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Systematic Review

A Shared Information Technology-Business-Health Model: Lessons for Healthcare Leaders on Integrating Technology from Investment

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ABSTRACT

Objective: Technology is rapidly shifting our day-to-day existence, education, social relationships, health care and business. Psychiatric leaders have slowly explored telepsychiatric services – but few have an approach to technology in general—due to competing clinical, educational and research demands. Technology has typically been added on, rather than integrated, to institutional functions.

Method: This narrative review used a literature search of Medline, PsycNET, PsycINFO, Embase, Cochrane, SpringerLink, Scopus, ABI/Inform, Business Source Complete, and Web of Science, using subject headings and keywords along with a manual search of reference lists of articles published by November 2020. The keywords explored four areas: 1) business; 2) service delivery; 3) system change; and 4) technology. Articles were reviewed by title/abstract, full text review and review of references. They were included if they discussed integration of technology into health care and compared literature from medicine/health, psychiatry/behavioral health, business, technology, leadership and health care administration. The goal was to explore how medicine/psychiatry has integrated technology compared to business, and apply business approaches to health care and training.

Results: From a total of 2,710 potential references, two authors found 327 eligible for full text review and found 69 papers directly relevant to the concepts. Business and medicine/psychiatry have similarities/differences from both historical and contemporary views. Many health care systems and companies lack a strategic plan for technology and focus only on short-term due to administrative demands. Clinical informatics is a rapidly expanding area and would be central to this process. It has started to facilitate patient-centered care as defined by quality, affordable, and timely health care. While in principle information systems use integrative approaches, electronic health records, electronic means of communications with patients and staff, behavioral health indicators and related digital advances are often added to existing systems rather than integrated. Effective businesses use integrative approaches to share domain knowledge and streamline practices to link information technology (IT) with research and development, production, financing and marketing management. A case example highlights the IT strategy and business leaders' comments in shifting to straight through processing (STP) from the banking industry for investments. It also exemplifies a model of shared IT-business understanding, which improves performance *via* efficiency, quality of data/information processing/integration and managerial teamwork.

Conclusion: When it is integrated into health care service delivery workflow, evaluated and quality improved, IT facilitates the translation of strategic planning into organizational change. Incremental versus strategically innovative approaches to technological integration for care, education and administration are considered. Successful implementation requires a needs and impact assessment for patients, staff, clinicians and leaders across all levels of the organization. Benefits to the mission, limited disruptions of core operational workflow and reasonable costs reduce the likelihood of failure.

Keywords

Health care; Business; Information technology; Shared; Leadership; Understanding; Straight through processing.

INTRODUCTION

Technology is sweeping through our society in unparalleled fashion, affecting our day-to-day life, education, social relationships, health care and business.¹ In this era of patient-centered care, telepsychiatry (i.e., video or synchronous) facilitates access to care, leverages a wide range of treatments at a distance and provides quality care with outcomes as good as in-person care.^{2,3} It also provides versatility to health systems by enabling more patient points-of-entry, matching patient needs with provider skills and helping providers work at the top of their licenses.³ Many clinicians are still shifting from doctor-, treatment- and/or clinic-centered care, to person-centered health promotion and patient-centered care—much less adapting to new technologies (e.g., text, apps, wearable sensors, social media). Integrative use of mobile health (e.g., emergency transport linkage to the emergency department cardiologist) and in-time clinical decision support is a goal, yet not a standard practice in many institutions.

The adjustment to technology is informed by the consumer movement, traditional medical practice and the evolution of institutional approaches to incorporate it. In business, technology is a key part of the consumer decision journey, in which people consider life choices, evaluate options, make purchases, develop loyalty and advocate others do the same.⁴ In health care, clinicians and people make decisions based on perceived needs, resources and experiences.⁵ While people may conduct their life with technology in-time, health decisions are usually best weighed over time, based on patient-physician discussion and informed by data. More broadly, traditional medical practice and the evolution of science have stood the test of time, similar to the evolution of a country's development with checks and balances (e.g., U.S. between the executive office, legislature and judiciary system). Academic health centers (AHCs) promote science and stability, but may make decisions about technology incrementally compared to private health care systems.

Globally, health care systems and governmental agencies are emphasizing quality, evidence-based care and are trying to set individual patient, aggregate and population outcomes that can be evaluated by mental health data/indicators.⁶ This requires services that are acceptable to patients, have metrics that can be measured and approaches that are scalable—all of which depend on technology. System management (e.g., health information systems (IS), information technology (IT), telehealth), facilities and clinics (e.g., labs, home health) and delivery structures (e.g., integrated networks) can play a key role in health care. IT falls into three general categories: clinical information systems, administrative information and clinical decision support (CDS) systems, which are supported by advances in artificial intelligence (AI) and machine learning (ML).⁷ Incremental often means “adding to” existing options (e.g., scheduling systems, the electronic health record (EHR), telehealth video). For example, technology is added to improve documentation of care or as part of a new clinical service, yet the practical impact on clinicians may be overlooked (e.g., time cost, burnout).⁸ Unintended consequences often occur in system implementation as trade-offs are made between goals and users' work

practices.⁹

The field of business has some similarities with health care related to implementation of technology. Both business and medicine have innovators, early adopters, early majority, late majority and laggards.¹⁰ However, large businesses and those in competitive industries have had to adopt quickly—to avoid going extinct (e.g., Nintendo).¹¹ Indeed, progressive business practice depends on technology heavily (e.g., banking, marketing, sales). Successful businesses shifted IT from an “add-on” or appendage to a core, integrated foundation with research and development, marketing, production and financing functions—they came to a shared IT-business understanding to use IT as an organizing framework.¹² Core components of this model have transformed the work of investment banking and other companies like *Cirque de Soliel*, *L'Oreal* and Nintendo.^{11,13-15}

This paper is designed for leaders of health care, training/education, and other organizations as a tool to “step back” and see business enterprises and now academic health care systems are integrating IT for service delivery and workflow. It draws from a literature across psychiatry/behavioral science, technology, business and health care (i.e., clinical care, education and administration). It may help the reader learn in three ways, to: 1) understand the foundational principles and processes of business and health care in order to contextualize the role of technology; 2) apply a case example to health care of how IT was used to engage customers in banking, financing and investing (i.e., straight through processing to streamline transactions, reduce errors and manual cognitive processes); and 3) understand the challenges for Health Care systems to implement a shared IT-business-health model rather than incremental none-integrative approaches for clinical care, education and administration.

METHODS

Approach

This scoping review used a literature search of Medline, PsycNET, PsycINFO, Embase, Cochrane, SpringerLink, Scopus, ABI/Inform, Business Source Complete, and Web of Science, using subject headings and keywords along with a manual search of reference lists of articles published by November 2020. The stages in this process have been described as: 1) using a well-defined research question with purpose; 2) identifying relevant studies based on the question and purpose, employing a suitable team; 3) selecting studies based on an iterative process for searching the literature, refining the search strategy, and reviewing articles for study inclusion; 4) charting the data by having at least two reviewers extract information; 5) analyzing reporting, and considering the meaning of the findings; and 6) using preliminary findings to obtain consultation from stakeholders.^{16,17}

The Research Question

The question that guided the review was, “*What approaches are successful for health care organizations to integrate technology into clinical and*

administrative workflow, based on inroads from business?"

The goal was to use identify models of integrating technology into health care practices in addition to traditional clinical informatics approaches, so that clinical, technical, workflow, and administrative factors could be better planned, implemented, evaluated and improved. While clinical informatics is a rapidly expanding area may be central to this process, additional paradigms were sought to facilitate patient-centered care as defined by quality, affordable, and timely health care. For example, effectiveness and implementation science approaches assess acceptability, adoption, feasibility, cost, and sustainability.

Identifying Relevant Studies: The Search Strategy

Search terms were organized in four concept areas akin to a scoping review¹⁶ with modifications¹⁷:

- **Business:** adaptive, administrative, asset, break-even, brand, channel, communication, competitive, consolidate, content, corporate, costs, deliver, development, distribution, diversification, equipment, equity, expense, finance, fiscal, fixed, industry, inventory, investment, labor, leadership, liability, loss, management, margin, market(ing), opportunity, organization, outsourcing, plant, product(ion), profit, research, return, service, strategy, sunk, transaction, value.
- **Service delivery:** access, asynchronous, clinical, clinician, continuity, curriculum, decision, distance, documentation, education, e-mail, framework, learner, learning, measure, monitor, outcome, patient, pedagogy, remote, sensor, share, skill, social media, support, team, text, training, video, virtual, wearable.
- **System change:** academic, adapt, addition, adopt, alternative, analysis, approaches, assessment, benchmark, center, complementary, configure, data, design, develop, engineer, evaluation, health, implementation, improvement, installation, integration (integrity), long-term, maintain, manage, method, model, modification, operating, optimization, procedure, process, program, quality, phase, process, regulation, resolution, replacement, revision, scalable, science, short-term, simulation, standard, technique, transmission, workflow, utility.
- **Technology:** app, architecture, bridge, cell, computer, connection, database, development, device, digital, eConsult, e-consult, electronic, hardware, health, infrastructure, information, Internet, medical, mobile, monitoring, network, on-line, protocol, record, registry, software, store-and-forward, structure, system, web-based..

Study Selection

Articles were reviewed by title/abstract, full text review and review of references. The goal was to explore how medicine/psychiatry has integrated technology compared to business, and apply business approaches to health care and training; service delivery rather than production models of business were sought.

Articles were included if they discussed integration of technology into health care and compared literature from medicine/health, psychiatry/behavioral health, business, technology,

leadership and health care administration. Articles were excluded if they were restricted to one concept area, did not have data, did not have business or scientific methodology, or if were not in English.

Charting the Data

A data-charting form was not developed and used to extract data from each study, but notes were organized consistent with a narrative review or descriptive analytical methods by each reviewer to extract contextual or process-oriented information from each study. The reviewers then compared and consolidated information regarding content. A qualitative content analysis approach would have been used if there was more content, to make sense of the wealth of extracted data. A descriptive analytical method was used to summarize the process and content information of discussions with experts, in an effort to chart and summarize complex concepts in a meaningful way.

Analysis, Reporting and Considering the Meaning of the Findings

This phase often organizes meaningful results in a table, study by study, with data outlined and consolidated by the authors and expert consensus step, but a thematic analysis was not possible.

A field study approach with unstructured interviews was used to investigate how a Company explores the use of STP. This method allows respondents to express in their own ways and pace without bias.¹⁸ To be precise, unstructured interview resembles a conversation more than an interview—thought the questions come from the interviewer—for an open-ended exploration of the issues rather than making assumptions. Sometimes independent and dependent variables already exist within the social structure of a Company under study, and inferences can then be drawn about behaviors, social attitudes, values and beliefs.¹⁹

Consultation for Expert Opinion

Expert opinion was solicited to review preliminary findings, and suggest additional steps to improve the review. The goal was to gain input and perspective from a diverse group of health professionals from business, medicine, behavioral health, health services and technology. Participants were also sought from clinical, administrative (e.g., chairs, deans, leaders of national organizations), health care (e.g., health system director, executive, chief of staff) and technology (e.g., artificial intelligence, developers, engineers, informatics, information systems) sectors.

RESULTS

Literature

The flow chart shows that from a total of 2,710 potential references, two authors (DH, JL) found 2,678 eligible for title and abstract review and found 327 papers eligible for full text review as directly relevant to the concept areas in combination. The authors found 58 papers directly relevant to the concepts and 11 from references searched for a total of 69.

A Historical Perspective: Similarities/Differences Between Business and Medicine/Psychiatry, in General, and Related to Technology

A business is usually defined as any organization that provides products, services or both to individual consumers or to other organizations.²⁰ The premise is a need for goods and services that satisfy the need, and there is an aim to make a profit and share that with stakeholders who have invested. Leaders steer the functions of businesses, which include research and development, marketing, production, accounting and financing. Businesses operate within in an overall economic system (i.e., market with supply and demand) with risk and uncertainty.

Science and medicine has changed significantly over time,^{20,21} with the late 19th-20th century bringing a scientific foundation and organized medicine. The focus of medicine as a business started in the 1920s, and later, health care systems, reform of training and other tenets of modern care (e.g., specialization, public health, insurance and governmental funding) appeared. The late 20th-early 21st century has seen corporatization, information revolution, globalization and the era of health care reform. Academic medicine comprises medical schools, teaching hospitals and large multispecialty physician practices and its key roles are: treating complex conditions; advancing medical discoveries for better diagnostics, preventive strategies, and treatments; educating the next generation of physicians; and providing irreplaceable community services.²² Medical research is conducted by sustainable, predictable funding growth for the National Institutes of Health. Specialized clinical care at teaching hospitals includes Medicare finances graduate medical education (GME) for direct costs for physician training and indirect medical education (IME).

The U.S. has a unique system of health care delivery, as most developed countries have national health insurance and governmental oversight.²⁰ It is fragmented with people seeking health care through different means and a constantly changing pattern of financing, insurance, delivery and payment mechanisms with private and public components. The complexity of health care includes education/research, suppliers, insurers, providers, payers and the government. The policy cycle is complex itself, with issue, design, public support, legislative decisions and policy implementation steps. The newest movements in addition to patient-centered care are value-based care and accountable care organizations driven by the Centers for Medicare and Medicaid Service.^{23,24} Value-based purchasing (VBP) adjustments on reimbursement have been tied to clinical care quality (2013), patient experience (2014), safety (2015), efficiency (2016) and mortality (2017).

Technology, clinical care and competencies: There are continuum of technology-based options used by patients, families, caregivers and professionals. This continuum includes: Internet-based information; self-help/support groups; materials for patient and clinician education; social media; self- and clinician-assisted self-assessment; asynchronous text, e-mail and video options; mobile health with apps; and synchronous video (i.e., telepsychiatry) (Table 1).^{25,26}

Technology helps users with goals, and systems may help reduce liabilities of technologies for consumers and patients by standardizing approaches. The spectrum reflects a shift to patient-centered care – and person-centered care²⁷—empowering the whole person behind the patient.^{28,29} These movements put business and medicine on a common ground—helping the person/customer/patient with quality service/care. This shift parallels past trends in banking, as people have used automated teller machines (ATMs) instead of banks/tellers, though health care is more complex than that.

An e-platform may be needed for infrastructure and to efficiently and effectively stage various telecare options. Common technological approaches in medicine include: 1) EHRs, though for users, may interfere with patient engagement and menu-based user interfaces have been cumbersome and unforgiving, but are evolving into more intuitive graphical interfaces^{30,31}; 2) dictation with voice recognition, which still has challenges of integration with legacy, billing and practice management systems—this text system could be replaced by video recordings³²; 3) e-consultation (i.e., e-consult or eConsult) to support a primary care provider (PCP) for decision-making^{33,34}; 4) text-based, chat and social media communication, pose integration challenges and keyboard characters/ emoticons may be used differently across cultures³²; and 5) mobile phones, apps and wearable sensors, which are not always evidence-based or integrated into health care systems, but could provide comprehensive self-management approaches and advanced features that leverage the broader functionalities of mobile phones (e.g., sensors, ecological momentary assessments).^{35,38} By obtaining patient input and preventing/troubleshooting problems, users build trust (i.e., reduce concerns of privacy).²⁶

Many BH professions have put out best practices, guidelines, and position statements for clinicians to adjust to video and asynchronous technologies. Contributions come from: psychiatry/medicine, psychology, social work, counseling, couple/marriage/family, the American Telemedicine Association, the American Psychiatric Association and the Coalition for Technology in Behavioral Science.³⁹ Most guidelines focused on video and sparingly mentioned e-mail, e-consultation, social media or texting,⁴⁰⁻⁴² until competencies were published for social media,^{39,43} mobile health,^{44,45} and asynchronous care. The overarching goal of competencies is to ensure quality of care for patients, improve clinician skills and promote training.

Business versus medicine/psychiatry leadership: Continuous, committed and active leadership is crucial for strategic planning, management and implementation of change.⁴⁶ Technology may mean different things to different people, professions and businesses, but it is almost always associated with innovation.^{47,48} A comprehensive definition of innovation relates to the impact on an organization, based on the magnitude of the advance and the dimension of novelty experienced⁴⁷:

- Incremental: expresses minor changes to current services/product and processes;
- Radical: not frequent in organizations, but requires a major breakthrough or discovery; and

Table 1. E-Behavioral Health Continuum of Interventions for Health Care

Tier	Source	Initiator goals/Aims	Liabilities	Approaches
1	Website information	Health information: gain perspective, obtain standard and updated info Refer patients for somatic symptom disorders	Quality of information and lack of regulation; less of an issue if referred to site	Help patients, families, caregivers and colleagues in medicine/surgery
2	Support/chat groups	Patient: education Caregivers: tips and perspectives on coping	(Peer compatibility?) Information quality	May help with adjustment to common medical problems
3	Social media (SM) one- or two-way	Easy and convenient Likely more convenient for one time use Good option for patient and clinician prefer	Not privacy compliant Busy clinicians may not have time; see if "value added"	Important to set expectations, limits and boundaries around time and content of matter
4	Informal education for self-assessment	Person/patient: education, tips Caregiver: education, supports, and advice Clinician: give assignments	Not as good as in-person Use a team and give good sites for quality	Refer to sites that focus on longitudinal skill development
5	Resources for self-care decision-making	Person/patient/caregiver: additional options Clinician: skepticism unless known source; best withinelectronic health record (EHR)	Good for options, though, what if it depends on...should do A or B?	Information on topics Good for team members
6	eConsult between primary care provider (PCP) and specialist in EHR	PCP (pediatrician, family medicine, obstetrician): timely to visit and sent in time Specialist: simple questions (e.g., facts, steps to do) can be answered	May not work for difficult patient cases These take time to clarify question and review chart	Monitor timeliness, follow up and quality Build into care workflow and culture of care
7	Assisted self-care assessment and decision-making	Person/patient/caregiver: empowering as customized and supported Clinician: effective to distribute skills	Without help, may make decisions lacking context? Stay within scope of practice	Link with social work, hotline and/or clinic, if needed
8	Asynchronous, between-session patient-clinician contact (e.g., wearable, app text)	Person/patient/caregiver has minor question or needs a detail→e-mail/text; tracking symptoms→app Clinician: e-mail/text for quick, simple advice; apps good for monitoring disorder	Align 1-2 apps with 1-2 purposes to focus Errors, miscommunications Time, documentation and privacy issues	Provide training for faculty and team EHR integrative power Need evidence-based app and evidence-based approach
9	Synchronous, telepsychiatry (TP)	Person/patient: it really works and is much more convenient Clinician: if patients like it, it is a good option	It always has to be scheduled (and paid for)	A great option; not always needed due to lesser, easier options
10	Hybrid care: in-person and e-option; TP and e-option)	Person/patient: connect in different ways Clinician: ad hoc to planned	Requires discussion, prioritization and feedback Takes willingness to change, time and \$	Folks will shift if healthcare financing shifts? Paradigm shift is needed

• Transformative: an exceptional shift in processes and beliefs.

