does not apply if the child's educational performance is adversely affected primarily because the child has emotional disturbance, as defined in number four below.

2. Deaf-Blindness

It is a concomitant hearing and visual impairment, the combination of which causes such severe communication and other developmental and educational needs. Such needs cannot be accommodated in special education programs dedicated for children with deafness exclusively nor with blindness exclusively.

3. Deafness

It is a hearing impairment, the severity of which damages a child's processing of linguistic information through hearing, with or without amplification, and that adversely affects the child's educational performance.

4. Emotional Disturbance

It is a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree, that adversely affects a child's educational performance:

(a) An inability to learn that cannot be explained by intellectual, sensory, or health factors.

(b) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

(c) Inappropriate types of behavior or feelings under normal circumstances.

(d) A general pervasive mood of unhappiness or depression.

(e) A tendency to develop physical symptoms or fears associated with personal or school problems.

The term includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is judged that they have an emotional disturbance.

5. Hearing Impairment

It is impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance, but is not included under the definition of "deafness".

6. Mental Retardation

It is a significantly sub-average general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance.

7. Multiple Disabilities

It is a concomitant impairment (such as mental retardation-blindness, mental retardation-orthopedic impairment, etc.), the combination of which causes severe educational needs. Such needs cannot be accommodated in a special education program dedicated for one of the impairments exclusively. The term does not include deaf-blindness.

8. Orthopedic Impairment

It is a severe orthopedic impairment that adversely affects a child's educational performance. The term includes impairments caused by a congenital anomaly (e.g. clubfoot, absence of some member, etc.), impairments caused by disease (e.g. poliomyelitis, bone tuberculosis, etc.), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures).

9. Other Health Impairment

It is having limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that— (a) is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, and sickle cell anemia; and

(b) Adversely affects a child's educational performance.

10. Specific Learning Disability

It is a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes conditions on the likes of perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

11. Speech or Language Impairment

It is a communication disorder such as stuttering, impaired articulation, language impairment, or a voice impairment that adversely affects a child's educational performance.

12. Traumatic Brain Injury

It is an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psycho-social impairment, or both, that adversely affects a child's educational performance. The term applies to open

or closed head injuries resulting in impairments in one or more areas, such as cognition, language, memory, attention, reasoning, abstract thinking, judgment, problem-solving, sensory, perceptual, and motor abilities, as well as psycho-social behavior, physical functions, information processing, and speech. The term does not include brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma.

13. Visual Impairment Including Blindness

It is impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness.

In a perspective to fulfill the requirements of individuals presenting any kind of disability, the following is required :(2014 .الغزّي، وآخرون)

A specialized intervention at home or at school or in the community for the issue of delays in language, and physical, cognitive, or social development;

Regular medical treatments or interventions for health conditions;

Individualized educational programs or plans for learning disabilities;

Extra care for daily living skills;

A special help to enhance communication;

Special therapies for improving physical strength and coordination;

Special therapies for emotional or behavioral problems;

Special equipment to help increase movement;

Few years ago, there wasn't much help and hope for children with special needs. Most of them suffered under-education, underestimation and undervaluation. Nonetheless, time has changed and now we are increasingly aware, as a society, of the children's right to be valued, educated, and challenged. Laws are being

enacted to ensure the rights of people with disabilities. Furthermore, technology is rapidly advancing, medical help is improving, and professionals are enhancing their knowledge and skills (Sternberg, R. J. & Grigorenko, E. L., 2000). A wider range of services for children and their families is emerging, as parents are becoming more enabled supporters. It is a long and a hard way for parents, professionals, and children with special needs because all together they are creating a new kind of future (Sternberg, R. J. & Grigorenko, E. L., 2000).

How early intervention services are provided to the child and the family is as important as which service to provide. How services are applied is based on modern suggested training in early intervention. Early intervention is fenced by a resilient theoretic basis. The theories that form the basis of early intervention focus on the child as a learner in the frame of his or her family, and the factors that influence their lives.

Early Intervention

Early intervention comprises a set of supports, services, and experiences to prevent or minimize long-term problems, as early as possible. While it can be offered at any age, whether before or during the early stages of disabling conditions and circumstances, the term, however, is commonly reserved for infants and young children. Typically, children who receive this early intervention are both, those already suffering and at-risk. The risk might be developmental, emotional, social, behavioral, or school problems due to biological reasons (e.g., low birth weight) or even environmental factors such as poverty.

Early interventions and orientations are manifold. Some programs take into account that the child needs an extraordinary learning environment. They highlight on the crucial role of the parents and home in shaping the child's future. Therefore, such programs offer several types of family-based intervention including case

management, family support, home visits, and parent's education. These programs, then, target the needs of the family as a whole and study the effect of early intervention on other family members (Peters, 2000). Under the IDEA, "infants and toddlers with disabilities" are children from birth till age two who need early intervention services, and that because they are experiencing developmental delays in one or more of the following areas: cognitive development, physical development, communication development, social or emotional development, adaptive development, as assessed by suitable assessment tools and procedures; or they have a diagnosed physical or mental condition that has a high possibility of resulting in developmental delays.

Individualized Family Service Plan

The Individualized Family Service Plan (IFSP) is addressed to support families in the improvement of results of their child. The IFSP works as a method to monitor supports and abilities for each child. It should be established by the family with the help of a multidisciplinary team to articulate information affecting the child and his or her family, taking into account many elements. The first element is a report of the child's current stages of cognitive, physical, communication, social, and emotional development. (Hammill, & Bartel, 1978).

Contemporary levels of cognitive development include a varied selection of mental capabilities or intelligences. The current level of cognitive development includes reports related to attention, memory, critical thinking, communication, and reasoning. Reports of physical development include vision, hearing, and other health issues adding to the motor skills of the child. Motor skills are made of two groups; large motor skills for instance climbing, walking, crawling, and rolling; and fine motor skills such as cutting, pinching, and holding small things. Moreover, contemporaneous levels of collaboration and social/emotional development need to be observed and reported including speech, gestures, and facial expression in

order to observe verbal and non-verbal ways of communicating. Such development includes satisfactory ways of interacting with peers, siblings, and family members. Briefly, the development contains all the other domains like self-care or self-help skills as a demonstration of age-appropriate skills. These skills can include dressing, eating, toileting, and suitable autonomous working.

A supplementary prerequisite of the IFSP is a record of the family's resources, related to improving the development of the child. Plans of explicit early intervention services must contain the regularity, strength, interval, and technique of providing these services. The beginning of services, and the person in charge for service coordination, as well as carrying out the plan are also stated on the IFSP. (Rapp, W. & Arndt, K. 2012). Additionally, the plan must also include the steps to take in order to involve the toddler in the preschool or other appropriate services.

Once prepared, the IFSP team should meet at least twice yearly to notice progress and provide revisions based on assessments, and other related information. Also, the IFSP should be revised with the family once every six months. Finally, the early intervention team must clarify to families the constituents of the IFSP and get families' confirmation for those services.

