Evidence in Education

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Introduction

Over the years, evidence has played an indispensable role in various fields such as engineering, medicine, and law. In the field of medicine, rigorous clinical trials are conducted to ensure the efficacy, safety and affordability of drugs before their release. Similarly, in engineering, automobiles undergo extensive test drives, safety checks and crash tests to guarantee its smooth and efficient operation on the road. The parties in a legal suit have to produce evidence to the court in order to secure a favourable verdict. The importance of research and evidence in making decisions is inherent to practice in these sectors, and is widely recognized as the best approach. However, the integration of evidence in educational practice is less institutionalized and requires further attention.

Evidence in education sees its early advocacy in the suggestion that "teaching would be more effective and more satisfying" (p.3, Hargreaves, 1996) if it were a research-based profession. Not only does he argue for prioritizing an adequate research base, he articulates teacher expertise to mean "not just having relevant experience and knowledge but having demonstrable competence and clear evidence to justify one way rather than another" (p.12, Hargreaves, 1996). **With the advent of non-state actors such as civil society organizations, nonprofits and for-profits in strengthening the education system, Hargreaves' arguments are true for all interventions and practices in addition to teaching.**

The increasing role of evidence in policy-making in public service domains over the last few decades are a result of a number of favorable factors such as the growth of literate populations, availability of various types of data, international commitments such as Education for All, SDG and accountability of governments at a global level, as well as the growth in the size and capabilities of the research community (Cooper *et. al*., 2009). For instance, the National Education Policy (NEP) 2020 combines research evidence from aggregated datasets such as UDISE[1], NSS[2] and anecdotal evidence on the daily difficulties of supervising and enhancing

[1] The Unified District Information System for Education or UDISE is a database about schools in India. The database was developed at the Department of School Education, Ministry of Education, Government of India and Maintained by National Informatics Centre, Government of India.

[2] The National Sample Survey or NSS is a large-scale sample survey of diverse fields launched for collection of data required by different agencies of the Government, both Central and States.

small, spread-out schools to recommend school complexes for better governance and improvements in quality of education beyond access (Muralidharan & Singh, 2021).

However, gaps are present in using evidence for the planning and implementation of programs, schemes and projects. An illustration of this can be found in the history of integrating technology in education through Computer-Aided Learning (CAL) in rural and remote schools under the Rashtriya Madhyamik Shiksha Abhiyan (RMSA). CAL was implemented in order to enhance students' access to technology and improve learning outcomes by supplementing traditional teaching methods. However, its implementation faced challenges due to the lack of evidence-informed planning. In a case study explicating the positive effects of CAL on math outcomes in rural Andhra Pradesh, it is also conclusively stated that the evidence of the value of CAL in rural environments is scant. The study attributes this to the prevalence of multi-grade classrooms due to small cohort sizes, unavailability of electricity and the investment necessary to sustain the CAL model (Verghese et. al., 2008).

With a critical emphasis on Foundational Literacy and Numeracy in the NEP 2020, a dedicated mission has been launched by the Government of India - NIPUN Bharat. The exercise of formulating "learning outcomes" under the NIPUN Bharat guidelines involved international research, Oral Reading Fluency studies and large-scale Foundational Learning study by NCERT in order to describe FLN goals, competencies and learning outcomes, articulated in the NCF for Foundational Stage 2022. However, Menon, S., raises critical concerns with the evidence generated for the case of "learning outcomes" through this exercise.

> In current discourses in our country, the articulation and monitoring of LOs are expected to solve larger societal inequities….Apathy towards history prevents us from critically examining what we learned from the articulation of minimum learning levels (MLLs) in the 1990s (NCERT, 1991)....can LO as specified in the new framework, be expected to produce results vastly different from what happened with the MLLs three decades ago? Is there any evidence that demonstrates that specifying and monitoring LO improves educational outcomes?

Through the above examples, we see that it is pertinent to build a robust system of evidence in educational practice - in teaching, in educational governance, in designing and implementing programs - beyond the use of research and data in policy-making. This paper

attempts to argue for coherent and consistent use of evidence in educational practice, with the following objectives :

1. Define evidence in educational practice and demonstrate its importance
2. Illustrate the process of implementing evidence-informed practice (EIP) in education
3. Identify enablers and disablers to evidence-informed practice

The following sections in the paper outline what is evidence, what is its purpose in educational practice, some examples of evidence-informed practice, and most importantly, how it can be put into effect by practitioners in education. It highlights the benefits of evidence-informed practice in education, and clarifies factors at the systemic or organizational level that influence the same. The paper argues for use of evidence-informed approach to educational practice, be it teaching-learning, school transformation programs or systemic reform.