John Kotter, Professor of Leadership at Harvard Business School, has contributed two key approaches to leadership for business and health care.⁴⁹ First, he proposed that leadership is a process that focuses on making organizational changes – the stimuli behind an organization’s adoption of — and adaptation to — improved processes. Management is primarily assigning and tracking tangible outcomes, however, leaders manage and managers lead to some degree. Second, he highlighted eight essential factors for transformation efforts.⁵⁰ Transformation takes time, so performance improvements must be planned, actively created and achieved, and short-term wins keep participants interested and experiencing some sense of urgency.

In spite of the plethora of possibilities for improved patient care through the use of technology, human factors present the greatest impediment to the implementation of new systems. Success depends upon a blend of both technical and strong organizational skills to plan and manage these changes. Leaders need to strategically plan, understand how innovations diffuse through groups,¹⁰ assess the groups’ readiness for change,⁵¹ monitor the organizational culture, recognize/plan for resistance to change and communicate effectively. Failure of implementation is usually due to insufficient attention to how change is experienced by the peo-

ple who do most of the changing.^{10,52}

Effective change leaders:

- Embrace change when needed and take initiative;
- Develop a vision for change and communicate its urgency;
- Communicate with managers and employees, individually and through mass media, with feedback options;
- Stay actively involved; and
- Direct and review change management planning and implementation.

Several approaches, such as those of Deming and Walton^{53,54} and of Nadler et al,⁵⁵ describe detailed tactics for working through problems and change in large organizations. Deming, in particular, stressed the importance of including staff at all organizational levels including the lowest tier front-line workers and, notably, customers in “quality circles” as he engineered numerous quality improvements at Toyota. Similarly, behavioral health care institutions need an approach for change management and a technology e-platform to plan, prioritize, and allocate resources for technology (e.g., telepsychiatric video) related to academic goals, education and community partnerships.⁵⁶ This may include competencies related to patient care, education, faculty development,

leadership, finance and partnerships – and it is better to take a broader e-health approach rather than focusing on one technology like telepsychiatry.²⁶

Assessing and enhancing readiness for change: Successful change requires both individuals at all levels and their organizational policies and procedures to change or shift. Complicated processes may seem wonderful to leadership, but can be perceived as burdensome, overly complicated, ineffective, and even counterproductive by those in middle management and those providing services. Unless each level perceives the intended changes to be in their own interests, they may not prioritize or cooperate with implementation, and if objections are not adequately voiced and addressed, those affected may refuse to participate or, in subtler fashion, may engage in passive-aggressive behavior, such as delay, which sabotages the implementation plan.

Assessing how ready to change a group of individuals and organizations may be complex. Readiness is associated with people’s perceptions of financial support, a well-defined mission, leadership structure, cohesive teamwork, the technical skills needed to adopt an innovation, and the extent to which they see their own needs for safety, security, and autonomy protected. From studies using survey instruments, focus groups, clinical interviews, site visits, and community profiles, it is key to 1) assess, 2) contextualize, and 3) enhance readiness.⁵⁷ A checklist of factors may help organizations measure readiness for change and develop attitudes and beliefs that provide the context (Table 2). The personal attributes of “change agents,” are important, such as perceived credibility, trustworthiness, sincerity, and expertise. Internal change agents who are mid-range authority figures may assess readiness better than leaders at the top.

Table 2. Essential Factors for Transformation Efforts in General and Specific to Technology for Healthcare
Essential Factors in General
<ol style="list-style-type: none"> 1. Establish a sense of urgency. 2. Form a powerful guiding coalition. 3. Create and communicate a vision. 4. Empower others to act on the vision. 5. Plan and create short-, mid- and long-term goals and successes. 6. Consolidate improvements and produce still more change. 7. Institutionalize new approaches.
Essential Factors for Healthcare and Technology
<ol style="list-style-type: none"> 8. Assess the level of innovation required: (i.e., incremental, radical, transformative). 9. Align innovation with organizational culture. 10. Link innovative service process with healthcare outcomes and/or deliverables to end-user(s) (i.e., patient, staff, clinicians; trainees, faculty; interdisciplinary teams). 11. Include clinicians and supporting agencies, patients and regulatory units. 12. Recognize and planning for resistance to change, among other things. 13. Plan an approach to contend with unexpected events. 14. Model and communicate competencies and best practices for change.
Problem-Solving Challenges (e.g., Resistance)
<ol style="list-style-type: none"> 15. The status quo is threatened. 16. Immobilization (i.e., the initial shock reaction to a negatively perceived change). 17. Denial or the hope that the change project is not real or will go away. 18. Anger or frustration often directed toward others. 19. Bargaining to minimize the impact of change. 20. Depression and other sentiments experienced when bargaining has failed (may represent the beginning of acceptance). 21. Testing, which is similar to bargaining, but more common as persons begin to accept the change and learn how to succeed under the new conditions.

Implementing innovations often meets resistance to change. Many senior managers forget a critical principle of change management: organizations do not change; people do (Marshall, 1996).⁵⁸ It is inevitable, particularly if individuals experience a loss of control. An outside organizational consultant who facilitates workers’ grief processes may help.⁵⁹ Such consultants may provide a safe, non-punitive environment—a transitional space—in which employees may safely explore the implications of the imposed changes. The consultants may explore how anxieties and uncertainty, the introduction of additional complications in the form of new procedures, red tape, regulations, and other factors appear to take precedence over problem-solving, provision of services, and addressing worker concerns.

Predictors of success: leadership and management orientation: Studies have been examining relationships between the managerial-controlled critical success factors, which predict good performance across business, education and health care (largely non-profit) service sectors of the U.S. economy. In 2001, services-producing industries accounted for 81% of the nation’s employment.⁶⁰ Between 1960 and 2002, employment went from: 0.6 to 2.5 million (M) in education; 0.66 to 9.3 M in business; and 1.5 to 11M in health care⁶¹ then 16.4 M in 2010.²⁰ Market orientation (MKT), learning orientation (LRN), entrepreneurial management style (ENT) and organizational flexibility (ORG) are predictors of organizational success (Table 3).

Market orientation had the highest correlation with performance in all three sectors.⁶² Generally, the next-highest correlations were with LRN and ENT style rather than ORG. However, in business services, ORG had a higher correlation with performance than either ENT or LRN. There were a number of managerial implications, which not surprisingly, varied by sector. Different industries and markets have different critical success factors and drivers. It is important that executives reflect on these factors, their industry and the market. Health care has done well vis-à-vis both business services and education on MKT, LRN and ENT. This probably reflects challenges faced with managed care/capitation, hyper-competition with mergers/acquisitions and discussions on who is the decision-maker (i.e., now the patient more than ever). Surviving health care organizations have been forced to become marketers and more entrepreneurial with innovation and excellent care.

An Example of Straight Through Processing: How the Banking, Financing and Investing Institutions Have Engaged Customers

Company background/history: Businesses respond to challenges of generating income, meeting consumer expectations and competing with others in a variety of ways. The Company offers life insurance products, such as term, whole, universal and variable universal life insurances, fixed and variable annuities, disability income insurance products, retirement plans and business solutions (e.g., fringe benefits and retirement plans). In addition, it also offers investments which include mutual funds, variable annuities, direct participation programs, full-service stock and bond trading products, group retirement plans, college savings plans, health savings accounts and

Table 3. U.S. Service Industry Predictors of Leadership and Organizational Success Across Business, Education and Healthcare	
Market Orientation (MKT)	
• Definition: A business philosophy where the focus is on identifying customer needs or wants and meeting them. The three basic tenets are customer orientation, competitive orientation, and inter-functional coordination.	
• Keys: The generation of market intelligence, sharing of this knowledge throughout the firm and a marketing response mechanism are important.	
Learning orientation (LRN)	
• Definition: Individuals in an organization not only have the ability to do adaptive (incremental) and generative (paradigm shift) learning, but also to keep an open mind regarding different perspectives and continual learning.	
• Keys: The norm becomes collaborative learning and is a market orientation is inherently a learning orientation.	
Entrepreneurial Management Style (ENT)	
• Definition: An organizational process that encourages and practices innovation, risk-taking, and proactive behavior toward customers, competition and opportunities.	
• Keys: The process enables the firm to create value by identifying market opportunities and creating unique combinations of resources to pursue these opportunities. The firm is proactive in obtaining intelligence on customers and competitors, innovative by reconfiguring its resources to formulate a strategic response and implements the response, which usually entails some degree of risk and uncertainty.	
Organizational Flexibility (ORG)	
• Definition: the degree in which a business unit is adaptable in administrative relations and the authority vested in situational expertise.	
• Keys: It is "organic" in terms of its attributes and structure.	

cash management accounts. The company has strategically grown as a leader within the insurance industry for providing quality, low cost products and achieving superior financial growth. Its shares of stock are 100% owned by the Company's Mutual Holding, Inc., whose voting members are life insurance policyholders and annuity contract owners. In 2018, it accomplished its 29th consecutive year of growth of individual life insurance sales, a record unmatched in the industry, with a 20% increase from 2015 and \$XX billion (B) of assets under management.

Challenges for the company and other banking, financing and investing institutions include generating income, meeting consumer expectations and competing with others. Manual data may have some pearls, but they are hard to access quickly and require reconciliation. This delays decisions, costs time to reconcile and leads to dissatisfaction.⁶³ In the trade life cycle — from initiation to settlement — trades by phone or *via* a trading desk had to be keyed into PDF trade tickets, entered into the investment accounting system in order to process the trade and security information for reporting purposes and general ledger notation. The trade is then faxed to the custodian for settlement purposes and all communication with brokers is done *via* phone and email. Companies had tended to leave out IT, in general, or to barely include it in order to capture parts of the data flow.^{64,65}

Two issues have encouraged the Company to change. First, insurers — like all other businesses — have to determine how to utilize technology strategically to best manage current and new challenges related to core processes and growth of market share.⁶⁶ Insurers have had more downgrades per Fitch Ratings, Standard & Poor's and A.M. Best than other businesses, suggesting that the "back office" had to be modernized.⁶⁷ Second, global financial services had skyrocketed from 13 M (\$382 B) in 1980 to 221M (\$11.1 trillion (T) in 2000.⁶³ The Security and Exchange Commission (SEC) facilitated STP use for cross-border trading by setting standards T+1 (trade day + 1 day instead of T+3). This required millions of transactions — and the participants — to in-

terface and use a system that did not crash.^{63,68}

The company considered a solution for analysis, time/resources and planning.

Straight through processing (STP) is defined as end-to-end automation of security trading from order to settlement. Information that has been electronically entered by one party may to be transferred from another party instead of manually re-entering the same pieces of information repeatedly over the entire sequence of events (Figure 1). This reduces the time it takes to process a transaction and increases the likelihood that a contract or an agreement is settled on time and without error. This works using automatic linkages across geography with a paperless sequence of events. STP helps all parties, including asset managers, brokers, dealers, custodians, banks and other financial services players.

There are levels of STP: 1) intra-STP, within an organization and its branches; 2) extra-STP, between firms with direct access into other companies' internal processes across an industry; and 3) global-STP, across worldwide or global boundaries. Challenges are/have been: 1) data capture; 2) internal workflow; 3) external workflow; 4) real time processing; 5) front, middle and back end office connectivity; 6) adoption of industry standards and protocols; 7) multilateral interfaces with third parties; 8) just-in-time enrichment; and 9) global implementation.

Field study notes: Questions asked of Company leaders and application to psychiatry/behavioral health and health care (progression from current state to IT integration).

1. How would you describe the current IT/systems structure within the back office and the front office areas within your Company?

It has the functional capacity for status quo operations, but with significant opportunity for improvement. We are attempting to move away from a situation where we are playing catch-up to one

Figure 1. Steps of Trading Processes and Participating Parties Under the Straight Through Processing Umbrella

STEPS	Securities Information Management	Pre-trade Preparation	Trade Execution	Post-trade Pre-settlement	Pre-settlement	Settlement Transaction	Post-settlement	Securities Administration
PARTIES	Asset/Fund Manager Research Institutions Information Services Providers Global/Local Custodians Listed Institutions	Asset/Fund Manager Broker/Dealers Market Makers	Asset/Fund Manager Broker/Dealers Market Makers	Asset/Fund Manager Broker/Dealers Exchanges/Markets	Asset/Fund Manager Broker/Dealers Global Custodians	Asset/Fund Manager Broker/Dealers Global/Local Custodians	Agent and Clearing Banks Securities Depositories Global/Local Custodians	Agent and Clearing Banks Securities Depositories Global/Local Custodians
PROCESSES/ DOMAINS	Investment Management							
	Insurance/Asset Management							
	Capital Market							
	Retail and Wholesale Banking							
Adapted from Idea Group, Incorporated, 2003.								

more adaptable to future changes. These things take time and resources. There are an incredible number of obstacles all companies face to accomplish this. Too many of our manual and IT processes are exceptions instead of the rule. This not only creates inefficiencies, but it reduces adaptability and increases risk, especially in the areas of potential sharing of knowledge by personnel.

Application to psychiatry: mental health clinical care. In an outpatient department, there are many gaps between the back office and front office (i.e., patient side). Clinical care involves insurance (i.e., benefits), scheduling, billing, collections and communication (e.g., records to primary care) – rarely are all parties on the same page (e.g., insurer and clinic administration may only know benefits and patients and clinicians have to double check). For clinical care workflow, information systems and domains include the EHR, picture archiving and communication systems (PACS), laboratory information systems and CDS systems. Some health care systems have CDS to provide clinicians, patients and others with knowledge and person-specific information, intelligently filtered or presented at appropriate times, to enhance health and health care.^{7,69} Similar to STP for investments, CDS improves patient outcomes, reduces unnecessary mistakes and expenses and increases efficiency.⁷⁰

2. Would you say that most of your IT projects currently within the back-office and front office within the investment department are short-term (i.e., 6-months) or long-term? What has caused this? We have been focused on shorter-term solutions more recently given the lack of appetite for longer-term projects, which tend to be on the pricier side in both terms of dollars and people. We have been trying to show a clear cost/benefit solution to the projects we are pursuing. Most critically we are getting creative with how to solve problems. For example, I might not be able to sell a project on implementing a new data warehouse. But I might be able to sell someone building the database structure for me. We attempt to budget for the actual IT, marketing/messaging and training short-term costs –if we do that well, we believe we get lower direct and indirect costs later. Then, over 1-6-months, We borrow help from existing or others' staff to load data into the data warehouse in an automated fashion *via* extract, transform and load (ETL) or

scheduled jobs, and I can build the reporting systems myself. These pieces make it easier to get enhanced, dedicated resources for the whole process *via* permanent funding.

Application to psychiatry: Mental health research and clinical care. With research there is a need to link participant expectations with procedures and completion of a study. The time, resources and infrastructure is organized with a grant, though short-term rather than long-term; some are pilots to collect data for more substantial grants for long-term projects. Clinical services and insurance are usually focused short-term (e.g., 2-4-months for therapy) or mid-term if not intensive (e.g., medication visits); few have extensive long-term insurance for clinical care. The best that can be hoped for is cost-offset, with IS and IT investments for a health care system adding to workflow, information used by multiple parties in-time across departments, and rarely, in a community.

3. How are insurance companies managing the complex challenges of integrating back-office processes with front-office solutions (i.e., what is your Company's approach)?

Companies have to create accountability for results and this means that people have to be empowered with the correct tools and resources (i.e., more than dollars and staff). The correct ethos of an organization is the biggest benefit, which for us is about customer service, accurate data, precise operations, teamwork and more transparency; we move away from silos of responsibility and disconnects between staff and customers. Business processes are becoming more complicated all the time, across multiple departments, computer software and companies. We often rely on project managers who are only concerned about their “project silo” rather than integrating multiple projects, departments, and systems together in a cohesive process (i.e., true accountability). IT additions over the years have not helped; we needed systems that enhanced data flow, integration, access and communication. Now, there are project prioritization meetings across groups (IT, marketing and production) — in-person and virtual — and we have a committed effort to break knowledge silos/barriers. Coronavirus disease 2019 (COVID-19) has boosted our virtual culture quite a bit.

Application to psychiatry: Administration: We have too few staff and many managers to keep up with university/hospital, accreditation and regular administrative tasks. We do not have time, resources and infrastructure to get organized and we have to focus on the short-term rather than the long-term — there is never enough time? Assertive health care systems forge through these challenges with incremental IT — often because “patients deserve the best.” However, expenditures are limited by budgets and systems usually do not face extinction and there are not millions or billions of dollars to make it worth their while. Some systems will invest, though, as IT can link clinical, administrative, quality improvement and external accreditation processes, making it is easier to queue participants for completing tasks, monitoring outcomes and documenting standards are met.

Summary

The company decided to prioritize the following:

- Reach higher volume activity (various instruments other than the routine fixed income and futures),
- Acquire more drill-down data and complex analytics demanded by strategic business units (SBUs),
- More quickly obtain financial information for financial control, and
- Require portfolio managers to be trained for more in-depth risk analysis and portfolio analytics.

While STP initially was seen as the way to get a trade “locked in,”⁷¹ perspective shifted from settling the trade to multi-lateral payment and netting⁶⁴ — a significant reshaping of the Company’s entire process from before and after STP (Figures 2 and 3).

Overall, STP has reduced trade life time cycle — with the potential to reduce systemic and operational risk — while increasing speed and reducing cost. STP provides a competitive advantage for a company with a good business understanding-IT relationship.

Challenges and Reasons for Health Care (e.g., Medicine/ Psychiatry) to Implement a Shared IT-Business Understanding

AHCs are the standard in the health care system for tertiary and quaternary care, training/education/professional development and research. AHCs also have important partnerships with other organizations, provide jobs for the economy and serve communities in many other ways. They have survived through vigorous cost-cutting efforts, but AHCs must change dramatically to meet the changing needs of patients and society.⁷² First, there is the need for better balance between specialization, ambulatory/primary care and cost-effective services. Second, they face aging of the population, a dramatic rise of chronic disease, an influx of patients from different cultures, decreasing financing streams and marketplace dynamics. Third, they have to contend with technology implantation and change.