At-Risk Children

The term at-risk is normally used to include children and youth, and has a resilient innate meaning. However, the term has no reliable definition and can be observed by branding certain groups. The progressive side of this undetermined definition is that program providers have some flexibility in how they define "at-risk" for their programs. Regardless of this flexibility, it is still important to have a standard or a reference point for vibrant communication between providers, funders, policy makers, and the media about what "at-risk" precisely means. Some would debate that all children are at-risk some way or another, while others highlight that some

children encounter greater risks than other children do. For example, children may qualify as at-risk if they already present a certain disability, or have been abused. On the other hand, some would argue that one should not describe children themselves as being at-risk, but rather the environment in which they grow. For instance, one can say that the family, as a whole, is at-risk.

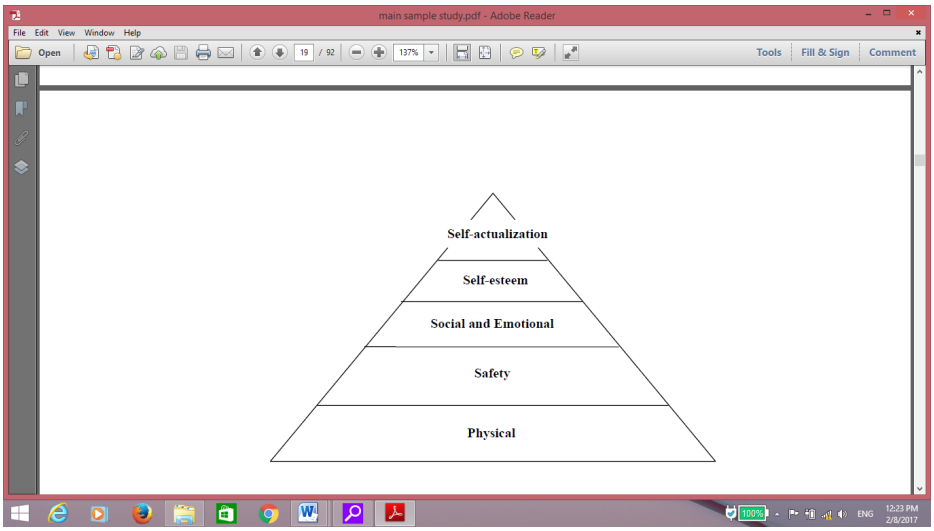
Principally, families are the most critical setting for the development of children, and family risk factors, such as poverty, low parental education levels, have been regularly found to challenge children's development.

A third approach would focus on the community, neighborhood, or school background as an at-risk environment. For example, a low-income community with a high crime level and a low high school level might be viewed as a place that puts children at-risk of poor outcomes.

Maslow's Hierarchy of Needs

Maslow's Hierarchy of Needs is a pivotal theory used to train many in the domain. According to Maslow, some needs are more important than others and must be met before anything else. The parents have to meet basic physiological and security needs that are placed in first priority. Until they find stable housing and can meet needs for food, health care, and other daily living necessities, parents will most likely not be able to focus on higher order achievement needs on the likes of engaging in early intervention (Thompson, Ch. L. & Henderson, D. A.). Such approach does not indicate that intervention is unimportant; it only explains that other, more serious needs must come first. Maslow's theory (1954) is built on the supposition that individuals have inside them an inherent hierarchy of needs as presented below in Figure 2.

Fig. 2. Maslow's Hierarchy of Needs



Beginning from the lowermost, the classifications in the pyramid are physical requirements, security requirements, community requirements, appreciation requirements, and self-actualization needs. The most basic needs are placed at the bottom of the hierarchy such as food, water, and sleep. People move up the pyramid when needs in a previous level have been met. Consequently, when physical needs are satisfied, it becomes likely to transfer to the upper level of needs, safety. Succeeding safety needs, social needs must be addressed like love, belonging, friendships, family relationships, and ties. Next, esteem needs and self-actualization needs. In some situations, an individual might not be able to stay in one level for the reason that a need in one of the lower levels is demonstrated.

Families and Early Intervention

In the United States, the main duty of families in early intervention changed since the beginning of families in early intervention guideline. Families are the main

debate of the Federal Early Intervention Law for young children with disabilities. By emphasizing on the family in Part C of IDEA, law gave another definition for the family members as receivers of services in acknowledgement of their serious role in a child's development. Conversely, services have not always mirrored this probability (أبو سعد، أ. 2014).

Development of the IFSP is a dynamic process that involves a collaborative planning effort and partnership between the parents or caregivers on one side, and the professionals on another side, who will deliver the services and supports to the infant or the toddler along with his or her family. It is intended as an ongoing process of planning and adjusting services to keep up with the changes in developmental needs. The IFSP should be reader and user-friendly, easily read and understood. Moreover, cultural values and believes should be respected and considered in the IFSP since it is addressing families as a family-centered approach.

Family-Focused Approach

Depending on the specific orientation of family systems, this approach has a variety of goals. Historically, the starring role of the family has improved after involving families in individualized plans. Families form an interconnected part of the mediation service group. Specialists and families cope together to regulate and improve the development of the child. Though, families request the professionals' advice and guidance to meet definite needs. The central consideration is regarding what is in the best interest of the family (Chapman, G. & Campbell, R. 1997). Outcomes are evaluated on the basis of the particular orientation of the professionals. On behalf of various experts, the swing from expert-focused, to family-focused services challenged their training, and produced an upsurge in the need for family

involvement in the planning. In all the family approaches, change needs to happen relationally and not just physically (Chapman, G. & Campbell, R. 1997).

Studies designate that the family-centered approach leads to superior products for children than the outdated child-centered methodology. Indeed, family-centered approaches practice representations that introduce early intervention centering on the child surrounded by daily backgrounds and connections. Studies have shown that there is a higher level of parents' participation when using family-centered practices, and a higher positive impact on the child. Such impact will positively influence the outcomes (Sears, W. & Thompson, L, 1998).

The Four Stages of Adaptation

Some parents who have kids with disabilities experience many stages in the journey of adaptation. In the discussions with parents of children with special needs, the researcher noticed that they experience many stages in their journey. There were distinct changes in all the parents' sense of control over their lives, their increased self-confidence and skills in their parenting roles, the balance of their lives, and their attitude about the future. The four stages of adaptation are surviving, searching, settling in, and separating (Woznick, L. & Goodheart, C. D. 2002).

Surviving

Surviving is what you do, as a parent, to keep going when you are feeling completely helpless, because something totally out of your control has taken away your child's equal chance at life. Surviving is different for everyone; it may last a week or even years. Some of the feelings may stay for a lifetime; some may be accompanied by expected events of unexpected memories. Surviving is reacting and coping, and it involves a lot of feelings that may include fear, confusion, guilt, blame, shame,

and anger. Parents may experience different feelings at different times. There is no right way to get through this stage, but there are some things the parents can do to alleviate it. First, the parents have to understand that these feelings are quite normal. Then they must take care of themselves during this period and use support networks such as counselors, friends, or family members. They pass through this period of surviving in their own way and on their own time. There are a lot turning points for the parents to remember, for instance the formation of a sense of control, optimism, and hope after a certain period of time. Such formation takes place when the parents admit that they have to survive. As a matter of fact, to admit "They have survived", is to say "They have overcome"; Parents' survival is to move ahead with life with purpose, energy, and sense of trust that whatever happens to their family, they will somehow find a way to deal with it.

Everyone survives in different ways, some parents may know that their child would have special needs even before he was born, for example from pregnancy diagnoses. While some parents may know that their child is going to have special needs directly after birth as a result of injury or illness, other parents may know gradually, one step at a time, as the child shows signs that something is not going right. Some parents may notice delays in learning or development, unusual behavior patterns, or continuous illness. But more importantly, the nature of the child's special needs and their level of severity do not make it any easier or any harder to deal with. Having special diagnoses may not make it harder to just knowing that the child is at-risk or is slow to develop. When and how the parents learn that their child has a problem does not make the process of adaptation easier or harder. Basically, the attitude of the extended family, the cultural group, or even the religious beliefs may affect whether the adaptation will be easier or harder. There is no perfect way or right

way of getting through this beginning stage. When parents become aware that their child has a problem or is at-risk for a problem, they begin to deal with this issue in two ways, coping and reacting.

Coping.

Coping is the process of managing the issues that come the parents' way. Sometimes parents may feel like they are trying to empty a flooding ship with one bucket. They may have to make decisions without feeling confident about them. Plus, they may have to deal with specialists to whom they are unacquainted, who may give recommendations and advice that sound unfamiliar. Coping with all of this, is not an easy task but parents have shown ability to handle it even better than they guessed they could (Ricci, I. 1997).

Reacting.

Reacting drains energy and decreases feelings of control over own life. Until a certain time, parents of children with special needs, will not possess any sense of direction over their lives. They are always trying to figure out what is going on and what to do next. Their reactions may range from confusion, to fear, to incompetence and may be accompanied by feelings of grief, anger, guilt, and helplessness. These are the ways that many people feel, usually, upon hearing sad or frightening news. A parent with a child with disability probably experienced all of these feelings combined. Most of these feelings get resolved or fade as the parents find themselves ready to move on and as they begin to feel that they have control of their lives once again.

Surviving begins with a state of shock which is a normal reaction to a traumatic or major loss as in death or disaster. Shock is a psychological reaction to protect the body and mind from being overwhelmed (Cunningham, C. 2016). Surviving is

an intensely personal journey. No one can exactly understand what it is like for the parents. Sometimes, they may feel like a helpless, incompetent victim. They may feel drained and lifeless, with a lot of loneliness.

Sadness is a normal emotional reaction to events, thoughts, stories, or memories that remind a person of a loss. He may feel sad about changes he is doing in his life or thoughts about what his child might not be able to do, or how will he tell the news to his friends and relatives. Sadness comes and goes and sometimes might lead to depression. Depression is a chronic mood state that may affect eating or sleeping when a person feels like the problem will linger. A state of confusion, chaos, uncertainty, ambiguity, fear, as well as worrying, guilt, shame, and embarrassment appear while trying to adjust and adapt to the new situation. These are called toxic emotions and on a more serious note, might lead to suicidal anger (Goleman, D. 1996).

At some point, there is a turning point from surviving to searching. This stage is filled with anger that can take many forms, starting with the general anger of taking it personal, to anger more specifically directed at someone in the form of blame such as a blame towards the hospital, towards the person who diagnosed or omitted to diagnose, or even towards the child. Resentment and envy are normal forms of anger at this stage where the parents make comparisons with normal children. Then a feeling of betrayal leads to conscious or unconscious denial as a protective device that the mind uses when a person is not ready to deal with problems.

Searching Searching is the second stage of adaptation. Parents will probably have periods of searching during their whole lives with their child. There are two kinds of searching; outer searching and inner searching. Outer searching begins with the first questions about the child: “what is wrong? Can it be fixed?” Outer searching

begins while parents are still surviving. It consists of looking for a diagnosis and for services.

Some parents feel incompetent towards, and frightened from the new challenge; others, conversely, feel motivated, energized, needed, and fulfilled. But what is certain is that almost all feel an exhausting conflict and mixed emotions. Since every parent is different, there is no right way to feel, and many feelings have the ability to change the life direction and philosophy of the parents. Searching is an incredible journey that begins while parents are still struggling with the issues of surviving. For the purpose of properly taking care of the child and finding the appropriate help and intervention that cannot wait, parents must rapidly resolve all of the feelings and questions they are dealing with. This stage is the stage of mastery and direction towards the appropriate solution after diagnoses. Parents need to label the problem so that it becomes easier to understand it and treat it. This will also help in stereotyping and setting certain expectations of what the child may or may not be able to do. Searching gives strength and new awareness of special needs and the way they are treated in society. Besides, it connects the parents with other families with similar problems. A feeling of empowerment will arise as the parents feel more competent and successful while facing the frustrations of dealing with barriers. But nonetheless, searching is filled with mixed feelings of success and failure, hope and despair, and accomplishment and frustration (McGraw, Ph. 2014). In the process of searching, parents ask a lot of questions in order to rest assured about their children. Some of these questions are:

Can I be a good enough parent to meet all of my child's needs?

How will my child's disability affect my relationships?

How will my child's "special needs" affect my other children?

How will these circumstances affect the desire or ability to have more children?

Who can I understand what I'm going through?

What if my child grows up and cannot be independent, get married, or have children?

Will my child be able to go to school and have friends?

Will my child be normal, healthy, and happy?

Who will take care of my child if something happens to me?

Will I ever stop worrying about all of this?

After asking all these questions and struggling with answers parents realize that there are no quick cures or easy solutions and some of their questions do not, and will never have answers. Thus, searching will never stop but it will develop into a state of peace of mind and that will be the turning point between searching and settling in.

Settling In

Settling in is the third stage in the adaptation process. It is a time of more predictable, settled-in living even if a person is still busy in searching issues. It is the stage of integrating a child's special needs into the rest of the parents' lives, and the stage of establishing a new sense of stability and harmony for the entire family. It is a shift in attitude, balance, and control as well. During survival, most of the energy is spent on coping. Some parents stay in the surviving stage for a longer time. And as the emotions felt in the searching move into the background, the parents settle down.

Separating

Separating is the fourth and last stage of adaptation. The process of separating includes both emotional separateness of the parents and children, and physical separation that may occur when a child has special needs. Separating begins at birth, since every step towards growth is a step towards independence and separation. However, the daily, small experiences children need in order to practice being independent in a safe and protected way, may not happen easily for the child. Separation for children with special needs often has to be initiated, planned, or supervised by the parents. The child may have to learn daily living skills in small steps with a lot of arrangement. Moreover, the child needs self-discipline because his parents will not always be the lifeguards and rescue squads. The child needs to know his strengths and weaknesses and needs to know the importance of self-regulation. The most important of it all, is that a child should understand his disability and learn how to fight his own challenges.