Institutional movement toward telemedicine and telepsychiatry – whose modern era probably started around 20-years-ago – has been slow with some exceptions (e.g., research, private companies, Veterans Affairs).⁴⁰ Telepsychiatry video aligns with conventional care compared to other technologies used by patients, clinicians and others. Along with the EHR, it had been a specific indicator for institutional e-readiness (or not) until the COVID-19 era; the degree of telepsychiatric integration into workflow – if measured and measurable – will be an indicator of systems’ progress (or not) in the near future. AHCs have implemented EHRs,

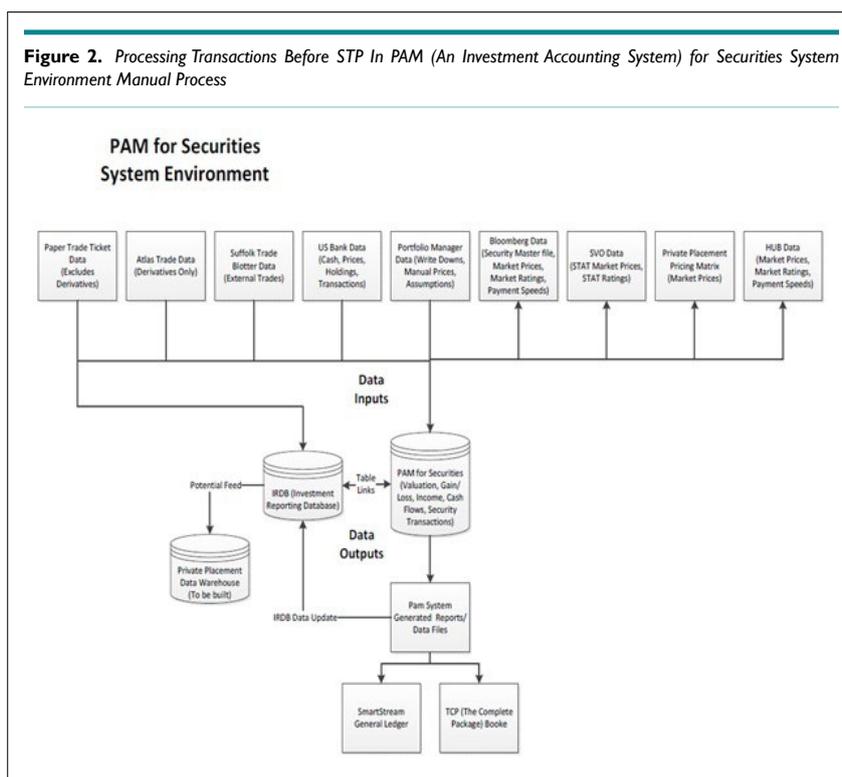
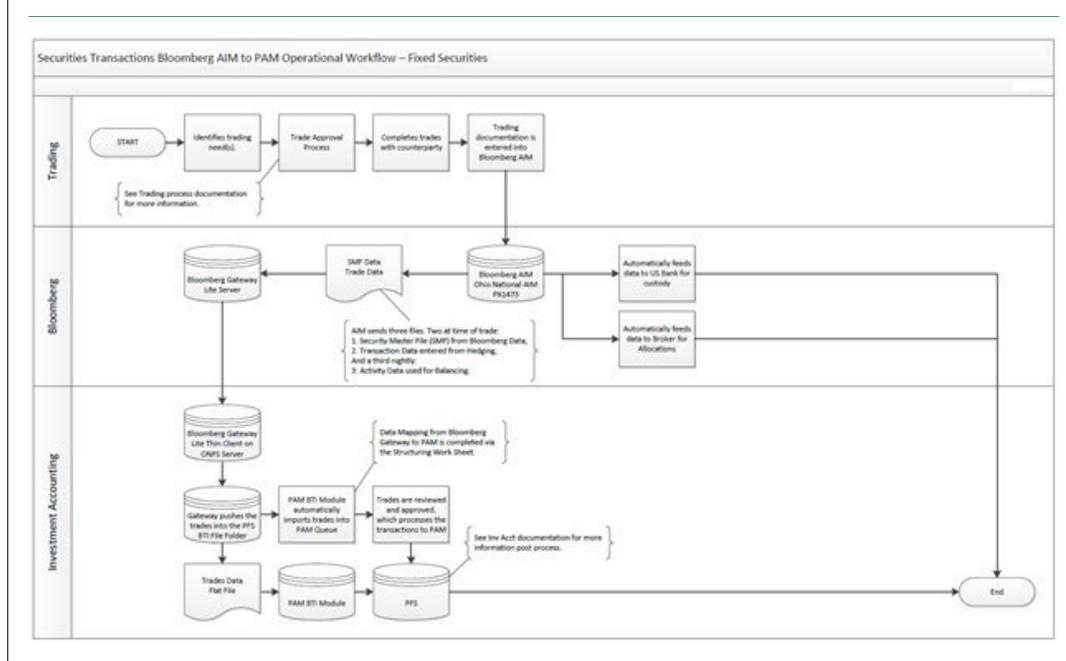


Figure 3. Processing Security Transactions after STP with Bloomberg AIM to PAM (An Investment Accounting System) Operational Workflow for Fixed Securities



some decision support and a few other technologies (e.g., robotics, mobile health). Institutions with e-service lines (Veterans Affairs), training guidelines (e.g., Department of Defense) and technology-specific competencies (e.g., video, mobile health) indicate progress and readiness for technological integration; most IT and IS interventions are more hospital centered and in medicine (e.g., intensive care) rather than behavioral health.

The shared IT-business understanding: A Shared IT-Business Understanding is defined as shared domain knowledge and common understanding between the IT and research and development, marketing, production and financing functions.¹² Specifically, a shared IT-Business Understanding is: 1) the knowledge that IT managers possess about a specific process; 2) the knowledge the line managers possess about potential opportunities to apply IT to improve the process; and 3) the common understanding between IT and line managers regarding how IT can be used to improve process performance. Problems have been associated with adding on IT for one function, short-term rather than long-term planning, manual processes and problems evaluating entire workflow systems.^{73,74}

Empirical studies show successful implementation of IT requires integration with other core business functions and it leads to improved organizational performance.¹² IT helps leaders negotiate change and position for the next growth cycle, in terms of distribution, management, scale and capital issues.⁷⁵ This reflects the IT-business strategic alignment can support, organize and drive business processes. IT integration in this sense, then, is an indicator of the maturity of an organization. Investments in IT *via* STP have surged and the payoffs are significant – if done with a specific goal in mind and with purpose.⁷⁶⁻⁷⁸

The Ross competencies/stages: Perhaps the best step toward a shared IT-business understanding is to create a strategic IT architecture with outcomes tiered in four levels.⁷⁹ In fact, the terms architecture and infrastructure are sometimes used interchangeably, with architecture seen as the plan for the next infrastructure. More often, IT architecture refers to a firm’s list of technology standards. But viewing IT architecture only as technology standards does not connect it to business requirements. An enterprise IT architecture concept, though, does place technology standards in the context of business requirements.

To develop a synergy between business strategy and IT architecture, firms must develop organizational competencies in IT architecture.⁷⁹ An IT architecture competency is the ability of a firm to create a mutually reinforcing pattern of evolving, tightly aligned business strategy and IT capabilities. The logical sequence for developing an enterprise IT architecture is based on defining: 1) the firm’s strategic objectives; 2) key IT capabilities for enabling those objectives; and 3) the policies and technical choices for developing the IT capabilities. This specifically includes a company’s need (e.g., doing a needs assessment) and assessing how IT is used (i.e., levels extend from silo to standardized to rationalized data to modular architecture)⁷⁹ (Table 4). Steps include defining a set of critical IT capabilities with lasting value, tradeoffs due to policies and technical choices and incremental progress.

In the case example, the Company realized that they needed to look more closely at developing a shared IT-business understanding, and that specifically, that they were missing the opportunity to capture more/better data and moving too slowly through manual processes. They also realized that this type of IT

Table 4. ROSS' Four Informational Technology (IT) Architectural Stages: Qualities and PROS/CONS for Businesses and Applied to Academic Health Centers

Architecture Stage	Definition/Example	Assumptions	PROS	CONS
Application Silo	Individual applications rather than for the entire enterprise High technology companies Individual clinician	Best available technology Single geography Needs-based Technology-based change management	Facilitates innovation Well-received by most Predictable system benefits and outcomes measurable Data: centered in the application	Difficulty linking new applications to related systems Applications become a burden Expensive to maintain
Standardized Technology	Enterprise-wide and provides efficiencies through standardization and, usually centralized UPS Clinic system approach	Technology standards to limit technology choice and reduce the number of platforms Solutions-based Standardization and exception management	Good for local knowledge and worker support Better IT maintainability, reliability and security Data: create warehouses to share Cost savings	Data still in individual applications; silos Manager resistance to standards Figure out exceptions Long-term planning key
Rationalized Data	Enterprise-wide IT architecture expands to include standardization of data and processes Air Products, Nestle USA, Delta Airlines Healthcare system	Data management and infrastructure; core wiring Performance- and integration-based-management	Stabilizes the firm's core activities and increases predictability of outcomes Data integrity Process standardization Stability Business not IT owns data	Difficulty deciding "core" processes (excluding others) Change harder and incremental (to reach) Implementation risk: accountability, discipline
Modular	Enterprise-wide standards with loosely coupled applications and technology for local differences Citibank Asia Pacific AHC with departments or special programs	Enables strategic agility through customized or reusable modules Extend the core processes but allow for differences	Business units select customer-oriented processes from a menu Greater discretion Efficiency (e.g., quickly implements core products in new countries)	Ongoing dialog between management and IT executives: clarify required/selective and one/more processes for choice

intervention was not just a “good idea” or innovation, but that they may be falling behind competitors – at a competitive disadvantage.

Will AHCs, health care systems adopt a shared IT-business understanding model?

Key steps suggested for institutions to integrate video apply to other technologies: 1) assess readiness; 2) create/hardwire the culture; 3) write policies and procedures; 4) establish the curriculum and competencies; 5) train learners and faculty; and 6) evaluate/manage change.⁵⁶ Institutional level competencies – aside from technology competencies for clinicians – involve steps for video and asynchronous competencies organized into focus areas: Patient-Centered Care; Evaluation and Outcomes; Roles/Needs of Participants (e.g., Trainees, Faculty, Teams, Professions); Teams, Professions and Systems Within Institutions; and the Academic Health Center Institutional Structure, Process and Administration (Table 5).

There are usually competing priorities in companies akin to AHCs’ clinical care, education, research and other missions. In addition, AHCs contend with policy, accreditation, reimbursement and other administrative tasks. Regulatory standards often determine how quickly policy decisions are reached and consequently result in huge differences in current state of the technology development and adoption around the globe. The significant disadvantage that an AHC or a department has, is that its existence does not depend on a shared IT-business understanding unless an AHC’s does, since millions or billions of dollars are not immediately at stake to remain viable. Traditional AHCs are not competitive with clinical models of other more modern health care systems (e.g., Kaiser, Veterans Affairs), so new AHC models by the Mayo and

Cleveland Clinics are moving forward.

If an AHC decides to transform its strategic planning with technology, then institutional competencies would include a better e-platform for integrated clinical and administrative workflow, as well as a vision for short- and long-term planning. A change management plan with process management²⁶ could help to plan, prioritize and allocate resources. Buy-in across all levels is essential,^{50,51} as stakeholders have to believe that technology significantly contributes to improving the mission. Then, training, supervision and evaluation is needed for managing, adjusting competencies/skills and quality/performance improvement. The deployment, innovation and integration – not the cost or elegance – enables companies to standardize and reduce costs and risks. eHealth integration and interoperability solutions use an enterprise architecture.⁸⁰ When implementation climate is strong, consistency of technology use is high. However, quality of technology use was high only when implementation climate was strong and values compatibility is high.⁸¹

DISCUSSION

Technology is rapidly shifting what we do and how we do it in day-to-day life, education, social relationships, health care and business. Our view of technology, like our view of medicine, will change over time based on social, political and scientific roots. Much of this is evident in the evolution of telephone, the stethoscope and now telehealth and telepsychiatry; human factors have always played a role.⁸² Similarly, how medicine has been conceptualized has changed over many eras from descriptions a social science, a germ theory of disease, and a battleground to a management enterprise, as well as a way to meet rights/needs (i.e., the social justice

Table 5. Competencies for Institutions/Academic Health Centers for Synchronous and Asynchronous Telehealth

Competency Focus	General Technology Approach	Shift to Include Synchronous Care	Shift to Include Asynchronous Care
Patient-centered Care	Offer multiple points-of-entry Employ interprofessional teams and care coordination Data warehouse, analysis and health information exchange Screen for technology use	Educate on in-person and synchronous similarities Use as one of many care models/treatment options Use templates and adjust policies and procedures	Offer selected options (e.g., apps, sensors/wearables) Design clinical technology workflows Import social science, health behavior and business ideas
Evaluation and Outcomes	Assess readiness for change Link behavior to outcomes for a patient or program Use evidence-based measures Use accreditation principles: Goal, Measure, Benchmark, Target and Data	Build video scheduled and on demand options Use disease state measures and adapt, if applicable, aligned with in-person accreditation Use 360 evaluation	Organize care on a technology platform (e.g., EHR, pre- and post loads) Use technology-specific measures, evidence-based if available Use 360 evaluation
Trainee/Student Needs/Roles	Patient- and learner-centered outcomes Prepare as Resource Manager Clarify personal versus professional technology use Use technology as a lifelong learner/teacher	Integrate skill development, care, teaching, supervision Monitor well-being and professionalism Adjust curricula (e.g., part-time rotations, supervision) Employ quality measures	Use quantitative and qualitative approaches Use observation, video and simulation Role model healthy behaviors Capitalize on personal expertise to spur others' use
Faculty Clinical, Teaching and Leadership Roles	Emphasize communication, well-being and professionalism Emphasize resource manager technology leadership role Use social science, health service and business constructs to shift attitudes	Monitor technology impact on care, well-being/fatigue Integrate part-time use for care, with teaching by champions Define success based on teams, systems and populations	Use sustainable, longitudinal approaches Remember that "less is more" and evidence base is key Use technology for portfolio, curricula, dissemination, networking and other purposes
Teams, Professions and Systems Within Institutions	Assess structure/function of social groups that govern behavior of a community Use faculty development with teams, projects and professions to build skills and shift culture	Foster alignment across systems Organize goals and outcomes for success based on teams, systems and professions Employ team-based care and virtual teams	Align shared outcomes Patient/clinician outcomes Learner/teacher Clinic/system Institution/community Use stepped care and interprofessional principles
AHC Organizational Structure, Process and Finance	Evaluate/manage governance structure and change Weigh human resources, Technology and cost issues Market technology delivery of care competitively Build AHC-community partnerships to share resources and integrate care Align clinical, educational and research missions and values Integrate (not add or append) information technology into organizational structure	Use faculty development projects for existing/new leaders, as a gateway to others (e.g., mobile health) Measure technology in performance evaluations and provide feedback Add research and funding infrastructure for pilot and full-scale projects, to impact health service delivery and training programs	Assess context, pace, scope and drive off/for change Monitor private, federal, state and other sectors for best practices, partner agencies and grant funding Strive for incremental, sustainable solutions Use/adapt others' evidence-based system approaches Develop strategies for promoting adoption/optimization of clinical information systems

model) and an evidence-based practice (i.e., public or population health).⁸³ Business may serve as a role model for medicine/psychiatry to use technology to streamline health care across individual, community and societal domains. Models like the Learning-Adapting-Leveling (LAL) shoot for translation of technology from market to implementation into health care systems moving towards personalized health care.⁸⁴

Technology *via* mobile health could reshape health care service delivery if is integrated into services, used wisely and limitations are addressed.⁸⁵ A review of cognition and mobile health has raised concerns about attention, memory, and delay of gratification – and undercut colloquial assumptions that we can cognitively multi-task.^{86,87} Current research on mobile health does not often employ true experimental methods with random assignment, longitudinal evaluation, momentary in-time integration of data, diverse populations and objective measures.^{86,88} A further shift is research and evaluation based on effectiveness, implementation science and models of assessment of technology.⁸⁹⁻⁹² User-friendly approaches and frameworks for evaluating multi-stakeholder perspectives predict success (e.g., co-construction between designers and users).^{93,94} One example would be applying the Effective Technology Use Model to implementation of e-consult management

software.⁹⁵ Another option is to upgrade the Integrated Technology Implementation Model (TIM) for integrating technology into health care practice by adding a conceptual guide for nursing leadership, vendors, and engineers based on focus group methodology (i.e., Integrated TIM (ITIM)).⁹⁶

A shift in research paradigms is also suggested at a system level.⁹⁷ The Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) have been used widely in studies of health information technology implementation. TAM is determined by attitude toward using the technology, which in turn is determined by two perceptions of usefulness and ease of use. Various external factors affect both perceptions. UTAUT's four constructs that affect usage intention are performance expectancy, effort expectancy, social influence and facilitating conditions. Age, gender, experience, and voluntariness of use mediate the impact of these expectancies on intention⁹⁸ and poor perceptions about the technology's usefulness and lack of trust employers' use of tracking data were associated with weaker intentions.⁹⁹ In addition, these tend to focus on individual adopters' beliefs, perceptions and intention rather than tackling complexity with a broad enough perspective for all levels of an institution – or preferably across populations.

Multi-dimensional approaches can better capture the complexity of issues surrounding implementation and use of HIT. Models for good governance of health care technology management in the public sector globally, based on evidence-informed policy development and implementation are also suggested.¹⁰⁰ Furthermore, health technology reassessment is suggested *via* structured, evidence-based assessment of the clinical, social, ethical and economic effects to inform optimal use and quality of technology in comparison with its alternatives by health care providers, managers and policy-makers.¹⁰¹ Suggested phases are: 1) selection (identification and prioritization), 2) decision (evidence synthesis, policy development); and 3) policy implementation, evaluation. Some countries have an advantage in establishing consortia to create an alliance of universities, university hospitals, research institutions and IT companies, which establish Data Integration Centers (DICs) at each partner hospital and to implement use cases which demonstrate the usefulness of the approach.¹⁰²

AHC and psychiatric leaders have slowly explored/added telepsychiatric services – but few have an approach to technology, in general, due to competing clinical, educational and research demands. On one hand, radical and/or transformative change is not easy for AHCs, but on the other hand, incremental approaches are resulting in health care and psychiatry/behavioral health being passed by other components of our culture. The model of a shared IT-business-medicine¹⁰³ or IT-business-health understanding¹⁰⁴ – as part of strategic planning – could improve performance *via* efficiency, quality of data/information processing/integration and managerial teamwork. For it to work, though, clinicians, managers and administrators need to shift their philosophy—from seeing what happens—to proactively designing the services in advance to achieve outcomes. Needs and impact assessment for participants across all levels of the organization, continuous quality/performance and short- and long-term planning are required. For example, it is important to assess attitudes and behavior of health care workers before, during, and after implementation of real-time location system technology.⁹⁹

There are limitations to this work and many future directions are suggested. The first limitation is that this is not a formal systematic review, as this explored the literature to find key concepts, which will serve as the foundation for more specific future research. Second, other models of assessing, implementing and integrating technology exist. The shared IT-business understanding, though, is conceptually simple. If it is coupled with institutional competencies for technology and an architectural process with competency stages, institutions may self-assess and explore the next step. Third, STP is only one of many potential examples of system integration, but it is representative of business culture. Fourth, a more formal process of expert consensus could be helpful for this type of review. Finally, more research is needed on the assessment of companies' models, objectives, methods and outcomes. The pilot application of this model and similar frameworks to medicine/psychiatry would also be helpful. Within such research, quantitative and qualitative methods would be imperative. Effectiveness rather than efficacy evaluation would also be suggested.

CONCLUSION

The field of business has some similarities with health care related to implementation of technology. Continuous, committed and active leadership is crucial for strategic planning, management and implementation of change. Leadership skill and orientation toward market, learning, entrepreneurial management style (ENT) and organizational flexibility are predictors of organizational success. When IT is integrated into health care service delivery workflow rather than appended, it facilitates the translation of strategic planning into organizational change. Successful implementation requires a needs and impact assessment for patients, staff, clinicians and leaders across all levels of the organization. Incremental and strategically innovative approaches need to be evaluated and quality improved. Benefits to the mission, limited disruptions of core operational workflow and reasonable costs reduce the likelihood of failure.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest

REFERENCES

1. Pew Research Center, 2019. Mobile Fact Sheet. Web site. <https://www.pewresearch.org/internet/fact-sheet/mobile/>. Accessed December 18, 2020.
2. Hilty DM, Ferrer D, Callahan EJ, Johnston B, Yellowlees PM. The effectiveness of telemental health: A 2013 review. *Telemed J E Health*. 2013; 19: 444-454. doi: 10.1089/tmj.2013.0075

3. Hilty DM, Rabinowitz TR, McCarron RM, Katzelnick DJ, Chang T, Bauer A, et al. An update on telepsychiatry and how it can leverage collaborative, stepped, and integrated services to primary care. *Psychosomatics*. 2018; 59(3): 227-250. doi: 10.1016/j.psym.2017.12.005
4. Edelman DC. Branding in the digital age: You're spending your money in all the wrong places. *Harvard Business Review*, 2010; 63-69.
5. Hilty DM. Advancing science, clinical care and education: Shall we update Engel's biopsychosocial model to a bio-psycho-socio-cultural model? *Psychol Cogn Sci*. 2016; 1(1): e1-e6. doi: 10.17140/PCSOJ-1-e001
6. Ahuja S, Hanlon C, Chisholm D, Semrau M, Gurung D, Abdulmalik J, et al. Experience of implementing new mental health indicators within information systems in six low- and middle-income countries. *BJPsych Open*. 2019; 5(5): e71. doi: 10.1192/bjo.2019.29
7. Luxton DD. *Artificial Intelligence in Behavioral Health Care*. Boston, MA: Elsevier; 2016.
8. Shanafelt TD, Dyrbye LN, Sinsky C, Hasan O, Satele D, Sloan J, et al. Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. *Mayo Clinic Proceedings*. 2016; 91(7): 836-848. doi: 10.1016/j.mayocp.2016.05.007
9. Kuziemsky CE. A model of tradeoffs for understanding health information technology implementation. *Studies in Health Technology and Informatics*. 2015; 215: 116-128. doi: 10.3233/978-1-61499-560-9-116
10. Rogers EM. *Diffusion of innovations*. 4th ed. New York, USA: Free Press; 1995.
11. Emerald Group Publishing Group. Survival through innovation: Microsoft and Nintendo strive to offer the latest "must haves." *Strategic Direction; Bradford*. 2007; 24(1): 21-24. doi: 10.1108/02580540810839313
12. Ray G, Muhanna WA, Barney JB. Competing with IT: The role of shared IT-business understanding. *Communications of the ACM*. 2007; 50: 87-91. doi: 10.1145/1323688.1323700
13. Handrigan J. Nintendo's disruptive strategy: Implications for the Video Game Industry. Memorial University of Newfoundland - Marine Institute. Case Study #2. 2013. Web site. <http://www.johnpaulhandrigan.net/wp-content/uploads/2013/04/Nintendos-Disruptive-Strategy-Implications-for-the-Video-Game-Industry.pdf>. Accessed December 18, 2020.
14. Rivard S, Pinsonneault A, Croteau AM. Information technology at Cirque du Soleil: Looking back, moving forward. *International Journal of Case Studies in Management*. 2012; 10(4): 1-13.
15. Dubois D, Bens K. Ombre, Tie-Dye, Splat Hair: Trends or Fads? "Pull" and "Push" Social Media Strategies at L'Oréal Paris. 2014. Web site. https://cases.insead.edu/loreal-google/documents/6060-Ombre_LOréal-CS-EN-0-06-2014-w.pdf. Accessed December 18, 2020.
16. Arksey H, O'Malley L. Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*. 2005; 8: 19-32. doi: 10.1080/1364557032000119616
17. Levac D, Colquhoun H, O'Brien KK. Scoping studies: Advancing the methodology. *Implementation Science*. 2010; 5: 69. doi: 10.1186/1748-5908-5-69
18. Corbin J, Morse JM. The unstructured interactive interview: Issues of reciprocity and risks when dealing with sensitive topics. *Qualitative Inquiry*. 2003; 9: 335-354. doi: 10.1177/1077800403009003001
19. Gray DE. *Doing Research in the Real World*. 2nd ed. Thousand Oaks, California, USA: Sage Publications; 2009.
20. Shi L, Singh DA. *Delivering Health Care in America: A Systems Approach*. 6th ed. Burlington, MA, USA: Jones and Bartlett Learning; 2015; 17(40): 195-245.
21. Dye CF. *Leadership in Health Care: Essential Values and Skills*. 2nd ed. Chicago, IL, USA: Health Administration Press; 2010.
22. American Association of Medical Colleges. Academic medicine's three missions of research, education, and patient care are critical to ensuring preparedness. 2015. Web site. <https://www.aamc.org/download/446672/data/academicmedicinesthreemissionsofresearcheducationandpatientcare.pdf>. Accessed December 18, 2020.
23. Centers for Medicare and Medicaid Services. Value-Based Programs. 2020. Web site. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Value-Based-Programs>. Accessed December 18, 2020.
24. Affordable Care Act (ACA). 2018. Web site. <https://www.healthcare.gov/glossary/affordable-care-act/>. Accessed December 18, 2020.
25. Hilty DM, Chan S, Torous J, Mahautmr J, Mucic DM. New frontiers in health care and technology: Internet- and web-based mental options emerge to complement in-person and telepsychiatric care options. *Journal of Health and Medical Informatics*. 2015; 6(4): 1-14. doi: 10.4172/2157-7420.1000200
26. Hilty DM, Torous J, Parish M, Chan S, Xiong G, Scher L, et al. A literature review comparing clinicians' approaches and skills to in-person, synchronous and asynchronous care: Moving toward asynchronous competencies to ensure quality care. *Telemedicine Journal and E-Health*. 2020; doi: 10.1089/tmj.2020.0054

27. deBronkart D. From patient centred to people powered: Autonomy on the rise. *Br Med J*. 2015; 350: 148. doi: 10.1136/bmj.h148
28. Miles A, Mezzich J. The care of the patient and the soul of the clinic: Person- centered medicine as an emergent model of modern clinical practice. *Int J Pers Centered Med*. 2011; 1(2): 207-222. doi: 10.5750/ijpcm.v1i2.61
29. Ekman I, Swedberg K, Taft C, Lindseth A, Norberg A, Brink E, et al. Person- centered care—ready for prime time. *Eur J Cardiovasc Nurs*. 2011; 10(4): 248-251. doi: 10.1016/j.ejcnurse.2011.06.008
30. Aydın CE, Forsythe DE. Implementing computers in ambulatory care: Implications of physician practice patterns for system design. *Proc AMLA Annu Fall Symp*. 1997; 677-681.
31. Terry K. Electronic medical records make sense—at last. *Medical Economics*. 1999; 76: 134-153.
32. Hilty DM, Randhawa K, Maheu MM, McKean AS, Pantera R, Rizzo A. A review of telepresence, virtual reality and augmented reality applied to clinical care. *J Technol Behav Sci*. 2020; 5: 178-205. doi: 10.1007/s41347-020-00126-x
33. Liddy C, Drosinis P, Keely E. Electronic consultation systems: worldwide prevalence and their impact on patient care - a systematic review. *Fam Pract*. 2016; 33(3): 274-285. doi: 10.1093/fampra/cmw024
34. Archibald D, Stratton J, Liddy C, Grant RE, Green D, Keely EJ. Evaluation of an electronic consultation service in psychiatry for primary care providers. *BMC Psychiatry*. 2018; 18(1): 119. doi: 10.1186/s12888-018-1701-3
35. Berrouguet S, Baca-García E, Brandt S, Walter M, Courtet P. Fundamentals for future mobile-health (mhealth): A systematic review of mobile phone and web-based text messaging in mental health. *J Med Int Res*. 2016; 18(6): e135. doi: 10.2196/jmir.5066
36. Pisani AR, Wyman PA, Gurditta K, Schmeelk-Cone K, Anderson CL, Judd E. Mobile phone intervention to reduce youth suicide in rural communities: Field test. *JMIR Ment Health*. 2018; 5(2): e10425. doi: 10.2196/10425
37. L'Hommedieu M, L'Hommedieu J, Begay C, Schenone A, Dimitropoulou L, Margolin G, et al. Lessons learned: recommendations for implementing a longitudinal study using wearable and environmental sensors in a health care organization. *JMIR mHealth and uHealth*. 2019; 7(12): e13305. doi: 10.2196/13305
38. Hilty DM, Armstrong CM, Luxton DD, Gentry M, Krupinski E. A framework of sensor, wearable and remote patient monitoring competencies for clinical care and training: Scoping review. *JMIR Mhealth Uhealth*. 2020; 8(2): e12229. doi: 10.2196/12229
39. Hilty DM, Zalpuri I, Stubbe D, Snowdy CE, Shoemaker EZ, Joshi SV, et al. Social media/networking as part of e-behavioral health and psychiatric education: Competencies, teaching methods, and implications. *J Technol Behav Sci*. 2018; 3(4): 268-293. doi: 10.1007/s41347-018-0061-7
40. Hilty DM, Crawford A, Teshima J, Chan S, Sunderji N, Yellowlees PM, et al. A framework for telepsychiatric training and e-health: Competency-based education, evaluation and implications. *Int Rev Psychiatry*. 2015; 27(6): 569-592. doi: 10.3109/09540261.2015.1091292
41. Hilty DM, Maheu MM, Drude KP, Hertlein KM. The need to implement and evaluate telehealth competency frameworks to ensure quality care across behavioral health professions. *Acad Psychiatry*. 2018; 42(6): 818-824. doi: 10.1007/s40596-018-0992-5
42. Maheu M, Drude K, Hertlein K, Lipschutz R, Wall K, Hilty DM. An interdisciplinary framework for telebehavioral health competencies. *J Technol Behav Sci*. 2019; 3(2): 108-140. doi: 10.1007/s41347-019-00113
43. Zalpuri I, Liu H, Stubbe D, Wrzosek M, Sadhu J, Hilty D. A competency-based framework for social media for trainees, faculty and others. *Academic Psychiatry*. 2018; 42(6): 808-817. doi: 10.1007/s40596-018-0983-6
44. Hilty DM, Chan S, Torous J, Luo J, Boland R. A telehealth framework for mobile health, smartphones and apps: Competencies, training and faculty development. *J Technol Behav Sci*. 2019; 4(2): 106-123. doi: 10.1007/s41347-019-00091-0
45. Hilty DM, Chan S, Torous J, Luo J, Boland RJ. A framework for competencies for the use of mobile technologies in psychiatry and medicine. *JMIR Mhealth Uhealth*. 2020; 8(2): e12229. doi: 10.2196/12229
46. Carr DK, Hard KJ, Trahan WJ. *Managing the Change Process: A Field Book for Change Agents, Consultants, Team Leaders, and Reengineering Managers*. New York, NY, USA: McGraw Hill. 1996; 115-140.
47. Mulgan G, Albury D. Innovation in the Public Sector, Strategy Unit, Cabinet Office, October 2003. Web site. http://www.sba.oakland.edu/faculty/mathieson/mis524/resources/readings/innovation/innovation_in_the_public_sector.pdf. Accessed December 18, 2020.
48. Borins S. The Challenge of Innovating in Government. The Pricewaterhouse Coopers Endowment for The Business of Government. 2001. Web site. <http://www.businessofgovernment.org/report/challenge-innovating-government>. Accessed December 18, 2020.
49. Kotter JP. *A Force for Change: How Leadership Differs from Management*. New York, USA: The Free Press; 1990.

50. Kotter JP. Leading change. Why transformation efforts fail. *Harvard Business Review*. 1996; 59-67.
51. Miller WR, Rollnick S. *Motivational Interviewing: Preparing People for Change*. 2nd ed. New York, USA: Guilford; 2002.
52. Backer TE. Managing the human side of change in VA's transformation. *Hosp Health Serv Adm*. 1997; 42: 431-459.
53. Deming WE. *Out of the Crisis*. Cambridge, England: MIT Press; 1982.
54. Walton M. *The Deming Management Method*. New York, USA: Perigee Trade; 1988.
55. Nadler G, Hibino S, Farrell J. *Creative Solution Finding: The Triumph of Breakthrough Thinking Over Conventional Problem Solving*. Rocklin, CA, USA: Prima Publications; 1999.
56. Hilty DM, Unutzer J, Ko D-K, Luo J, Worley LM, Yager J. Approaches for departments, schools and health systems to better implement technologies used for clinical care and education. *Acad Psychiatry*. 2019; 43: 611-616. doi: 10.1007/s40596-019-01074-2
57. Armenakis AA, Harris SG, Mossholder KW. Creating readiness for organizational change. *Human Relations*. 1993; 46: 681-703. doi: 10.1177/001872679304600601
58. Marshall J, Conner DR. Another reason why companies resist change. strategy and business. 1996. Web site. <http://www.strategy-business.com/press/article/8614?pg=0>. Accessed December 18, 2020.
59. Diamond MA. Organizational change as human process, not technique. *NIDA research monograph*. 1995; 155: 119-131.
60. U. S. Department of Labor, Bureau of Labor Statistics. Coronavirus Resources. Web site. <https://www.dol.gov>. Accessed August 20, 2020.
61. Hagenbaugh B. Nation's wealth disparity widens. USA Today. 2002. Web site. <http://usatoday.printthis.clickability.com/pt/cpt?action=cpt&expire=&urlID=5183409&fb=Y&partnerID=1661>. Accessed December 18, 2020.
62. Hilton B, Balloun J, Weinstein C. Success factors for organizational performance: Comparing business services, health care, and education. *SAM Advanced Management Journal*. 2005; 70(4): 16-28.
63. Hee J, Chen Y, Huang W. Straight through processing technology in global financial market: Readiness assessment and implementation. *Journal of Global Information Management*. 2003; 11(2): 56-66.
64. Grody AD. Observations on the new US financial regulation challenges to the financial sector: data standardization, straight-through-processing and operational risks. *Journal of Operational Risk*. 2010; 5(3): 23-27.
65. Sinn B. Straight-through processing helps bolster insurer data quality, client intelligence. 2009. Web site. <https://www.propertycasualty360.com/2009/09/20/straight-through-processing-helps-bolster-insurer-data-quality-client-intelligence/?slreturn=20210028203035>. Accessed December 18, 2020.
66. Saccocia C. Placing your technology bets. *Insur Tech*. 2003; 28(13): 37-41.
67. Franklin R. Modernizing the back office of the securities industry. *Computer World*. 2000; 34: 11-36.
68. Mearian L. Trades at top speed. *Computer World*. 2003; 37(9): 21-24.
69. Osheroff JA, Teich JM, Middleton B, Steen EB, Wright A, Detmer DE. A roadmap for national action on clinical decision support. *J Am Med Inform Assoc*. 2007; 14(2): 141-145. doi: 10.1197/jamia.M2334
70. Kawamoto K, Houlihan CA, Balas EA, Lobach DF. Improving clinical practice using clinical decision support systems: A systematic review of trials to identify features critical to success. *BMJ (Clinical Research Edition)*. 2005; 330(7494): 765. doi: 10.1136/bmj.38398.500764.8F
71. Natarajan M, Arshad K, Girish N, Sethu G. (). Straight through processing (STP): Prospects and challenges. *Journal of Decision Making*. 2004; 29(1): 93-100. doi: 10.1177/0256090920040108
72. The National Academy of Sciences, Engineering, and Medicine. Health and Medicine Division. 2020. Web site. <https://www.nationalacademies.org/hmd/health-and-medicine-division>. Accessed December 18, 2020.
73. Bower JL, Christensen CM. Disruptive Technologies: Catching the Wave. 1995. Web site. <https://hbr.org/1995/01/disruptive-technologies-catching-the-wave>. Accessed December 18, 2020.
74. Christensen CM, Grossman JH, Hwang J. *The Innovators Prescription – A Disruptive Solution for Health Care*. New York, NY, USA: McGraw Hill; 2009.
75. Annunziata VP. Straight-through Processing. Energy Markets. 2001. Web site. <https://search-proquest-com.proxy.libraries.uc.edu/docview/228764026?accountid=2909>. Accessed December 18, 2020.
76. Dedrick J, Gurbaxani V, Kramer KL. Information technology and economic performance: A critical review of the empirical evidence. *ACM Computing Surveys*. 2003; 35: 1-28.