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Exploring the Impact of Teachers' Discourse on Students' Mathematical Language While Writing a Formal Proof About Congruent Triangles

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Abstract

This study is based on a thesis that focuses on the impact of the talk of grade seven mathematics teachers on improving student mathematical language. The importance of the study originates from the essential role of the mathematical language in students' understanding of mathematics and their proof writing. By creating an engaging discourse, teachers can push students to speak mathematically and express their thoughts. Therefore, the types of talks, their sequence, and their effectiveness in creating a discourse were examined. Mercer's (1995) categories were used to classify and evaluate the transcripts of 13 sessions. Three teachers from three different schools participated in this study. The results show that teachers were aware of teaching students the required mathematical language to write proof. In addition, they relied heavily on questions. However, the classes were teacher-centered, and the students' participation was limited to short answers. Students did not have the opportunity to speak mathematically at length and reflect on their thinking. They rarely commented on the contributions of each other. Therefore, teachers are encouraged to prepare activities that target the development of student

mathematical language. Moreover, it is recommended for future research to conduct interviews with students to learn more about their abilities and attitudes toward math talk and proof writing.

Keywords: ***Mathematical language, mathematical proof, discourse, congruent triangle***

Introduction:

Proof is an essential tool to learn and understand mathematics. It is one of the general objectives of the Lebanese mathematics curriculum (Center of Educational Research and Development, 1997). According to Moore (1994), mathematical language is one of the factors that hinders proof writing. This leads to increased interest in the role of teachers in developing students' use of mathematical language that helps develop their reasoning from informal to formal proof writing. Abdul Gafoor & Sarabi (2015) state that by instructing the language of mathematics, students improve the ability to ask and answer questions in and with mathematics.

An engaging class discourse can help in increasing students' precision. According to Stein (2007), "The discourse of a classroom—the ways of representing, thinking, talking, agreeing, and disagreeing—is central to what and how students learn mathematics." Kersaint (2015, p. 4) explains that sharing and exchanging their ideas allows to reflect on their understanding while making sense of and critiquing the others' ideas in a collaborative and supportive learning environment.

Truxaw & DeFranco (2008) state that in most traditional mathematics classes, the prevailing type of discourse is univocal. Moreover, Mercer (1995) states that the classroom interaction-dominated pattern is IRF (Initiation by teacher - Student response - Teacher feedback). This contrasts dialogue discourse where students

are active participants, and the teacher is astute in recognizing when a student's misconception can be utilized to encourage further thinking (Wachira et al., 2013). They then add that a key element of discourse is the need to use mathematics language and articulate mathematics concepts in order to learn both the language and the concepts. This sheds light on the importance of the type and quality of teachers' discourse. Teachers use different types and patterns of talks that shape the discourse. The ability to make these types and patterns fit together and promote genuine communication indicates the effectiveness of the discourse and the teaching practice.

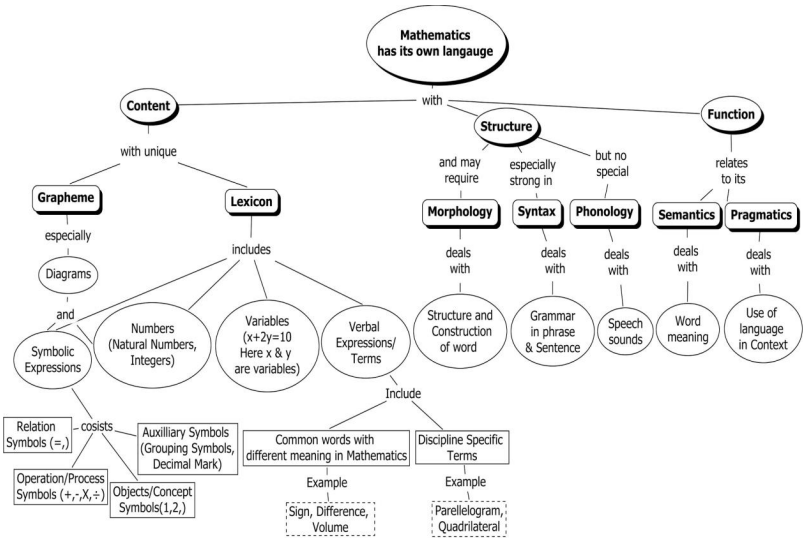
In the Lebanese mathematics curriculum, 'Cases of Congruent Triangles' is a lesson taught to grade 7 students who must develop in this lesson the skill of writing simple formal proofs.

This research intends to assess the quality of teachers' discourse by finding the types of verbal teachers' talk used and discussing their impact on the mathematical language of students while they write a formal proof about Congruent Triangles. This study will focus on the precision of language while writing a formal proof, and verify the usefulness of Cutforth's (2017) proposal about the transition from informal to formal proof. Glover (2018) proves that Mercer's (1995) categories can assess the effectiveness of teacher talk. Mercer (1995) considers these categories as teaching techniques used by the teacher to teach language; however, in this study, these categories will be adopted for teaching mathematical language. One research was found that uses Mercer's categories to analyze teachers' talks, but it is in teaching the English language. Therefore, this study will analyze teacher talk from a new perspective; also, it will highlight the importance of mathematical language and the way discourse can help in enhancing students' mathematical language.

Theoretical Background

This study relies on the sociocultural theory of the Russian psychologist Lev Vygotsky. In Vygotsky's theory, language plays a key role in the theory of human cognitive development (Burkholder & Peláez, 2000). Mathematics is considered a language as it is a system of communication that has a vocabulary, grammar, syntax, and people who use and understand it (Helmenstine, 2019). It is equipped with a system of specialized symbols and vocabularies — each with its level of generality and formality" ("The Definitive Glossary of Higher Math Jargon", 2020). According to Schleppegrell (2007), the linguistic challenges of mathematics education were highlighted by M.A.K. Halliday (1978) in his influential discussion of the "mathematical register." Linguistics identified three main components of a language that are content, structure, and function (use). Similarly, the components of the mathematical language can be identified as Abdul Gafoor & Sarabi (2015) explain in Figure 1.

Figure 1: Components of Language of Mathematics



Reasoning and proof of congruent triangles usually involve proving the congruence of two triangles according to three congruent triangles theorems. These theorems are:

1. Side-Side-Side (SSS), if three sides of a triangle are congruent to three sides of another triangle, the triangles are congruent.
2. Side-Angle-Side (SAS), if two sides and the included angle of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent.
3. Angle-Side-Angle (ASA), if two angles and the included side of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent.

Interaction in teaching is a classroom input that has been widely debated and researched (Glover, 2018). Effective teaching is what leads students to talk more, breaks the IRF pattern, and makes the discourse more dialogic. Teachers must give opportunities to students that allow them to discuss, collaborate, and share their ideas. This will enhance their ability to articulate their mathematical ideas. Several frameworks were built in order to classify and evaluate teachers' talk. Mercer (1995) suggested techniques that teachers used to achieve their goals. The following table presents Mercer's categories and sub-categories.

Table 1

Mercer's Categories and Sub-categories

Category	Sub-category
Elicitation	Direct
	Cued
Responses	Conformations
	Rejections
	Repetitions
	Elaborations
	Reformulations
Descriptions	we statements
	Literal recaps
	Reconstructive Recaps

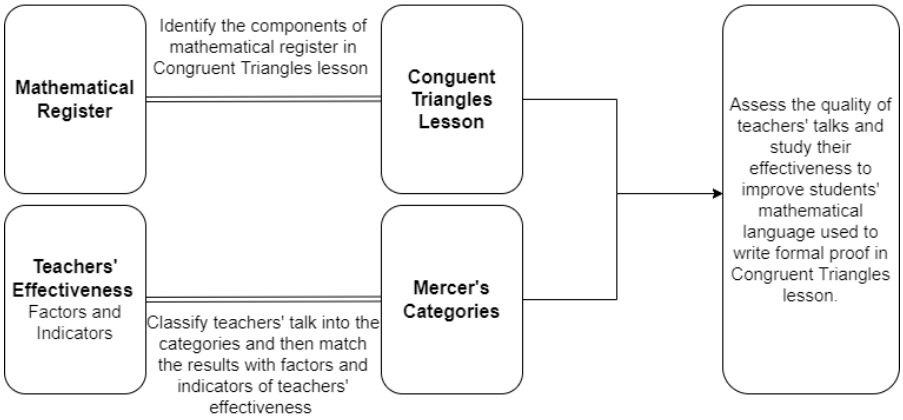
Note. Reprinted from "HOW TO EVALUATE THE EFFECTIVENESS OF TEACHER TALK" by Philip. Glover, 2018, International Online Journal of Education and Teaching (IOJET), 5(3). 497-512. (https://creativecommons.org/licenses/by-nc-nd/4.0/)

Glover (2018) explains that in order to study the qualities of the talk according to Mercer's framework, the researcher can consider how the different categories and sub-categories fit together into sequences or combinations. The way a teacher follows up on student utterances makes an important contribution to the effectiveness of the discourse.

The following figure represents the conceptual framework of the study.

Figure 2

Conceptual Framework of the Study



Literature Review

"The use of precise language allows for the creation of a viable argument, which subsequently allows students to better understand the appropriate use and importance of precise mathematical language" (Adams et al., 2016). Sarabi & Abdul Gafoor (2017) find that the high-difficulty components in the mathematics language are contributed by the syntax, pragmatics, morphology, and vocabulary of the mathematics language.

Several ways can contribute to the enhancement of students' mathematical language. Temple & Doerr (2012) found that the interactional strategies varied based on the goal of the episode. It is remarkable, in the discussions, the contributions of all students, in addition to the teacher's interest in picking the most suitable interactional strategy. Both the students and the teacher were involved in the learning process. The teacher's goal was not only to have students speak more mathematics but also to have them use precise language and justify their reasoning. One of the most important findings is that each strategy has a positive impact on learners' learning of the mathematical register.

This flexibility is known as orchestrating the discourse that helps students experience the use of mathematical language.

In contrast to Temple & Doerr (2012), in Klose (2015), students played the main role in their mathematical language improvement. Students will record a podcast that defines and explains what symmetry is. The process was interactive, and students were responsible for looking for resources, negotiating, and editing the script of the podcast. Students showed improvement in the precision of the language and concept presentation structure.

In a more comprehensive study that involved verbal and written communication of the mathematical language and several aspects of the mathematical language, Uyen et al. (2021) found that students improved their mathematics communication skills while learning congruent triangles after going through the four-phase process. The process included personal work, group work, debate, and institutionalization.

Evaluation of the effectiveness of the mathematical discourse depends on the approach, design, and used criterion. Pourdavood & Wachira (2016) find that mathematical discourse can promote mathematical understanding among secondary school students. In addition, they found that students' attitudes toward discourse could change over time. Glover (2006) analyzed teachers' talk to identify the differences in it in examination classes (English classes) compared with non-examination classes using Mercer's (1995) categories.

Based on these studies, Mercer's (1995) would be a new perspective to evaluate the quality of discourse in math classrooms. Furthermore, helping students to enhance their mathematical language would be a good step towards making mathematics more meaningful.

Research Questions

This study aims to answer the following questions:

1. According to Mercer (1995), what are the types of teachers' talk used in Congruent Triangles lesson?
2. How does the teachers' discourse impact students' mathematical language?

Methodology

This study is a qualitative study that intends to analyze teachers' discourse. Its design is content analysis. "A content analysis is a detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns, themes, or biases" (Leedy & Ormrod, 2015). Content analyses are usually done on different forms of human communication wherein this study will be transcripts of conversations. Recordings of several sessions in three different schools are recorded and analyzed. The discourse was transcribed and analyzed by using a qualitative discourse analysis procedure, mainly. However, some counting and categorization, descriptive and inferential statistics concerning the types of teachers' talk and students' responses were also developed at some stages. The content analysis of these transcripts will reveal the communication patterns and evaluate the talk by the classification and tabulation of the different kinds of talks used.

Participants

Three grade seven math teachers from three different secondary schools in Saida District are randomly selected for participating in this study during the academic year 2020-2021. The three classes encompass 67 students (11-12 years old). Math is taught in English in these schools. The below table illustrates the profile of the teachers who participated in this research.

Table 2

Teachers' Demographic Data

	School	Gender	Years of experience	Number of students in the class	Used Book
Teacher 1	Private	Female	4	21	Mathematics for grade seven from Puissance Collection by Dar Al Ahliah 2019
Teacher 2	Private	Male	4	21	The official book
Teacher 3	Public	Female	17	25	The official book

Instruments

Due to the COVID-19 pandemic, schools adopted remote learning that year. Teachers 1 and 3 used the Microsoft Teams platform while Teacher 2 used the Zoom program. The data were collected from the observation of sessions where I was a total observer. Then, the sessions were video recorded using Microsoft teams and Zoom. The records were transcribed using MAXQDA software.

Procedure

First, the required mathematical language of the Congruent Triangles lesson in the official mathematics curriculum and textbook "Building up Mathematics" developed by the Center for Educational Research and Development (CRDP) in 1998 was identified. The chosen components of the language of mathematics from Figure 1 are shown in table 4.