77. Kohlh R, Devarag S. Measuring information technology pay-off: A meta-analysis of structural variables in firm-level empirical research. *Information Systems Research*. 2003; 14: 127-145. doi: [10.1287/isre.14.2.127.16019](https://doi.org/10.1287/isre.14.2.127.16019)
78. Rai A, Parnayakuni R, Patnayakuni N. Technology investments and business performance. *Communication of the ACM*. 1997; 40: 89-97. doi: [10.1145/256175.256191](https://doi.org/10.1145/256175.256191)
79. Ross JW. Creating a strategic IT architecture competency: Learning in stages. MIT Sloan School of Management Working Paper, 4314-03, Center for Information Systems Research Working Paper, No. 335. 2003. Web site. <http://dspace.mit.edu/handle/1721.1/3526>. Accessed December 18, 2020.
80. Adenuga OA, Kekwaletswe RM, Coleman A. eHealth integration and interoperability issues: Towards a solution through enterprise architecture. *Health Inf Sci Syst*. 2015; 3: 1. doi: [10.1186/s13755-015-0009-7](https://doi.org/10.1186/s13755-015-0009-7)
81. Holahan PJ, Lesselroth BJ, Adams K, Wang K, Church V. Beyond technology acceptance to effective technology use: A parsimonious and actionable model. *Journal of the American Medical Informatics Association*. 2015; 22(3): 718-729. doi: [10.1093/jamia/ocu043](https://doi.org/10.1093/jamia/ocu043)
82. Mermelstein H, Krupinski E, DeGuzman E, Rabinowitz T, Hilty DM. The application of technology to health: The evolution of telephone to telemedicine and telepsychiatry: A historical review and look at human factors. *J Technol Behav Sci*. 2017; 1(2): 5-20. doi: [10.1007/s41347-017-0010-x](https://doi.org/10.1007/s41347-017-0010-x)
83. Sturmberg JP, O'Halloran D, Colagiuri R, Fernandez A, Lukersmith S, Torkfar G, et al. Health care frames - from Virchow to Obama and beyond: The changing frames in health care and their implications for patient care. *J Eval Clin Pract*. 2014; 20(6): 1036-1044. doi: [10.1111/jep.12266](https://doi.org/10.1111/jep.12266)
84. Lal JA, Morr e SA, Brand A. The overarching framework of translation and integration into health care: A case for the LAL model. *Per Med*. 2014; 11(1): 41-62. doi: [10.2217/pme.13.97.13.97](https://doi.org/10.2217/pme.13.97.13.97)
85. Hilty DM, Chan S. Human behavior with mobile health: Smartphone/devices, apps and cognition. *Psychol Cogn Sci Open J*. 2018; 4(2): 36-47. doi: [10.17140/PCSOJ-4-141](https://doi.org/10.17140/PCSOJ-4-141)
86. Wilmer HH, Sherman LE, Chein JM. Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Frontiers in Psychology*. 2017; 8: 605. doi: [10.3389/fpsyg.2017.00605](https://doi.org/10.3389/fpsyg.2017.00605)
87. Egan T. *The Eight-Second Attention Span*. New York, NY, USA: The New York Times. 2016
88. Vukovic V, Favaretti C, Ricciardi W, de Waure C. Health technology assessment evidence on e-health/m-health technologies: Evaluating the transparency and thoroughness. *Int J Technol Assess Health Care*. 2018; 34(1), 87-96. doi: [10.1017/S026646231700451262317004512](https://doi.org/10.1017/S026646231700451262317004512)
89. Proctor E, Silmere H, Raghavan R, Raghavan R, Hovmand P, Arons G, et al. Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2010; 38(2): 65-76. doi: [10.1007/s10488-010-0319-7](https://doi.org/10.1007/s10488-010-0319-7)
90. Curran GM, Bauer M, Mittman B, Pyne JM, Stetler C. Effectiveness-implementation hybrid designs: Combining elements of clinical effectiveness and implementation research to enhance public health impact. *Med Care*. 2012; 50(3): 217-226. doi: [10.1097/MLR.0b013e3182408812](https://doi.org/10.1097/MLR.0b013e3182408812)
91. Gargon E, Gorst SL, Williamson PR. Choosing important health outcomes for comparative effectiveness research: 5th annual update to a systematic review of core outcome sets for research. *PLoS One*. 2019; 14(12): e0225980. doi: [10.1371/journal.pone.0225980](https://doi.org/10.1371/journal.pone.0225980)
92. Kidholm K, Jensen LK, Kj lhed T, Nielsen E, Horup MB. Validity of the model for assessment of telemedicine: A delphi study. *Journal of Telemedicine and Telecare*. 2018; 24(2): 118-125. doi: [10.1177/1357633X16686553](https://doi.org/10.1177/1357633X16686553)
93. Cranfield S, Hendy J, Reeves B, Hutchings A, Collin S, Fulop N. Investigating health care IT innovations: A "conceptual blending" approach. *Journal of Health Organizational Management*. 2015; 29(7): 1131-1148. doi: [10.1108/JHOM-08-2015-0121](https://doi.org/10.1108/JHOM-08-2015-0121)
94. Walker DM, Hefner JL, Sieck CJ, Huerta TR, McAlearney AS. Framework for evaluating and implementing inpatient portals: A multi-stakeholder perspective. *Journal of Medical Systems*. 2018; 42(9): 158. doi: [10.1007/s10916-018-1009-3](https://doi.org/10.1007/s10916-018-1009-3)
95. Lesselroth B, Adams K, Mastarone G, Tallett S, Ragland S, Laing A, et al. Applying the effective technology use model to implementation of electronic consult management software. *Stud Health Technol Inform*. 2019; 257: 261-265.
96. Schoville R, Titler MG. Integrated technology implementation model: Examination and enhancements. *Computers, Informatics, Nursing*. 2020; 38(11): 579-589. doi: [10.1097/CIN.0000000000000632](https://doi.org/10.1097/CIN.0000000000000632)
97. Shachak A, Kuziemy C, Petersen C. Beyond TAM and UTAUT: Future directions for HIT implementation research. *Journal of Biomedical Informatics*. 2019; 100; 103315. doi: [10.1016/j.jbi.2019.103315](https://doi.org/10.1016/j.jbi.2019.103315)
98. Rahimi B, Nadri H, Lotfnezhad Afshar H, Timpka T. A systematic review of the technology acceptance model in health informatics. *Applied Clinical Informatics*. 2018; 9(3): 604-634. doi: [10.1055/s-0038-1668091](https://doi.org/10.1055/s-0038-1668091)

99. Griffin JM, Hellmich TR, Pasupathy KS, Funni SA, Pagel SM, Srinivasan SS, et al. Attitudes and behavior of health care workers before, during, and after implementation of real-time location system technology. *Mayo Clin Proc Innov Qual Outcomes*. 2020; 4(1): 90-98. doi: [10.1016/j.mayocpiqo.2019.10.007](https://doi.org/10.1016/j.mayocpiqo.2019.10.007)
100. Hougbo PT, Coleman HL, Zweekhorst M, De Cock Buning T, Medenou D, Bunders JF. A model for good governance of health care technology management in the public sector: Learning from evidence-informed policy development and implementation in benin. *PLoS One*. 2017; 12(1): e0168842. doi: [10.1371/journal.pone.0168842](https://doi.org/10.1371/journal.pone.0168842)
101. Soril LJ, MacKean G, Noseworthy TW, Leggett LE, Clement FM. Achieving optimal technology use: A proposed model for health technology reassessment. *SAGE Open Med*. 2017; 5: 2050312117704861. doi: [10.1177/2050312117704861](https://doi.org/10.1177/2050312117704861)
102. Winter A, Stäubert S, Ammon D, Aiche S, Beyan O, Bischoff V, et al. Smart Medical Information Technology for Health care (SMITH) *- Data Integration based on Interoperability Standards. *Methods Inf Med*. 2018; 57(S 01): e92-e105. doi: [10.3414/ME18-02-0004](https://doi.org/10.3414/ME18-02-0004)
103. Hilty DM, Uno J, Chan S, Torous J, Boland RJ. Role of technology in faculty development in psychiatry. *Psychiatric Clinics of North America*. 2019; 42: 493-512. doi: [10.1016/j.psc.2019.05.013](https://doi.org/10.1016/j.psc.2019.05.013)
104. Hilty DM, Armstrong CM, Luxton DD, Gentry M, Krupinski E. Sensor, wearable and remote patient monitoring competencies for clinical care and training: Scoping review. *J Tech Behav Sci*. 2021; 1-26. doi: [10.1007/s41347-020-00190-3](https://doi.org/10.1007/s41347-020-00190-3)

Opinion

My 84-Year-Old Mother Lost Her Wedding Ring?

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An official website that provides general information for the public about the coronavirus disease 2019 (COVID-19) disease for Tom Green Country in Texas is the City of San Angelo, Texas website.¹

My Mother lived in San Angelo, Texas, which is within Tom Green Country. As of January 27, 2021, there have been 269 deaths in Tom Green County caused by the COVID-19 disease: 110 female and 159 male. As a preventative measure, health care and medical care facilities stated that visitors were not allowed to visit a family member who had a medical diagnosis of the COVID-19 disease. To mitigate the spread of the COVID-19 disease even more, many medical care facilities did not allow visitors into patient's rooms—regardless of medical diagnosis. My Mother died on Sunday, September 27, 2020. I could visit my Mother in person only because a new order regulating visitation, which I provide here, which is provided on the City of San Angelo, Texas:

“Effective September 24th, eligible nursing homes, assisted living facilities, & long-term care facilities will be able to designate up to two essential family caregivers for visitation to ensure their loved one's needs are being met.”

“For general visitors who are not a designated essential caregiver, these updated emergency rules will allow approved facilities to schedule outdoor no contact visits, open window visits, or indoor visitation with the use of plexiglass safety barriers to prevent the spread of COVID-19. Physical contact between residents and general visitors is not permitted. Facilities also must continue to meet all additional visitation requirements outlined in the emergency rules.”¹

My Father had moved with my older brother to Atlanta, Georgia a week earlier, partly because he was not allowed to see his wife. While he could stand outside and see his wife through the window, and speak with her *via* a walkie-talkie, or a cell phone, my Father had Emphysema, and was himself tired, not able to stand for long looking through a window. He also has severe hearing loss, so trying to her with a walkie-talkie, or even a cell phone was very

frustrating. He also has macular degeneration in his eyes. Have you ever tried to look through a mess of wire covering a window with macular degeneration? The wire mesh distorts the vision. With these three conditions limiting my Father's satisfaction of “having seen” his wife, he gave up. He gave up trying to “see” his wife. He was not able to “be with his wife.” Imagine being married for 65-years. Then, being told, you cannot be with your spouse as a safety measure to prevent the spread of a new virus. Imagine the confusion for the spouse who is ill, isolated in the patient room, learning she cannot be with her spouse. Imagine the confusion of the spouse who cannot be with their spouse who is ill, in many cases, dying, living their last days of their life, in a patient room, not allowed to have an in-person visit from their spouse—of 65-years. What does love feel like then? What do the promises of commitment and honor and cherish, and protecting one's spouse feel like then? Does love overcome the barrier, or does the barrier of a rule for everyone's safety prevent an emotional connection from actualizing? While a safety rule may not overcome an emotional connection between two people, a safety rule does limit the physical connection—the touch, the audible voice of one's spouse heard in the ear, one's family member's physical presence does not happen. Each person realizing that dying alone has new meaning. Connecting *via* a window, or by a cell phone call, or even by a streaming video connection does quite fulfill a promise that is lived through a lifetime of presence. My Father did not want to see his wife this way. My Father “couldn't” “see” his wife this way; he could not hear her, he could not see her, he could not be with her. I wonder if my Father felt as if had failed her? I wonder if my Father simply gave up because his physical limitations, his weakening endurance, his sadness overcame his desire to be with his wife, when he could not be with her? I wonder what my Mother felt, as she wondered why her husband could not be with her. Did not want to be with her? Could not muster enough strength just for a visit?

While I could not understand all the questions and unanswered feelings my parents must have been experiencing, I knew what I could do, I knew what I must do. I was going to be with my

Mother. I did not know if I could be in her room when I drove 6 hours to be with her. But I knew I must be with her. I knew I wanted to be with her. When I arrived at the care facility, I am extremely fortunate that the nurse told me that the safety rule of limited visitation had been relaxed just a few days earlier. I could be with my Mother, with a gown, a facial mask, and a plastic face shield, some plastic gloves, and at least four feet of distance between us—for no more than four hours at a time. Yet, I was with her. I knew I could speak to her words of courage. I could look into her eyes. I could use my courage, my faith, to instill within her soul the strength of my soul. I could speak the truth of God's love for her, and I could pray for her. I could smile with my eyes and my mouth, and I could be a source of love and reassurance and faith and hope when she could not be these things for herself. I wanted her to die in my presence. I wanted her to die knowing I loved her, her family loved her. I represented all the other family members who could not be there in person. This is what I wanted for her; this is what I wanted for myself. This is what I wanted for my family. Mostly, this assurance of God's love embodied in my presence for her is what I wanted her to know with no doubt. I pray this love is what she felt. My Mother died on Sunday, September 27, 2020 at 4:50 am, alone, having taken off her wedding ring?

The Centers for Disease Control and Prevention (CDC) website states that as of January 27, 2021, in the United States 88% of the people dying are dying in a hospital, medical care facility, or a nursing home, or a long-term care facility. At least eighty-eight percent of all people dying today in the United States are impacted by the safety rules of COVID-19.²

The John Hopkins University and Medicine website, on the Coronavirus Resource Center page, provides the scrollable widget titled, "Global Deaths" on the front or home page, which states that as of January 27, 2021, the estimate for our planet earth is that 2,173,965 people have died from COVID-19 or a COVID-19 related condition.³

With the new demands placed upon health care facilities due to the coronavirus, suggestions to alleviate or reduce loneliness for an elderly person include providing music playing softly in the elderly person's room, provide television programs or a list of favorite movies that can be viewed when requested. Provide the means for family and friends to visit with video messaging, such as *via* a Facetime or a Facebook connection. These messages can even be recorded, so that the video message can be replayed, or pre-recorded to accommodate each person's schedule. Some facilities require that persons visit through a window. Chairs and portable tables can be provided next to the window, so that an elderly spouse or partner can sit comfortably and speak with their loved one—communicating with a cell phone or a "walkie talkie."

I thank the nurses, nurses-aids, the doctors, all staff members of medical care facilities who are serving us through this pandemic. I also thank the chaplains and the spiritual guides. The goodness of these persons, to serve the ill patient, and to serve their families, is amazing. Each day, they themselves, risk being infected by a coronavirus; yet they serve with their best efforts.

REFERENCES

1. The City of San Angelo, Texas. Website. <https://www.cosatx.us/Home/Components/News/News/5258/17>. Accessed January 27, 2021.
2. The Centers for Disease Control and Prevention (CDC). See the table: Place of Death. Website. <https://www.cdc.gov/nchs/covid19/mortality-overview.htm>. Accessed January 27, 2021.
3. The John Hopkins University and Medicine website. See the widget "Global Deaths" Web site. <https://coronavirus.jhu.edu/map.html>. Accessed January 27, 2021.

Original Research

Psychological Effects of Coronavirus Disease 2019 on Students

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ABSTRACT

Background

This qualitative study investigated the psychological effects on 21 U.S. high school students during the coronavirus disease 2019 (COVID-19) pandemic.

Aim

The study aimed to identify and assess the pandemic's effect on the mental health of these students.

Method

To determine the stress and anxiety students faced during the pandemic, an online survey used five open-ended questions that focused on awareness of the pandemic surrounding the major themes of insight, stress, anxiety, social support, and adapted coping strategies. NVivo software analyzed the raw data. Colaizzi's descriptive phenomenological analysis method converted the quantitative results into a visual/verbal form. Based on the analysis, the researcher identified the pandemic's effects on students' mental health and well-being.

Results

All 21 participants responded to each of the five questions. Of the participants, 72% demonstrated a negative outlook on their future. Seventy percent (70%) of the participants felt that COVID-19 hurt their social life because of safety precautions, such as social distancing. Even though schools and their faculty tried to keep students engaged and active, 64% of the participants found it challenging to be physically distanced from friends and teachers while learning from home. Of the students, 62% worried about missing out on sports and activities canceled due to the pandemic. 63.14% of the students felt the pandemic stressed them to the point that fear and anxiety overwhelmed them with many questions about the future.

Conclusion

This study's results may help create programs that better meet students' mental and social needs.

Keywords

COVID-19; Pandemic; High school; College students; Mental health; Stress; Anxiety; Coping strategies; Depression.

INTRODUCTION

According to the World Health Organization (WHO), viral diseases and infections threaten the world daily. There have been many viral pathogens identified in the last two decades, like severe acute respiratory syndrome (SARS-CoV) in 2003, H1N1 influenza in 2009, and Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012.¹ On February 11, 2020, Dr. Tedros Adhanom Ghebreyesus, the Director-General of WHO, announced that the current virus would be called "COVID-19," or coronavirus disease 2019.² The initial designation was 2019-nCoV,

but the International Committee on Taxonomy of Viruses (ICTV) termed it the SARS-Cov-2 virus since the current virus was very similar to the SARS-CoV virus.

SARS-CoV-2 is an emerging viral pathogen that causes an upper respiratory infection, which results in symptoms that range from mild to severe illness such as high fever and difficulty in breathing.³ In the last eight to ten months of its birth, it rapidly spread across the globe. The first cases in Wuhan, China, were reported to the WHO Country Office on December 31, 2019. During this time, scientists were unable to determine the cause of the

cases. The first 29 cases were classified as “*pneumonia of unknown etiology*”.⁴ The Chinese Center for Disease Control and Prevention (CDC) and local CDCs later confirmed that the virus was a member of the coronavirus (CoV) family.