Permission was asked from the principals and the teachers. Five consecutive 40 min sessions taught by teacher 1, similarly for teacher 2, and three consecutive 80 min sessions taught by teacher 3 were transcribed word by word. Conversations that are related to the mathematical language were transcribed. The transcription results in 1994 lines (teachers and students' utterances). The language of instruction in schools 1 and 3 is English, but teacher 2 mainly used English for mathematical terms and rules. The transcripts of the second teacher were translated to English except when the teacher aimed to explain a term in Arabic. Notes like the speakers'

tone, if students answered using chat, and quick/long responses were written inside parentheses. The transcripts were categorized using Mercer's (1995) categories and distributed over the components of the mathematical language. An additional category was added which is called "Reasoning" and important notes were highlighted.

Several strategies were used to increase the validity and truthfulness of the research results. First, the researcher was engaged in persistent and relatively prolonged observations. According to Lincoln & Guba (1985), persistent observations allow to gather enough data to add to the credibility of the study and help answer the research questions. Thirteen sessions were transcribed in order to get enough data. Second, an audit trail was available: data was accurately recorded. Accurate recording during the study is critical (Maxwell, 2009). Sufficient details were included using audio recordings allowing revisiting events and conversations and transcribe them accurately. Third, peer debriefing which is a useful way to reduce bias and increase credibility in the study (Lincoln & Guba, 1985) was used. It involved discussing the researcher's interpretations of data with another expert in the domain, which allowed determining whether the findings accurately represent participants' actions and responses.

After categorizing the transcripts, the following codes are revealed.

Figure 3: ***Mercer's Categories and the Mathematical Language Component in This Study***

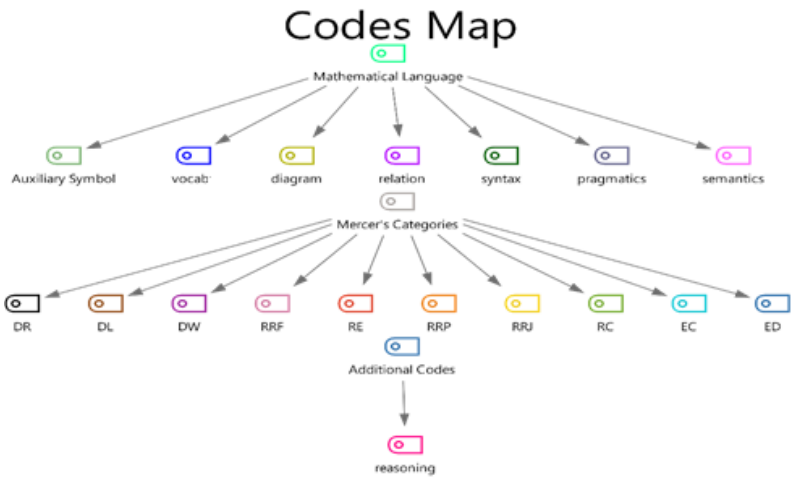


Table 3

Abbreviation of the Codes

Abbreviation	Category name
ED	Elicitation Direct
EC	Elicitation Cued
RC	Response Conformation
RRP	Response Repetition
RRJ	Response Rejection
RE	Response Elaboration
RRF	Response Reformulation
DW	Describe "we statements"
DL	Describe Literal Recaps
DR	Describe Reconstructive recaps

Table 4

Explanation of the Codes

Code	The code contains
Auxiliary Symbols	Parentheses and brackets of segments, lines, and semi-lines, parentheses for calculation of the missing angles
Vocab	Mathematical terms and definitions
Diagram	How to draw geometric shapes like triangles, lines, and perpendicular lines
Relation	Equality and perpendicularity
Syntax	The structure of the proof for example how to transform verbal expressions into written ones
Pragmatics	Understanding the rules in context for example reading geometric figures and coding them
Semantics	Word meaning and the indication of the definitions for example the mathematical properties and axioms
ED	Direct questions
EC	Questions with clues like verbal ones and pointing to the figure or previous proof

Code	The code contains
RC	Confirmation by yes/ excellent/okay/great
RRP	Repetition of student answers as it is
RRJ	Rejection by no/ repeating the answer with changing the tone for example students answered by equal so the teacher said "equal?"
RE	Adding information to students' answers
RRF	Reformulation of students' answers
DW	Description of previous experience
DL	Description of the present experience for example explanation, giving instructions, and the repetition of an idea or the solution of an exercise
DR	Description of an experience adding information
Reasoning	How to write 2-column proof and how to think while solving a problem

Data Analysis

Data were analyzed using content-based analysis. Descriptive statistics were done using MAXQDA. Following the categorization of the transcripts, the effectiveness of teachers' talks was evaluated based on the number of categories utilized, the sequence in which they were used, their relation to the mathematical language taught, and the student's readiness. The numbers of Mercer's categories are reported for each session in order to reveal the teacher's talks, the communication pattern, and the most frequent technique used by the teacher. The same was done for the mathematical language, this will reveal how rich is the discourse found in the class and how much the teachers are conscious of helping their students improve their mathematical language. Note that the mathematical language, which is found in teachers' talk, is only categorized. For this purpose, the teacher-student talk ratio was reported to see if students at the end of the lesson were capable of discussing mathematical problems alone and criticizing mathematical arguments.

Results and Analysis

The first step was to find, with the help of two teachers, the required mathematical language for this lesson in the official curriculum and book. The first teacher has 20 years of experience while the second has two years of experience. The following table shows the results and their categorization.

Table 5

The Mathematical Language in the Congruent Triangles Lesson Based on the Official Curriculum and Book

Mathematical Language	Category
Equal (congruent) Triangles	Vocab
Superposable triangles	Vocab
The side adjacent to two angles	Vocab
The angle enclosed between the two sides	Vocab
The coding of the figures	Pragmatics
Three Cases to prove Congruency (SSS-SAS-ASA)	Semantics
Homologous (corresponding) elements: vertices/angles/sides	Semantics
Geometric properties: The Sum of angles in any triangle is 180º Common side Subtraction and Addition properties Remarkable lines of triangles	Semantics
The naming of lines, angles, segments, and rays	Auxiliary Symbols
Equality of angles and segments, perpendicular lines	Relations
Drawing triangles, remarkable lines of a triangle, perpendicular lines, locating points and rays on opposite sides of the line	Diagram
Write formal proof using mathematical symbols	Syntax

Teacher-Student Talk Ratio

After calculating the number of characters in all sessions using MAXQDA, in the three schools, the student talk was less than 20% of the written transcripts. In addition, students' talk usually consisted of short answers like yes/no, choosing two equal sides or angles, or stating the property used. Therefore, teacher-talking moves did not elicit a decent amount of student talk.

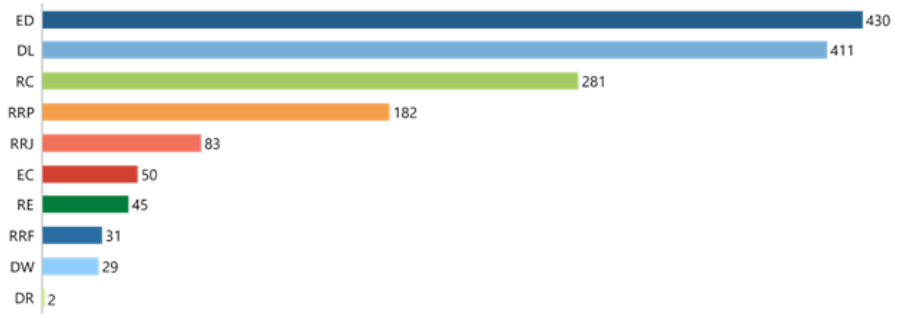
Mercer's Categories

Mercer's categories that were detected in each line of the teachers' talk covered 96% of teachers' talks. Therefore, Mercer's categories are sufficient to analyze teachers' talks.

The following figure is a bar graph that shows the distribution of these categories over the 13 sessions of the three schools.

Figure 4

Frequency of Mercer's Categories in the Whole Sessions



Each of Mercer's types of talk has an objective and elicits a certain response from students. As for direct elicitation, teachers elicited facts and answers to specific questions. It was not employed in the improvement of students' thinking and proving skills as required. Therefore, this technique was used a lot, but a better investment in it is suggested. However, the cued elicitation achieved its goal as students usually

benefited from the cue given. In addition, it was better to use it more often as it helped struggling students. The three forms of response: repetition, rejection, and confirmation, elicited the correct response. Confirming the answers assured students of the correctness of the answer and gave confidence to the responding student. Similarly, the repetition response ensured these benefits, in addition to alerting the unaware students. Concerning the rejection response, the teachers, as mentioned before, followed it with an explanation of questions that helped students understand how we get the correct answer or help the students get the answer by themselves. Reformulation and elaboration responses contributed to the writing of formal proofs as they usually targeted the precision of students' answers, though they were little used. "We statements" and reconstruction were rarely found, despite their importance in assisting students in connecting their prior and new knowledge and experiences. Finally, literal recaps that consisted mainly of explanation were clear and achieved the desired goal.

The distribution of Mercer's categories among the three schools is not much different. The three teachers relied on the same types of talk, which implies that the discussions among the three schools are similar. In addition, the roles of the teacher and the students were comparable. The teachers used similar methods and sequences of explanations. However, Teacher 3 moved at a slower pace. Approximately, in the same period, Teachers 1 and 2 solved higher-level questions than Teacher 3. Teacher 2 asked all students to engage by asking them to submit their answers on chat (via Zoom). Moreover, there is no difference in Mercer's categories between sessions in the three schools except that Teacher 3 reduced the explanation in the third session.

The Pattern of the Talks in the Sessions. The dominant pattern in all three schools begins with explaining or defining a new notion, followed by asking questions, responding to students' answers, and then repeating or rephrasing the correct answer. According to Mercer's categories, this pattern is:

1. Descriptions (three types)
2. Elicitations (two types)
3. Responses (five types)
4. Description (Literal Recaps)

This pattern of talks shapes communication in the class which was dominated by the teachers. Teachers explained the concepts at length and asked questions that led students to solve the exercises and scaffold their answers. Students rarely commented on each other's answers. There was no dialogue or discussion between students. The teachers were asking several students, but only some students were responding. In addition, students seldom ask, argue, or probe ideas. Therefore, this pattern did not create effective teacher-student and student-student discussions.

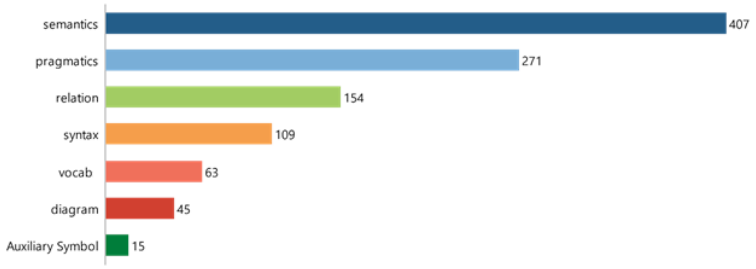
To visualize the sequence of talks, document portraits (See Appendix) were used as they show the sequence of codes for a selected document. In the sessions of School 1, the talks varied between explanations and questions. In each session, the teacher either explained a new concept, revised an old one, or re-explained the steps followed to solve an exercise, which resulted in the long sentences coded by Description: Literal Recaps (DL). However, the explanation of Teacher 2 was the shortest, as he would stop constantly to make sure the students could listen and contribute. As for School 3, the talks varied. In session two, the teacher explained a lot as the dominant talk was Description: Literal Recaps (DL), but in the third session, questioning and students' contributions increased.

Mathematical Language

The mathematical language was detected in each line of the teacher's talk. The following figure shows the distribution of these categories over the 13 sessions.

Figure 5

Frequency of the Mathematical Language Components Across the Coded Segments



Teachers were aware that students needed to learn the mathematical language. They were attentive that students should acquire the math vocab, identify the reasons, relations, and rules, read, and use the diagrams to prove math statements, and utilize concise and suitable symbols and syntax to express their ideas. Despite sometimes they misuse some words as in session 1, school, Pos. 15: "Letter A in the first triangle is equal to which letter/vertex/angle in the second triangle" where she should use instead "correspond to." Also, teachers sometimes used "equal triangles" as mentioned in the book; however, coinciding shapes are called "congruent" and not "equal". They frequently asked students about the elements of the mathematical language of this lesson. They just used explanation and questioning to teach mathematical language to students. The discourse was rich in mathematical language and formal proofs. Students were constantly exposed to this language.

On the other hand, students did not have the opportunity to talk mathematically at length. For this reason, it was not easy to detect their progress in learning the mathematical language. Most students' responses focused on naming equal sides and angles, cases of congruency, and homologous elements. The mathematical language of the students can be analyzed in a discussion about the meaning of congruency and the difference between defining congruency and proving the cases of congruent

triangles. The capability of teachers to enhance students' language arose in this conversation. Therefore, teachers are encouraged to listen more to their students.

Effectiveness of Teacher Talk

Questioning. Questioning is a popular tool that teachers use in their classrooms. Well-crafted questions lead to enhance students' levels of thinking and understanding. In this study, the three teachers relied heavily on questioning. They used questioning to elicit pupils' responses where the two types of elicitation (direct and cued) represented 31.09% of the total teacher talk.

One of the purposes of these questions was to recall previous information like cases, definitions, and rules. This was usually done at the beginning of the session or when the students did not know the answer. Therefore, the teacher reminds them of the rule or the case that they could use. Second, it was common for the three teachers to solve the exercises and problems gradually with the students. They asked students about their ways to solve each part. Moreover, instead of correcting students' answers, teachers ask questions to guide students to correct their answers.