The new virus is very contagious, which is evident from its rapid global spread. During a meeting on January 30, 2020, according to the International Health Regulations (IHR), the outbreak was declared by WHO as a Public Health Emergency of International Concern (PHEIC).⁵ By this time, the virus had spread to about 20 countries. The first reported case in the United States was on February 26, 2020. After SARS-CoV-2 was declared a pandemic, a series of nationwide travel restrictions and screenings of suspected cases were put into place in March 2020. The regulations were to avoid the pandemic’s spread. There were additional travel restrictions in the U.S. from places like China (on February 2, 2020), Iran (on March 2, 2020), and the U.K. (on March 16, 2020).⁶ The coronavirus 2019 (COVID-19) disease continues to spread worldwide, with more than 24.6 million cases and more than 835 thousand deaths as of August 28, 2020.⁷

The COVID-19 pandemic has brought into focus the mental stress and anxiety of various affected populations. My study asked questions to learn the impact of the pandemic, COVID-19, on current high school and college students in the U.S. During the past and present academic year in the U.S., students’ lives changed drastically because of the enforced quarantine. Most schools went from in-person teaching to virtual learning and had to adapt to different learning environments quickly. Schools closed due to the quarantine and many students remained at home to stay safe during the pandemic. During the stressful time that quarantine was, students reacted differently. In some cases, COVID-19 has increased loneliness, anxiety, stress, and depression among students. The study’s responses identified the students’ scenarios, well-being, and how they spent their time during the quarantine.

METHODS

Study Design

The study conducted an online survey to produce raw data. Sub-

sequent data analysis used Colaizzi’s descriptive phenomenological analysis to uncover high school and undergraduate students’ psychological emotions and feelings. Colaizzi’s proposed method, widely used in the health sciences, consists of seven specific steps. The steps are (a) familiarization, (b) identifying significant statements, (c) formulating meanings, (d) clustering themes, (e) developing a detailed description, (f) producing a fundamental structure, and (g) seeking verification of the entire structure.⁸ These seven steps provided a rigorous analysis asset, with each step staying close to the participants’ data. The result was a concise yet all-encompassing description of the phenomenon being studied, validated by the participants who contributed their thoughts to the situation. Since the method depends on first-person experiences, these personal accounts were gathered as responses using a standard Google Forms survey.

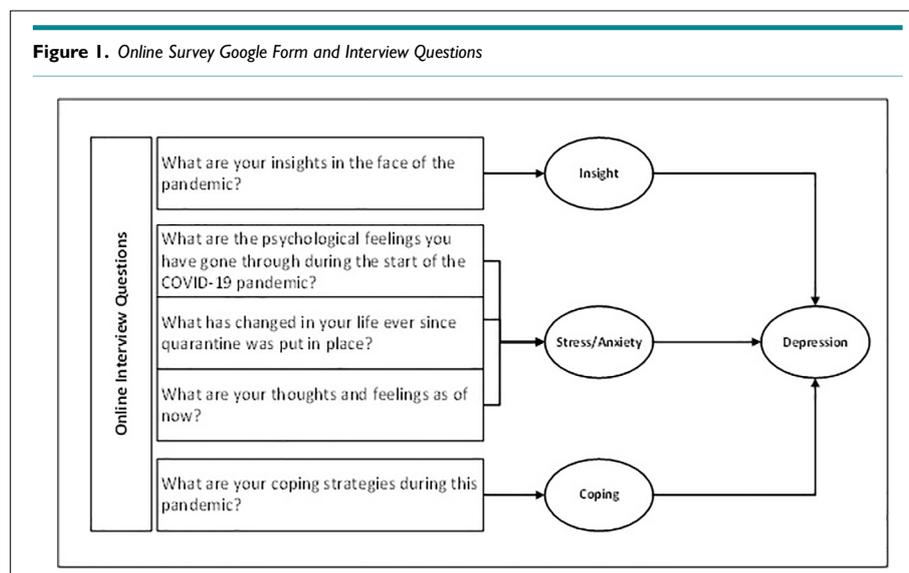
The qualitative method analyzed the participants’ answers by finding themes in the responses rather than focusing solely on one individual’s response. This approach allowed the study to be more accurate and conclusive of high school’s general population to undergraduate students in the United States of America.

Study Subjects

The study focused on recruiting participants who lived within the geographic boundaries of the United States of America. A convenience sampling strategy was used to recruit the students who were attending high school or undergraduate program. Participants were recruited by sending emails to students who were already known by the researcher. An email template was developed to send and request the participants to participate in the survey. In the email, the study objectives and a link to the Google Forms survey was included. During the online survey process, 21 high school and college students participated from different states within the United States. The requirements to participate in this study were: 1) participants had to be attending either high school or college (as an undergraduate student) and 2) participants need to sign a digital agreement before entering the survey.

Survey questions: The survey outline and questions were deter-

Figure 1. Online Survey Google Form and Interview Questions



mined by consulting related academic literature (see References) and producing relevant questions answered by students, and then they filled out the form. The questions asked in the survey were (see also Figure 1):

1. What are your insights in the face of the pandemic?
2. What are the psychological feelings you have gone through during the start of the COVID-19 pandemic?
3. What has changed in your life ever since quarantine was put in place?
4. What are your thoughts and feelings as of now?
5. What are your coping strategies during this pandemic?

Data Collection

The questions shown in Figure 1 were put in place to understand the emotional perspective of the effects of the pandemic on the students. The responses were not shared between the participants, which eliminated any possible bias or error. The first part of the survey was a participant’s permission form that all participants agreed to, which outlines:

1. I agree to participate in the research study. I understand the purpose and nature of this study, and I am participating voluntarily. I understand that I can withdraw from the study at any time, without any penalty or consequences.
2. I grant permission for the data generated from this interview to be used in the researcher’s publications on this topic.
3. I grant permission for the online survey responses to be recorded and saved for review by the researcher.
4. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission.
5. Choose one of the following options: A - I grant permission for the researcher to use direct, attributed quotations from my interview. Or B - I grant permission for the researcher to use my

responses in aggregate or anonymous statements, but I prefer to maintain confidentiality and request that any comments are presented without attribution to me.

The next section of the survey asked for the demographic details of the student to make sure the participant is either a high school or undergraduate student:

1. Student attending for the 2020-2021 school year: A-High School or B-Undergraduate.
2. Student grade level for the 2020-21 school years: A-Freshman, B-Sophomore, C-Junior, or D-Senior.
3. Student Gender: A-Female or B-Male.
4. Student age group: A-≤13, B-14 and ≤18, C-19 and ≤ 23, or D - ≥23.
5. Student household size (those living at home with family): A-1 and ≤4, B-5 and ≤8, C-9 and ≤12, or D-≥13.
6. State where the student lives.
7. Country where the student lives (provided only one option): A) the USA.

The final section of the survey was the five open-ended questions, as shown in Figure 1. These open-ended questions allowed the participants to answer with full honesty and specificity regarding their situations. The study subjects came from various locations around the U.S. to better understand how the pandemic impacts students across the country rather than in one fixed state or city. Table 1 shows the demographics. Table 2 shows the participants were both, male and female, and the survey didn’t provide any difference in the representation of how these two groups experience differed during the pandemic.

Data Analysis

According to the grounded theory standpoint, Urquhart and Whilst defined saturation point as the point in coding when no

Table 1. Participants’ Demographic Characteristics by Age in the United States (21 participants)

	Freshman	Sophomore	Junior	Senior	Grand Total
Highschool	5		1	4	10
<=13	1				1
Male	1				1
14 and <=18	4		1	4	9
Female	3		1	3	7
Male	1			1	2
Undergraduate	4	3	2	2	11
14 and <=18	4				4
Female	2				2
Male	2				2
19 and <= 23		3	2	2	7
Female		3	1		4
Male			1	2	3
Grand Total	9	3	3	6	21

Table 2. Participants’ Demographic Characteristics by State in the United States (21 participants)

States in the United States	Female	Male	Grand Total
California	1	0	1
Florida	1	0	1
Massachusetts	2	0	2
Oklahoma	2	0	2
Texas	4	3	7
Virginia	1	3	4
Pennsylvania	2	0	2
Massachusetts	0	1	1
North Carolina	0	1	1
Grand Total	13	8	21

new codes or emergent themes occur in the data.^{9,10} After 15 participants, the responses were repetitive, and it became empirically confident that a certain saturation point was reached. The survey continued until 21 participants, which ultimately presented results that confirmed this prediction. Then, the responses were analyzed using Colaizzi's phenomenological analysis methodology. All answers were viewed through a non-biased lens that allowed the study to produce more apparent themes regarding high school and undergraduate students' psychological feelings during the pandemic. Next, an inductive data analysis was used to condense the extensive raw text gathered during the survey process into a summarized format. During the data analysis, coding of the interviewed detailed text was performed to look for common patterns, themes, and categories related to the study questions in Figure 1.¹¹

In the study, the Computer-Assisted Qualitative Data Analysis Software (CAQDAS), NVivo Release 1.3, was used to autogenerate themes and group data to develop a rich report. The NVivo software used for this research study allowed using autogenerated thematic coding to classify the data, including a large volume of text grouped, coded, and categorized. Subsequently, the results were represented in visual formats through comparison tables and figures when deemed appropriate. The NVivo software supported the entry of all details collected through the survey responses. The collected information and raw text were in an electronic format that was compatible with the application software. NVivo helped organize the answers, find thematic trends, search narrated text, form categories, and display data in various graphical representations.

ETHICAL REVIEW

At the beginning of the survey, all participants said yes to questions concerning being a part of this research and having their responses used anonymously for research purposes. For the study's duration, extra security measures ensured that academic misconduct such as plagiarism and repeated publication did not occur. This is an independent thesis research. The approval of the Ethics Committee and the Institutional Review Committee (IRB) to carry out this study was not mentioned.

RESULTS

Question 1: Students' Understanding of the COVID-19 Pandemic

All 21 participants (P1-P21) answered the question, "What are your insights in the face of the pandemic?" The NVivo software coded the answers received for this question to display common themes and terms. The five most repeated and relevant words were "pandemic," "time," "people," "face," and "masks," with counts of 15, 16, 24, 9, and 9 respectively. The words "people," "face," and "masks" among the topmost repeated words indicate their importance and the adoption of the new culture of wearing the masks. The results signify that students are undergoing a significant transition that has a considerable impact on their lifestyle. To support their argument, participants used phrases such as:

"The pandemic has shed light on America's inequities, and it's heart-breaking to see how hard it's hit certain communities (Participant, P19). I believe that all safety precautions are reasonable and that everyone should respect them during these trying times. COVID is a bit scarier to people since there is no stable vaccine yet (P1). We were not prepared for a pandemic like this (P2). The people's freedom and safety are two different things that should be addressed accordingly (P3). Wearing masks and using hand sanitizer has suddenly become a political belief rather than pure reasoning (P5). Even during the times where the number of cases was surging, there was still an influx of customers with a complete disregard for face mask usage. The number of people who have their noses outside the mask or not wearing a mask contributes to the virus's lingering (P6). It's frustrating to know that people still refuse to wear masks and even go to parties (P11). We need to find a new way of life and adjust our daily lives to prevent feeling caged (P16)."

Most of the other top frequently used words also aligned well with the purpose of this question. These words described the need to adopt a new lifestyle and introduce the mask culture. Upon developing an awareness of the pandemic, participants mentioned that the significant challenges were adapting to the ongoing pandemic culture. Initial changes have given way to drastic changes in one's everyday life's mental, emotional, and social aspects. These changes have led many students to feel that more states within the U.S. should promote face masks to control the spread of COVID-19. Many people not wearing their face masks and engaging in constant social interactions increase the number of cases, which allows the pandemic to go on for a more extended period. These actions result in students not attending school in ways they used to before the pandemic, which lead to negative and cooped-up emotions.

Question 2: Students' Psychological Feelings during the Start of the COVID-19 Pandemic

All 21 participants (P1-P21) answered the question, "What are the psychological feelings you have gone through during the start of the COVID-19 pandemic?" The NVivo software coded the answers received for this question to display common themes and terms about which students experienced stress and/or anxiety. The five most repeated and relevant words were "pandemic," "felt," "school," "anxiety," and "stress" with 12, 15, 12, 7, and 8 counts, respectively. Having these words among the top five indicates that the answers received aligned with the student's feelings during the pandemic. To support the argument, participants used phrases such as:

"At the beginning of the pandemic, I felt too cramped and caged in, upset, stress, tired, bored, anxious, and stressed (P5, P15, P17, P21). I constantly felt on edge and have found myself becoming anxious when I am in the aisle of a store, and more than five people are in the same area. My temper seems to have gotten worse as well, whether I am driving, in a store, or even just being at home (P1). The fear of contracting the disease has never left and continues to haunt me and my close friends and family (P4 and P14). I was also disappointed as I couldn't finish high school properly (P3), and all clubs/sports stopped with it (P13). I felt fearful that my family or I would contract the virus (P4). Currently, my psychological feel-

ing is more anxious about the upcoming school year (P6). The pandemic had caused many ups and downs psychologically early on (P8). Throughout the pandemic, I have felt a surge in anxiety as someone who already dealt with anxiety, the feelings of impending doom and loneliness made things much worse (P11). Lastly, my research internships, volunteering events, and clinical positions have either been canceled or postponed due to the pandemic, which has caused me great stress and anxiety (P12)”.

There were different feelings among the students, such as anxiety, cramps, and tiredness. The pandemic made the students feel caged within their homes and stop them from socializing, which contributed to creating fear about the school year. The ongoing pandemic created high levels of stress among students to the point where they felt disconnected in a realm that some described as a “black hole”.

Question 3: Changes among the Students’ Lifestyles when the Quarantine was put in Place

All 21 participants (P1-P21) answered the question, “*What has changed in your life ever since quarantine was put in place?*” The NVivo software coded the answers for this question to display common themes and terms. The five most repeated and relevant words were “pandemic,” “changed,” “school,” “friends,” and “masks” with 8, 12, 12, 10, and 7 counts, respectively. The presence of these words among the top-five most repeated and relevant words indicates their importance concerning the question. The results signify that students are undergoing a significant transition that significantly impacts their lifestyle. To support this argument, participants used phrases such as:

“School ended for me back in March, and I have not seen my friends as much as I’d like (Participant, P1). We haven’t gone to school, and I have not left home in a while. We can only go out for necessary stuff, and we do online school (P21). Additionally, I must stay at home more, causing me stress because of an emotionally abusive father (P2). A lot has changed. I moved states. I was previously living in Kansas and going to school there. I quit and obtained a new job, and I’ve already transferred to a college nearer to home (P5). Masks and hand sanitizer must be brought with you everywhere. Social distancing has become very prevalent (P3). Along with (hopefully) everyone else, I have started to wear a mask everywhere I go. Even after the COVID pandemic goes away, I think masks will be an essential part of my life (P11). Wearing a mask has become a part of everyday clothing (P16). Whether it’s a computer, phone, or tablet, I feel like I am using technology a lot more than I used to. Another change would be sleep; I sleep a lot later and wake up later (P13). I felt like a lot of my independence was stripped away from me (P19). Felt bored staying home all day and not going out for any activities. Had to find ways to keep me busy and occupied (P20)”.

Furthermore, students experienced the introduction of social distancing policies such as virtual learning and maintaining a distance of at least six feet. Students could not talk to their friends as they used to at school due to the barrier screen placed in front of them. Even with all the measures taken at schools engaging in in-school learning, students still faced exposure to COVID-19 in many ways. In some schools where in-school learning is an option,

students could bring COVID-19 back to their teachers or classmates if they become exposed outside of school. Consequently, it is essential for students to stay home, the primary procedure for U.S. high schools and colleges. Students started following the orders of the CDC. They cultivated the habit of wearing masks in public areas to protect themselves and the people they live with from the virus. Many practices such as virtual learning, engaging in social distancing, applying sanitizer, washing hands frequently, and wearing masks were put into one routine to ensure the most safety. Each practice provides an additional layer of stress to defend against COVID-19.

Question 4: Thoughts and Feelings As-of-Now

All 21 participants (P1-P21) answered the question, “*What are your thoughts and feelings as of now?*” The NVivo software coded the answers for this question to display common themes and terms. The five most repeated and relevant words were “pandemic,” “school,” “feel,” “go/ing,” and “back” with 12, 10, 20, 17, and 15 counts, respectively. The presence of these words among the top-five most repeated and relevant words indicates their importance concerning the question. That question inquired about the student’s feelings as-of-now and about wanting to go back to a social setting, such as school (if possible). To support the argument, participants used phrases such as:

“I have felt many things since the pandemic, but mostly either angry or sleepy. I have also had thoughts that make me cry for some unknown reason, and I spend most nights tearing up over something that does not seem to matter (Participant, P1). I don’t think that we will get over this hurdle with the country’s current state for the next 6-15-months (P3). I feel like the pandemic will affect life for at least the next two years as we move back to the new normal (P8). This makes it frustrating to plan future events because it cannot be predicted when things will return to normal (P6). Even though the school started back up again, so I’m feeling stressed. It’s really hard to concentrate. Plus, the teachers kill time during our zoom meetings and are just assigning busy work (P15). I feel very emotional when I think about the times we’re living in because I believe we are all experiencing a collective shock and grief that we won’t ever fully process (P19). I wish we can go out again and go back to our normal life (P21). I’m currently in denial that I will start college in the fall. I refuse to get my hopes up for move-in day and orientation because nothing is guaranteed (P4)”.

With the school year ending abruptly and no summer activities, students worried not only about how the academic year would progress but also about their educational, personal, and social futures. Students expect life to get back to normal in the future, but they are nervous about how far away that future is. This worry is beginning to impact their personalities, mental well-being, and work ethic with an added pressure of “busy work” assigned by their schools. Additionally, the survey shows that the students are worried about their mental well-being and say that anxiety keeps them from being the person they want to be.

Question 5: Coping Strategies during the Pandemic

All 21 participants (P1-P21) answered the question, “*What are your*

“coping strategies during this pandemic?” The NVivo software coded the answers for this question to display common themes and terms. The five most repeated and relevant words were “a lot,” “time,” “watch,” “games,” and “friends” with 20, 14, 15, 11, and 7 counts, respectively. They indicate that the answers received are gearing toward spending more time on the screen and playing video games as a coping mechanism during the pandemic. To support this argument, participants used phrases such as:

“Listening to music and drawing seems to help me cope and learn that doing things inside can be just as fun and keep my brain functioning (Participant, P1). I have been catching up on a lot of sleep and watching T.V. to past [sic] the time (P2, P3, P4, P5, P15). Video games are an interesting way to continue to interact with friends daily. I’m very thankful for technology as it has allowed me to stay in touch with people I can’t see in person (P13 and P21). Additionally, periodically having group calls and texts with friends helps keep track of everyone’s mental health and boosts morale as people think back to what they have accomplished between sessions (P6, P9, and P11). One of the biggest strategies I live by is working out, exercise, walking, or outdoor games (P5, P14, P16, P18, and P20).”

It has been several months since schools and non-essential workplaces have closed. Many people settled into the new normal during these changing times, i.e., social distancing and virtual learning. Instead of face-to-face contact with teachers and friends, students have developed new ways to stay busy while adhering to public health guidelines. Students became addicted to video games, watched Television (T.V.) regularly, and attended virtual meetings on Zoom and other platforms. The virtual world has provided students with a unique opportunity to hang out with their friends. However, with the increase in screen time, few students used their free time as an opportunity to stay fit. Having the screen as their only source of learning and entertainment, students became sedentary. They did not get their usual daily exercise, which is something they could have gotten while staying on a school campus.

DISCUSSION

Many high school and undergraduate students in the United States are missing face-to-face instruction through virtual school due to COVID-19. This lack of interaction has led many students, teachers, and parents to share the common worry concerning mental health. There are also concerns that the gap between high- and low-achieving students will become larger. Given the need to ad-

dress these concerns, the study decided to attain and analyze high school and undergraduate students. Twenty-one students participated in the research and provided their responses on the virtual school learning patterns and learning loss due to the pandemic. Ultimately, the questions considered what students knew about the pandemic, how they felt around the time it started and during the pandemic, and what they are currently using/doing as their coping mechanisms. All 21 participants responded to each of the five questions. The NVivo software generated a sentimental analysis for each question and provided an emotional breakdown.

Currently, students believe that the future is uncertain since they do not know how long the pandemic will last. Uncertainty is a factor that the majority of participants addressed as their primary source of concern. The students know that it is impossible to learn about all real-world dangers firsthand. So, they count on others to warn them by seeing sources such as T.V., social media platforms, and messages between groups. Despite their efforts to stay updated, it is also an inefficient process. Even though it is essential to know what is happening, the pandemic’s negativity and harsh realities have impacted the students’ motivation. For instance, Figure 2 shows that 72.34% of the participants demonstrated a gloomy outlook for their future. Students are exposed to images or threat signals 24/7 through T.V., social media, and other channels and get the idea there is no near-term solution to the pandemic. The analysis shows that students are experiencing severe anxiety, directly correlating with stress levels and vulnerability.¹²

As millions of U.S. students hunkered down under widespread learn-from-home and social-distancing directives, it was tricky to sustain normal social life and mental health. When the pandemic started, anticipated events and graduations were changed or canceled. Figure 3 shows that even though maintaining personal and public health and safety was the essential thing. Disappointed participants (70.07%) saw their social lives and potential memory-filled events vaporize.

With a stressful end to the previous school year and many summer programs getting canceled, digital school performance became ever so strenuous for high schoolers and undergraduate students. Students entering high school or university during this period felt nervous to go back to school, mostly if they were first-year students. It was initially hard to implement some of the changes they were not used to, such as wearing protective

Figure 2. Sentimental Analysis on the Students’ Insight in the Face of the Pandemic

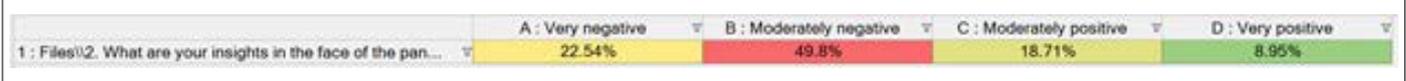


Figure 3. Sentimental Analysis of the Students’ Feelings when the Pandemic Started

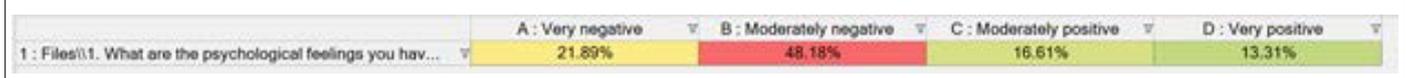


Figure 4. Sentimental analysis of the Students' Lives While Going Through the Pandemic

	A : Very negative	B : Moderately negative	C : Moderately positive	D : Very positive
1 : Files\3. What has changed in your life ever since qua...	14.49%	49.28%	29.17%	7.07%

Figure 5. Sentimental analysis on the Students Preparing for the New School Year during the Pandemic

	A : Very negative	B : Moderately negative	C : Moderately positive	D : Very positive
1 : Files\5. What are your thoughts and feelings as of now	23.15%	38.89%	20.65%	17.31%

Figure 6. Sentimental analysis on the Students' Coping Strategies during the Pandemic

	A : Very negative	B : Moderately negative	C : Moderately positive	D : Very positive
1 : Files\4. What are your coping strategies during this p...	14.52%	48.62%	28.34%	8.53%

clothing like masks and maintaining social distance. Figure 4 shows that even though some teachers try to encourage students to be active, 63.77% of the participants found it challenging to be physically distanced from friends and teachers while at school. Figure 4 shows that 36.23% of the participants remained somewhat positive about getting used to virtual methods. These participants have gotten close to fully adopting new lifestyles and were happy that they at least got to see their teachers and friends over calls.

After a strange end to the 2019-2020 school years with most students doing some form of distance learning, many school districts have yet to announce their plans for the upcoming school year, which has added stress and anxiety for both students and parents. The move from formal in person learning to online or hybrid learning, or even attending in person classes with masks and social distancing, weighed on students. Many feel worried about keeping up with their studies with the changing formats. There were class and curriculum cancellations because teachers cannot teach a hands-on class virtually. These cancellations led to reduced opportunities for students in areas that they wanted to explore for their future. The social aspect of back-to-school also impacted students. Figure 5 shows that 62.04% of students, during the start of the year, were worried about their social life and missing out on after-school activities, especially those canceled or adjusted, instead of the usual annual stress that would come with the back-to-school season. Although students are concerned about the future, they also feel a responsibility to make a positive change. A significant number of students, 37.96%, felt comfortable staying virtual to prevent further spreading cases.

Figure 6 shows that 63.14% of the participants felt that the pandemic was stressful. It brought fear and anxiety, which led to questions such as what could happen in the future. Such thoughts were stressful for students who had to balance academics, clubs, sports, internships, and the pandemic's weight. Public health actions, such as social distancing, made people feel isolated and lonely, which further increased stress and anxiety. However, these actions are necessary to reduce the spread of COVID-19.

Students adjusted to the virtual format during the pandemic period, and many relied more heavily on electronic devices. From doing schoolwork to playing videogames, students relied entirely on digital devices. In this process, students remained sedentary and did not get much physical exercise. Furthermore, by developing a heavily dependent relationship with screens, more stress was created, and community socialization fell apart. This added stress and lack of a social life makes it even more important to make digital therapeutics readily available in the academic curriculum.

CONCLUSION

The surveys of students show that their mental well-being has been devastated by the pandemic's social and economic consequences, as well as the continued uncertainty about their college education and post-college careers. Poor mental health leads to many cases of stress and anxiety, which increases the chances of students entering depression and loneliness. The study aligns with the American College Health Association report, which states that depression and anxiety are the top two impediments to high school and college students' academic education.¹³ Still reeling from the emergency closures of campuses across the country during the spring semester and the sudden shifts to online instruction, students are now worried about the current academic year and whether campuses reopened for in-person instruction can remain open as COVID-19 spreads among students. This worry creates stress and anxiety among the students, which can eventually lead to severe depression.

In the short term, due to stress and anxiety, many students who have not previously sought mental health support from their school will be requesting resources to do so. These potential requests mean that counseling centers at schools need to be prepared with a proper support system. In the long run, students will develop a screen addiction due to their increased time on screens to attend classes. According to a recent survey, the average person's screen time is up at least 50%, even more so for high school and undergraduate students. Extended amounts of time in front of

technology affect the brain's frontal cortex in much the same way as cocaine. There is a release of dopamine into the brain, which can negatively impact impulse control. In other words, watching T.V., playing video games, and scrolling through social media can be seen as a digital drug for our brains.

Adopting negative behaviors as a pandemic coping strategy, such as increased screen time, will lead to new addictions within students. Avoiding these addictions will require additional proper measures. More cases of depression can occur if we are addicted to the screen, mostly depending on the content. There could be anxiety, and there's always room for other predators on the internet. Students may encounter cyber bullying and other safety issues that can cause some long-term psychological effects. Furthermore, the more time a person spends staring at a screen, they harm their health by straining their eyes, putting on unhealthy body weight, and getting headaches. The same precautions that people are taking by using the internet as a substitute for real-life will be a reason for many risk factors that can appear in students' health in the future.

To overcome the pandemic's short-term and long-term impacts, schools need to introduce classes that help students understand how to properly manage their time on technological devices and build a healthy lifestyle during these trying times. This intervention is where digital therapeutics steps in. Digital therapeutics is an emerging healthcare technology and treatment methodology that often also includes support from remote clinicians. As students spend increasing time on screens, schools need to utilize digital therapeutics and digital solutions. The objective is to change students' behavior and lifestyle, usually with laptops, smartphones, and delivery through different digital channels. Digital therapeutics can help students avoid long-term chronic diseases like type 2 diabetes, obesity, stress, anxiety, and depression.

LIMITATIONS AND FUTURE WORK

This study documented the psychological effects among high school and college students due to the COVID-19 pandemic in the U.S. via a Google Form online survey. The survey was conducted while the pandemic was in its late early-to-middle stages. Consequently, this study's results may be limited since the current findings may differ from how students feel in the future. Given the nationwide similarities in schools and universities transitioning to virtual classes during quarantine, this study is expected to have many similarities in its findings. However, the study did not analyze how student mental health problems differ by personal and social contexts such as income, religion, etc. This limited approach allowed the study to limit the possibility of confounding results by using too many independent variables. Future studies can determine the effect on students' mental health, and well-being in later phases of the pandemic or after the pandemic enters adormant state.

REFERENCES

1. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. *Features, Evaluation, and Treatment of Coronavirus*. Treasure Island (FL), USA: StatPearls Publ; 2020.
2. World Health Organization (WHO). WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. 2020. Web site. <https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>. Accessed January 17, 2020.
3. Gralinski LE, Menachery VD. Return of the coronavirus: 2019-nCoV. *Viruses*. 2020; 12: 135. doi: 10.3390/v12020135
4. World Health Organization (WHO). Pneumonia of unknown cause – China. 2020. Web site. <https://www.who.int/csr/don/05-january-2020-pneumonia-of-unknown-cause-china/en/>. Accessed January 17, 2020.
5. World Health Organization (WHO). COVID-19 Public Health Emergency of International Concern (PHEIC) Global research and innovation forum. 2020. Web site. [https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-\(pheic\)-global-research-and-innovation-forum](https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum). Accessed January 17, 2020.
6. federalregister. Suspension of Entry as Immigrants and Nonimmigrants of Persons Who Pose a Risk of Transmitting 2019 Novel Coronavirus and Other Appropriate Measures To Address This Risk. federalregister. 2020. Web site. <https://www.federalregister.gov/documents/2020/02/05/2020-02424/suspension-of-entry-as-immigrants-and-nonimmigrants-of-persons-who-pose-a-risk-of-transmitting-2019>. Accessed January 17, 2020.
7. Elflein J. Coronavirus (COVID-19) in the U.S. - Statistics & Facts. Statista. 2020. Web site. <https://www.statista.com/topics/6084/coronavirus-covid-19-in-the-us/#cases>. Accessed January 17, 2020.
8. Morrow R, Rodriguez A, King N. Colaizzi's descriptive phenomenological method. *Psychologist*. 2015; 28(8): 643-644.
9. Urquhart C. *Grounded Theory for Qualitative Research*. 13th ed. Thousand Oaks, CA, USA: Sage Publications Ltd; 2013.
10. Haegeman K, Marinelli E, Scapolo F, Riccid A, Sokolov A. Quantitative and qualitative approaches in future-oriented technology analysis (FTA): From combination to integration? *Tech-nol Forecast Soc Change*. 2013; 80: 386-397. doi: 10.1016/j.techfore.2012.10.002
11. Yin RK. *Case Study Research: Design and Methods*. 4th ed. Los Angeles, USA: Sage Publications; 2009.
12. Bunevicius A, Katkute A. Symptoms of anxiety and depression in medical students and in humanities students: Relationship with big-five personality dimensions and vulnerability to stress. *Int J Soc Psychiatry*. 2008; 54: 494-501. doi: 10.1177/0020764008090843

13. American College Health Association. American College Health Association-National College Health Assessment Spring 2008 Reference Group Data Report (abridged): The American College Health Association. *Am Coll Heal Assoc.* 2009; 57: 477-488. doi: [10.3200/JACH.57.5.477-488](https://doi.org/10.3200/JACH.57.5.477-488)

Original Research

Relationship between Academic Stress and Emotional Intelligence in High School Students

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ABSTRACT

Background

Academic stress is a mental distress originated from the anticipated frustration associated with academic failure. Whereas, emotional intelligence (EI) is a characteristic of an individual that determines the degree, and intensity with which they are able to understand and accept one's own emotions as well as that of others.

Aim and Objective

The broad aim of the present study was to investigate an empirical-based examination of the relationship among academic stress and EI in high school students. The objectives of the study were to ascertain if there exist any gender, family structure and single child differences between academic stress and EI.

Method

This study is based on a quantitative analysis of the data. To collect validated data, purposive sampling was taken from varied streams and family structure of the age group 16 to 18-years; with no gender disparity. Student Academic Stress Scale (SASS) and emotional intelligence test (EIT) were used in this research. The data obtained was further validated through statistical techniques of correlation and analysis of variance (ANOVA) methods.

Results

The results showed an inverse correlation between EI and academic stress in high school students. The study also revealed single child and family structure factors are associated with the level of EI and showed an impact on academic stress of high school students.

Keywords

Academic stress; Emotional intelligence; High school students; Family structure.

INTRODUCTION

Stress

Stress is a negative emotional experience associated with biochemical, physiological, cognitive, and behavioral changes that occur when a person tries to manage or deal with the stressors.¹ We perceive stress as an inescapable joint in our life that is equally valuable for everyone because without having some stress, we are lethargic and easygoing creatures. Stress is not always a “*bad thing*”. It is subjective in interpretation. A stressor for some may not be stressful for someone else. For example, studying for an examination at the end moment may act as a motivator resulting in optimum stress levels for some students to study whereas, the

same scenario may trigger anxiety which results in heightened stress for someone else rendering the student's inability to perform the simplest tasks. Some stressors may motivate us to change our behaviors and move us closer to our chosen goals, dreams, and aspirations. If we felt no stress, we would not be compelled to act in ways that bring about meaningful change.² Such a stressor that acts as a motivator, is called Eustress. It improves one's performance, drive and helps us in focusing our energy in the right direction. It helps us to believe in our capabilities and feels invigorating. Distress, on the other hand, are those stressors that are demotivating and displaces our energy. It causes anxiety, depression, worry, and concern; may also cause physical illness, mental health issues, and/or emotional depletion. It generally feels unpleasant and painful.

Distress, whether acute or prolonged, decreases the overall performance and abilities of an individual.

Academic Stress

Academic stress refers to the unpleasant psychological situations that mostly occur due to environmental factors, such as educational expectations from parents, teachers, peers, and family members, pressure for academic achievement, the burden of homework, etc. Academic stress is mental distress with respect to some anticipated frustration associated with academic failure or even an awareness of the possibility of such failure.³ Student's interaction with the academic stress can be conceptualized by interaction with environmental stressors, cognitive appraisal and coping strategies of the academic related stressors, and psychological or physiological response to the stressors.⁴ Students face a lot of academic pressure, for example, school examination, showing progress in school subjects, answering questions in class, working in tuition classes to score well, competing with other classmates, fulfilling teachers' and parents' academic expectations. Thus, managing these demands students, under this threat face stress, since the demand is to reach the goal of academic achievement.

Academic Stress among High School Students

Academic stress among students have long been researched, and the studies show stressors as too many assignments, failures and poor relationships, competitiveness among students, high expectations by parents and many more as mentioned above. Stressful events that occur in families, like divorce, intrapersonal conflicts or maternal depression can lead to stress in adolescents which deteriorates functioning.⁵

Paternal Support on a Child Facing Academic Stress

According to some studies, parents play a significant role in the cognitive, social and emotional development of their children. Their role develops socialization to cultural and societal norms and the morals inherited in their children built them to combat future difficulties.⁶ Studies revealed that parents play a positive or negative influence on a child's academic aspirations and achievements. Molnar⁷ reported that a parent's education and home environment influence a child's academic achievement and after not achieving them they are accused of being dull and lazy which induces a sense of inferiority among adolescents and sometimes the situation worsens in the form of mental disorders, depression, stress and even suicides.

Gender Differences in Stress

The concept of stress and its perception based on gender is a fascinating undertaking because findings of studies conducted regarding stress with references to gender are somewhat conflicting. For instance, in a study by Mishra et al,⁸ it was revealed, "*that men and women differ in their perceptions and reactions to stress*" while Jogaratanam et al⁹ found differences between male and female students to be significant when it came to the time pressure dimension of stress. Likewise, Sulaiman et al¹⁰ found in their study that "*female students have different stress compared to male students, because may be female students*

tend to be more emotional and sensitive toward what is happening in their surroundings".

Emotional Intelligence

The skill to identify and articulate your own emotions while considering the emotions of others is called emotional intelligence (EI).¹¹ Emotional intelligence is generally said to include at least three skills: emotional awareness, or the ability to identify and name one's own emotions; the ability to harness those emotions and apply them to tasks like thinking and problem solving; and emotional regulation, which is the ability to manage emotions, which includes both regulating one's own emotions when necessary and helping others to do the same.

Emotional intelligence is the ability to determine, examine and analyze your emotions, and realize how your emotions are impacting people around you. It also involves your perception of others; how other people are feeling or expressing their emotions in a particular situation and allows you to mediate for a healthy relationship. However, various researchers have engaged themselves in finding relationships between EI and academic performance.^{12,13} Results predict a positive relationship between EI and academic performance and other cognitive outcomes.¹⁴

Goleman's Competency Model for Emotional Intelligence: Daniel¹⁵ focuses on EI as a wide array of competencies and skills that drive leadership performance and consists of five areas: self-awareness: it is an important trait of EI. People with high EI are usually more self-aware. These people understand their own strengths and weaknesses, and their impact on others. Self-regulation: people having high EI do not allow themselves to become pugnacious or petulant by others. They do not even make decisions in a hurry or careless manner, rather follow a more pragmatic way. Motivation: high emotional intelligent people are more self-motivated and are not amenable to other people. Empathy: this trait shows a helping nature to other people's concern. Social skills: high emotional intelligent people build a trustable relationship with others. They do not possess a prevaricate behavior, rather they are shown a venerated attitude by other people in their community/society.