The questions reinforced the objectives of the lesson. The teachers were always aware of the reasons for their questions. Their questions encourage students to use reasoning while writing proof. The questions were mainly product questions. Teachers asked for the reasons and the final answer. Unfortunately, no questions assess students' understanding of the concepts. Teachers, for instance, did not ask students to give counterexamples or explanations of the concepts in their own way. Concerning the cognitive level of the questions, because the questions' goals were recalling and solving gradually, most of them were of a low level according to Bloom. The questions, in general, belong to the first three levels of bloom, which

are to remember facts, understand concepts, and apply rules ("Designing Effective Projects: Thinking Skills Frameworks Bloom's Taxonomy: A New Look at an Old Standby," 2008). As for the knowledge dimension, the teachers were eliciting, factual, conceptual, and procedural knowledge only ("Designing Effective Projects: Thinking Skills Frameworks Bloom's Taxonomy: A New Look at an Old Standby," 2008). Moreover, almost all the questions were closed-ended. The teachers were expecting specific answers from students. Teacher 2 sometimes did not give students enough waiting time. Instead, he was asking and directly answering. The teachers used cues and reminders to guide the students.

It is worth noting that the questions did not lead to dialogue. During the lesson, teachers rarely deviated from the IRF pattern. Moreover, the only relationship found was individual (teacher-student). Therefore, during the discussion in the three schools, students rarely commented on each other's contributions or discussed their answers. Teachers did not benefit from technology (especially it is an online class) to make students collaborate or create discussions. To sum up, teachers used a lot of questioning; however, the quality of questions needs improvement.

Explanation. Concerning the explanation of the three teachers (description category according to Mercer), the teachers have a well-structured and clear explanation; moreover, sometimes they build on previous information. They highlighted issues that require special attention. The teachers continuously used colors and figures to explain the proof and concepts. Their explanations were accurate and when the time was right throughout the lesson. They emphasized and expanded on points but occasionally encouraged student reflection. The teachers sometimes identified student errors as positive teaching points, as well as talked about the students' reasons for their answers. Regarding summarizing, the teachers

reviewed what had been done in a lesson. Consequently, the teachers' explanations were good. They had better encourage more students' reflections.

Responses. As for their responses, the teachers appreciated correct answers, gave cues or asked questions in case the student was hesitant about his/her answer, and elicited information or explained the answer in case of wrong answers. The teachers used different forms of confirmation. They also simplified the questions and gave students another opportunity if they answered incorrectly. Moreover, they asked for justification for the students' answers. However, as the questions, the responses did not help in deviating from the IRF pattern. Responding to students' answers is an art that aids the formation of genuine discussion and improves students' reasoning and math language. They rarely ask other students to comment or correct their friends' answers, so they can improve this issue.

Discussion and Recommendations

This study focuses on the different talks which teachers use and their usefulness in enhancing the mathematical language of students.

An important finding related to the teacher-student talk ratio is that in the three schools, student talk was less than 20% of the written transcripts. The result confirms that teachers talk a lot, as in Domalewska (2015), and the percentage is more than the teacher talk time reported in Domalewska (2015), which takes almost 70% of the lesson time. Thus, teachers are encouraged to reduce talking by giving non-verbal cues, asking open-ended questions, and providing wait time.

The results show that Mercer's categories covered most of the teachers' contributions, as they covered 96% of them. As well, they provided an overview of the used pattern and the roles of the teacher and the students. The usefulness of

Mercer's categories (1995) in studying the effectiveness of teacher talk supports the claim of Glover (2018). The findings indicate that the sessions were teacher-centered where students' roles were limited to answering teachers' questions. Furthermore, the dominant pattern resembles the IRF pattern and it is based on Mercer's categories, as follows: Descriptions (three types), Elicitations (two types), Responses (five types), and Descriptions (Literal Recaps). The teachers relied mostly on explaining and questioning, and they were aware of teaching students the mathematical language of the lesson, although the level of the talks and sequence did not lead to dialogue. On the basis of Pourdavood & Wachira (2016), engaging mathematical discourse occurs when students are involved in mathematical discussions, reflect on their learning, and negotiate their thoughts. This is not the case with the recorded sessions, as they were guided instruction. Additionally, based on Temple & Doerr's (2012) interactional strategies, the dominant pattern of the transcripts was "funneling," where the teachers tried to lead the students to specific answers. Therefore, students were not active learners; they did not negotiate the ideas and proofs together, in contradiction to the teacher in Temple & Doerr (2012), who used the "focusing" pattern to get students involved in math discussions. The low-quality student discourse found confirms the preliminary results of the pilot study done by Weaver et al. (2005). Middle schoolers participating in large and small group episodes are most likely at lower cognitive levels (Weaver et al., 2005). Consequently, teachers are advised to improve their questioning such that they elicit not only facts and answers from students but also ways of thinking. Teachers, for example, can ask questions after solving a problem that trigger students' thoughts like "What if we have?", "What are the conditions that we used to prove congruency?", or "How did we start solving the problem?". Moreover, identifying speaking time for math

problems will allow students to engage in math speaking activities.

According to Pourdavood & Wachira (2016), formal mathematical language is another essential element of mathematical discourse. The teachers asked for reasons, ensured students' use of mathematical language, and teacher 3 explicitly explained how to write a proof. Moreover, students struggled with using mathematical language, such as naming the angles or writing a proof using math relations; this validates the results of Al Masri (2013) that mathematical language restrains students' learning of writing a proof. As mentioned by Uyen et al. (2021), the difficulty that students face while presenting the ideas and proofs of the Congruent Triangles lesson was detected. Likewise, Pourdavood & Wachira (2016) state that students are not engaged in the discussion because they do not know how to argue using mathematical language. Accordingly, teachers are encouraged to learn about the components of the mathematical language and allocate time targeting the development of the mathematical language and writing a proof. In addition, teachers can use scaffolding methods, as students will gradually learn how to write formal proof.

Because of the COVID-19 pandemic and online teaching, meeting with the teachers and students was difficult. Although transcribing the sessions and categorizing them using Mercer's categories (1995) gave an overview of the types of teacher's talks and how teachers used the talks to improve students' mathematical language, interviews with students would have allowed the researcher to better detect the development of the performance of students, especially since students' contributions were very short and limited. Moreover, interviews with teachers would have validated and deepened the results of the effectiveness of the used talks. Therefore, interviews with students and teachers are recommended for future research. In addition, it is

recommended to make tests that examine students' written math communication abilities and proof-writing skills.

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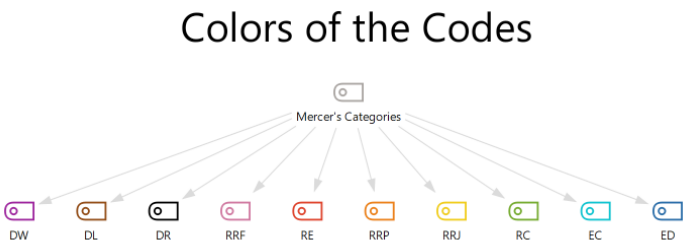
Appendix

Figure 6

Reference Colors for the Document Portraits



The empty spaces in document portraits represent non-coded segments, which are mainly the students' responses.

Figure 7

Document Portrait of Session 1 in School 1