Impact of Emotional Intelligence on Academic Performance

Currently, the concept of EI is having a considerable impact on every person's thoughts, relations and emotions, and a very significant influence on their decision making.¹⁶ Some of the studies are, Influence of EI on Student's Academic Achievements; aim was to investigate a student's EI level and using the dimensional approach, to what extent EI influences students' academic achievements.¹⁷ Another study explored the relationship of EI and creativity with academic achievement of second period high school students. This was a descriptive-correlational study. Results indicated a significant correlation between EI and academic achievement. There was also a significant and positive relationship between creativity and academic achievement. Additionally, no gender difference was found considering their academic achievement.¹⁸

HYPOTHESIS AND OBJECTIVES

The primary hypothesis of the study was to examine EI and how it relates to academic performance/stress. In the presence of the information gathered these are objectives:

Objective 1. There exists no relation between the academic stress of high school students with their EI.

Objective 2. There exists a gender disparity in the level of academic stress and EI.

Objective 3. There is no difference in the strength of relationship between EI and academic stress in the single child.

Objective 4. There is no significant relationship between academic stress in the joint family and nuclear family.

METHODOLOGY

Participants

Randomly a Delhi school was taken into account, where students were selected randomly from all the three streams i.e. science, commerce, and humanities respectively. A sample of 50 students was taken, 15 students from science stream, 15 students from commerce stream and 20 students from humanities stream. Purposive sampling type was used to gain the appropriate data for the research.

Design

In the present study 2×2 factorial design has been employed wherein gender was studied as an independent variable and academic stress and EI were studied as the dependent variables.

Tools

Student Academic Stress Scale (SASS) by Busari et al¹⁹: The SASS is a self-assessment scale which includes various domains such as environmental, cognitive, behavioural, and physiological that might impact the student's life in the form of a stressor (like academic work). The scale used a 5-point Likert scale. Higher scores indicate a greater stress response. The SASS produced allover significant reliability using Cronbach alpha for the overall SASS scale and subscales. All alphas were above 0.80. This indicates that the SASS is a reliable measure of academic stress response.

Emotional intelligence test: The EIT is a valid scale that measures EI by looking at the factors like motivation, empathy, self-awareness, and handling relationships. This scale measures the data using the Likert scale of five-point. In EIT, content validation and criterion validity were used. Construct validity was also used to make the test standardized.

Statistical Techniques

Mean, Standard Deviation, *t*-test (ANOVA) and correlation are employed to treat the raw scores and arrive at the result using SPSS Software.

RESULTS

Descriptive Statistics

Data is being presented in a tabular form in Table 1.

Table 1. Descriptive statistics of Academic Stress and Emotional Intelligence

	SASS	EIT
N (male)	25	25
N (female)	25	25
Mean	154.5200	217.7000
Std. Deviation	42.62712	36.39088
Age range	16-19	16-19

Characteristics of the Sample

Out of the 50 respondents, 50% of them were females, and 50% of them were males. The age group of respondents was between 16-18-years. The age group was constraint because the target sample was drawn from the high school students. Department/stream wise, 30% of respondents were from science stream, 30% of respondents were from commerce stream, and 40% of respondents were from humanities stream.

There exists no relation between the academic stress of high school students with their emotional intelligence: To determine if there was a relationship between EI and academic stress, the test of correlation was conducted (Table 2). The value of pearson correlation ($r=-0.668$) shows that there is a strong inverse relationship between EI and academic stress. If a respondent's EI is low then their academic stress is high and *vice-versa* ($p<0.05$).

Table 2. Correlation between Academic Stress and Emotional Intelligence

	SASS	EIT
SASS	Pearson Correlation	-0.668**
	Sig. (2-tailed)	0.000
	N	50
EIT	Pearson Correlation	-0.668**
	Sig. (2-tailed)	0.000
	N	50

**Correlation is significant at the 0.01 level (2-tailed).

Table 3. Oneway analysis of Emotional Intelligence (EIT) and Academic Stress (SASS) by Gender

	Sum of Squares	df	Mean Square	F	Sig.	
EIT	Between Groups	1180.980	1	1180.980	0.890	0.350
	Within Groups	63709.520	48	1327.282		
	Total	64890.500	49			
SASS	Between Groups	4122.320	1	4122.320	2.330	0.133
	Within Groups	84914.160	48	1769.045		
	Total	89036.480	49			

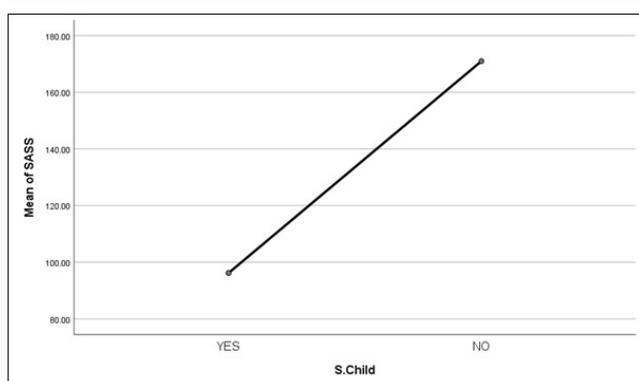
There exist gender differences between academic stress and emotional intelligence: To explore the difference in the level of EI and academic stress between male and female high school students, ANOVA was run (Table 3). The One-way analysis was unable to reveal a statistical gender difference in male and female high school students. Hence, we did not observe a significant difference between male and female students for EI (EIT) ($p=0.350$; $F(1)=0.890$) or for academic stress ($p=0.133$; $F(1)=2.330$).

There is no difference in the strength of relationship between emotional intelligence and academic stress in the single child: To test this hypothesis ANOVA test was applied (Table 4). The results show that there is a significant difference between the strength of relationship between EI and academic stress in the single child ($p<0.0001$; $F(df)=49$) (Graph 1).

Table 4. One way analysis of Emotional Intelligence (EIT) and Academic Stress (SASS) by Single Child

		Sum of Squares	df	Mean Square	F	Sig.
SASS	Between Groups	47995.869	1	47995.869	56.135	0.000
	Within Groups	41040.611	48	855.013		
	Total	89036.480	49			
EIT	Between Groups	34023.787	1	34023.787	52.909	0.000
	Within Groups	30866.713	48	643.057		
	Total	64890.500	49			

Graph 1. On x-axis-Single Child; YES and NO, On y-axis-Means of SASS, The Associated Correlation r value= 0.735



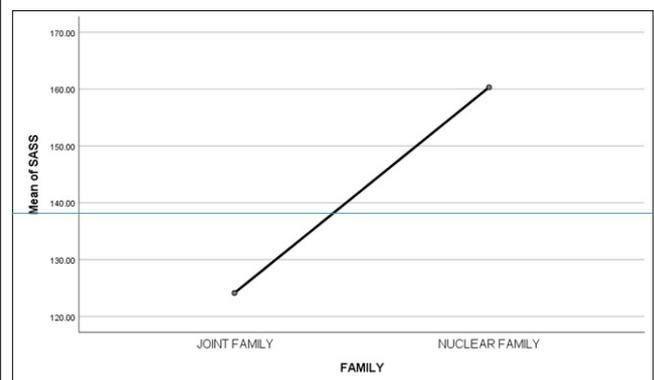
**This graphical representation is from the H3 (Hypothesis 3)

There is no significant difference between academic stress in the joint family and nuclear family: To test this hypothesis ANOVA test was employed after splitting the dataset into two groups of students having joint family and nuclear family. Table 5 shows that there partially existed a significant difference in the level of academic stress in students living in joint families and students living in nuclear families. Results show that there is a significant difference $p=0.026$; $f=0.026$; $(df)=49$ shows that a small relationship existed and the relationship was statistically significant (Graph 2).

Table 5. Oneway analysis of Joint family and Nuclear family by Academic stress (SASS)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8798.629	1	8798.629	5.264	0.026
Within Groups	80237.851	48	1671.622		
Total	89036.480	49			

Graph 2. On X-axis-Family (Joint Family and Nuclear Family) On Y-axis-means of SASS The Associated Correlation r value= 0.026



**This graphical representation is from the H4 (Hypothesis 4)

DISCUSSION

The results showed that there exists a strong relationship between EI and academic stress experienced by a high school student. We observed an inverse relationship showing that the level of EI is inversely proportional to the academic stress of a high school student. For example, if a student has high EI, that means s/he might have low academic stress. The study also explored gender differences, but results showed there were no significant differences between male and female students' EI score or academic stress scores. Besides gender differences there are two other factors that showed an influence on EI and academic stress, namely, respondents that are single children (one child in a family), and family dynamics (whether a child is brought up in a joint family or nuclear family).

The results showed that the majority of the respondents were not a single child in a family (single child in a family 28% and not a single child in a family 72%) and thus, it does have a significant influence in their level of EI and academic performance. It means a child raising up with siblings might have a social support that helps them in building up their capacity to be aware of, control, and express one's emotions, and at the same time handle interpersonal relationships empathetically. This child rearing with siblings helps them to build their EI that further assists them to comfortably handle their academic stress in schools. Similarly, results of the last hypothesis verify the academic stress of a child living in a joint family (35%) and nuclear family (65%). A statistically significant relationship was founded, and it states that nowadays

people prefer living in a nuclear family, that does have an impact on the child's upbringing. Children living in a nuclear family do not have many options for social support because most of the parents are employed. They do have to work to satisfy their family's financial needs, but most of them show an absence when there's a need for the child to have a social supporter around them, which ultimately lacks the child to build up his/her EI and that further affects their major life aspects.

LIMITATIONS

The results should be viewed cautiously as our population sample is limited to one high school in Delhi. However, given the strong correlations presented in this data, this study gives rise to future investigations across a broader population. The second limitation is cross-sectional research design because the data was collected from many different students at the same period of time. Thirdly, the sample collected was also limited and covered only high school students which consist of students from 11th and 12th classes. Thus, the study's result is restricted to a specified sample and not reviewed on a general population. Finally, the questionnaires were very lengthy and took a long time to be filled by the respondents. In our study, the response rate was good. Every student had fully marked the answers, but while coming to the end it became tedious.

SUGGESTIONS FOR FUTURE RESEARCH

In this research study-cross sectional design was used, therefore future research needs to observe the long-term effects or longitudinal effects of emotional and social competency on academic success. Further research should also observe other factors that influence academic stress taking EI as an independent variable, like in this study single child and child family rearing are the factors that showed their influence on EI and academic stress. Future research can also observe how much respondents are aware about their EI and how many schools do provide educational awareness about it.

CONCLUSION

The practical analysis of this study for academia is numerous. For preparing students to cope with stress several stress management techniques are used. Therefore, every school should take some stress management classes for students. These sessions can help students to learn the cognitive, social, and emotional competencies but these competencies are not developed through lectures and discussion, we have to put prime emphasis on theory-based knowledge. Students should know some basic knowledge and skills that will help them to become outstanding or achievable academic performers and comfortable in adapting effective leadership skills.

DECLARATIONS

Not applicable.

ACKNOWLEDGEMENT

This study has been approved by the Institutional Review Board

(IRB).

AVAILABILITY OF DATA AND MATERIAL

Data generated during the study are subject to a data sharing mandate and available in a public repository that does not issue datasets with DOIs.

CONFLICTS OF INTEREST

The author below certify that he has NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

REFERENCES

- Bernstein DA, Penner LA, Stewart AC, Roy EJ. *Psychology*. 8th ed. New York, USA: Houghton Mifflin Company Boston; 2008.
- Davidson RJ, Schwartz GE. Psychobiology of relaxation and related states. In: Mostofsky D, ed. *Behavior Modification and Control of Physiological Activity*. Englewood Cliffs, NJ, USA: Prentice Hall; 1976: 399-442.
- Gupta K, Khan BN. Anxiety level as a factor in concept formation. *J Psychol Reports*. 1987; 31: 187-192.
- Mire R, McKean M. College student's academic stress and its relation to their anxiety, time management and leisure satisfaction. *American Journal of Health Studies*. 2000; 120(1): 41-51.
- Forehand R, Wierson M, Thomas AM, Armistead L, Kempton T, Neighbors B. The role of family stressor and parent relationships on adolescent functioning. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1991; 30(2): 316. doi: [10.1097/00004583-199103000-00023](https://doi.org/10.1097/00004583-199103000-00023)
- Miller P, Goodnow J. Cultural practices: Toward an integration of culture and development. In: Goodnow J, Miller P, Kissel F, eds. *Cultural Practices as Contexts for Development*. San Francisco, CA, USA: Jossey Bass; 1995.
- Molnar P. Social and personality conditions of students' requests to continue studies in higher education. *Magyar Psychologica Szemle*. 1979; 225-237.
- Misra R, Castillo LG. Academic stress among college students: Comparison of American and International Students. *International Journal of Stress Management*. 2004; 11(2): 132-148. doi: [10.1037/1072-5245.11.2.132](https://doi.org/10.1037/1072-5245.11.2.132)

9. Jogaratnam G, Buchanan P. Balancing the demands of school and work: Stress and employed hospitality students. *International Journal of Contemporary Hospitality Management*. 2004; 16(4): 237-245. doi: [10.1108/09596110410537397](https://doi.org/10.1108/09596110410537397)
10. Sulaiman T, Hassan A, Sapian VM, Abdullah SK. The level of stress among students in urban and rural secondary schools in malaysia. *European Journal of Social Sciences*. 2009; 10(2): 179-184.
11. Brackett M, Katella N. Emotional intelligence in the classroom: Skill based training for teachers and students. *Journal of Emotional Intelligence*. 2007; 8(2): 1-28.
12. Brackett MA, Rivers SA, Salvoes P. Emotional intelligence: Implications for personal, social, academic and workplace success. *Social and Personality Psychology*. 2011; 10: 88-103. doi: [10.1111/j.1751-9004.2010.00334.x](https://doi.org/10.1111/j.1751-9004.2010.00334.x)
13. Bronzes A, Militia P. Association between emotional intelligence, socio- emotional adjustment and academic achievement in childhood: The influence of age. *Canadian Journal of School Psychology*. 2014; 29(2): 83-99. doi: [10.1177/0829573514521976](https://doi.org/10.1177/0829573514521976)
14. Malik SZ, Shahid S. Effect of emotional intelligence on academic performance among business students in pakistan. *Bulletin of Education and Research*. 2016; 38: 197-208.
15. Daniel G. What makes a leader? Harvard business review. New York, USA: Bantam Books; 1998.
16. Nasir M, Masrur R. An exploration of emotional intelligence of the students of IIUI in relation to gender, age and academic achievement. *Bulletin of Education and Research*. 2010; 37-51.
17. Seng NL, Hanafi Z, Taslikhan M. Influence of emotional intelligence on students' academic achievements. *International Journal of Humanities and Social Science Research*. 2016; 2(3): 41-46.
18. Hossein J, Shahidi R, Elhamifar A, Khademi H. Examine the relationship of emotional intelligence and creativity with academic achievement of second period high school students. *World Journal of Neuroscience*. 2015; 5(4): 275-281. doi: [10.4236/wjns.2015.54025](https://doi.org/10.4236/wjns.2015.54025)
19. Eniola SM, Busari AO. Emotional intelligence in promoting self-efficacy of the visually impaired fresh students of federal college of education (Special) Oyo, Nigeria. *The Social Sciences*. 2007; 2: 152-155.

Opinion

Feeling Angry at Coronavirus Disease 2019

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We have been dealing with a lot of stress around the world due to the coronavirus disease-2019 (COVID-19) outbreak during 2020 until now.

Many changes affecting our daily routines, so many new routines have become normal. We all have faced the continued need to adjust to new ways of doing everyday tasks. All these changes in our normality have an impact on us. According to the meaning we give ourselves about it, we will feel certain emotions. As a result of that, or those emotions, we will behave.

It is quite common to see people behave angrily with this COVID-19 outbreak. Anger is just one emotion. A frequent one. To feel anger is an emotion; to behave angrily is a choice. The increase of domestic violence rates, the rise in the number of people consulting psychologists, counselors, and now on medication, just show part of the impact this pandemic has had among humans and the difficulties many have had in handling their anger.

As humans, one way to evolve, to face difficulties has been gathering as societies. Lockdown logically affects our social interaction. With isolation, this tool is not available. So, with social distancing, we will need to adjust. We will have an impact and give a meaning, an explanation, to this isolation. Each one will have a different one according to our personal experiences. If we blame ourselves, if we consider ourselves guilty, we might feel anger.

As humans, another tool we have used to evolve has been our ability to prevent. Preventing has been a way that has made us feel under control and safe. This world crisis has challenged all known ways to prevent it. It has threatened us in ways we could not even imagine. So, again, the unexpected impact us. Each one of us will give it a meaning according to the way we have handled the unpredictable difficulties in our lives before. As a result, we will have different emotions. During the COVID-19 outbreak, we have found many feelings of fear. When we cannot handle fear, we might feel frustrated and as a result, we feel anger.

Grief, loss, has also been very present during the COVID-19 outbreak. Losing jobs, losing sense of normality and of course, mainly, losing loved ones. Again, each one of us will give loss a meaning according to our own prior experiences of grief and loss.

According to what I have said before. Many might be feeling anger during these times. It is important to understand that if we are experiencing anger, we must try to unwrap the meaning inside of us and see, what does this anger mean, where does this anger come from, and see what we can do about it.

The main issue with anger is that it affects our body in many ways. It increases adrenaline and other chemicals into the bloodstream which causes the heart to pump faster, raises the blood pressure, tenses the muscles, causes dry mouth, and upsets the stomach. Anger also affects our ability to love, to work, and live pleasantly, we need to work on the meaning that causes it.

Remember, we cannot change what is happening, but we can work on the explanation we give ourselves about it, and as a result, we might even be feeling different. Anger is a sign of our distress and a display of our suffering. To feel anger is an emotion. To be angry is a choice.

SUGGESTED REFERENCES

1. Balbi J. *Terapia Cognitiva posracionalista: Conversaciones con Vittorio Guidano*. [In: Spanish]. Buenos Aires, Argentina: Psicolibro Ediciones; 2018.
2. Beck JS. *Terapia Cognitiva: Conceptos Básicos y Profundización*. [In: Spanish]. Buenos Aires, Argentina: Gedisa Ediciones; 2018.
3. Fisch R. *Training in the Brief Therapy Model*. New York, USA: Guilford Press; 1994.

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