What is evidence in education and what are its benefits?

Evidence in education is defined as systematically generated, objective, and explicit information on the effectiveness of educational theory and practice. It encompasses a full spectrum of knowledge compiled from scientific empirical studies, practitioner inquiry and routinely collected data such as student assessments, school inspections and program evaluations (Malin et. al., 2020). Evidence-informed practice (EIP) offers several benefits to improve and reform educational theory and practice.

Evidence can help us understand what works, why, where and for whom. The nationwide, centrally sponsored PM-POSHAN scheme is a remarkable example of an evidence-informed solution to the challenge of inadequate nutrition in India. Evaluations of Tamil Nadu's pioneering noon-meal program by government, media, and researchers showed that, in rural regions, the provision of a single nutritious meal incentivized parental motivation for schooling, thus improving student nutrition, attendance, and curbing dropouts (Rajan, 1992). Noon meals were an incentive for disadvantaged communities to enter schooling, as evidenced by increased enrolment numbers. As an unintended outcome, the noon-meal programme significantly increased employment opportunities for rural women. The evidence of the programme’s wide-reaching benefits to a variety of demographics and geographies as well as its success in addressing challenges of acute hunger and school discontinuity were instrumental in the implementation of the Mid-day Meal scheme nationwide in 2001, currently renamed

PM-POSHAN Scheme. This scheme has been pivotal in improving attendance in schools, and livelihoods in the community. It also helps mitigate discriminatory practices based on social grouping, wherein children are encouraged to sit together and have a meal, irrespective of their caste, gender, ethnicity etc. Thus evidence lays the foundation for further course of action.

Evidence challenges what we might think is common sense (Breckon, 2016). For instance, it is an accepted and common practice to organize school curriculum into its constituent disciplines, namely language, mathematics, science and social sciences. However, Eisner (2003) points out that such disciplinary orientation of curriculum lacked relevance for many students - they either had little to do with students' everyday lives, or set up high academic hurdles in fields considered intellectually rigorous thus reducing enrolments in physics and chemistry. By referring to such evidence from the education system in the USA, Eisner makes a case for a transdisciplinary and multidisciplinary approach to schooling, which encourages students to secure a broader repertoire to experience, understand and engage with the world around them. Thus what may appear as a straightforward practice finds its scope for reform through evidence.

Evidence can enable alignment, adjustment and adaptability of educational programs and practice with respect to the goals of education. In various interactions with practitioners in Civil Society Organizations (CSOs) in India, the value of evidence to align the design and implementation of programs is highlighted :

> We often encounter situations where despite meticulous planning and design, the anticipated impact is not met. This is where the importance of evidence becomes manifest. Evidence incorporated into planning and design not only leads us towards the right direction but helps develop and implement informed programs.

Research also motivates ideas and processes for adapting program implementation to its desired goals. It was revealed in the interactions that research plays a pivotal role in discovering potential solutions to a problem and evidence of their application in diverse contexts. This offers a starting point for program design and implementation, and provides direction for adapting the same in specific contexts and to specific needs. Furthermore, it was shared that "research serves as a bridge between the theoretical and the practical, and also acts as a bridge between current reality and expected outcomes."

Evidence provides pathways to innovation and catalyzes educational reform. Practitioners in CSOs also communicated that research not only helps them learn about global

best practices but provides the opportunity to adopt a creative approach towards program design. Evidence also serves as a tool to mobilize and catalyze action to achieve success in educational programs, as articulated by a practitioner below :

> When stakeholders are presented with tangible evidence of progress and success, intrinsic motivation is kindled. Whether it's the program designers, implementers or beneficiaries, witnessing the concrete impact of their efforts serves as a powerful catalyst.

The evidence demonstrated by the success of District Primary Education Program in 1994 towards universalizing access, such as improved enrolment numbers from 1980s to 2000s, especially of girls[3], gave rise to the Education Guarantee Scheme (EGS) in Madhya Pradesh in 1997. The EGS was an innovative practice that attempted to bridge inequity in the availability of primary schools in Madhya Pradesh, which is largely populated by Scheduled Tribes. The program was rooted in historical evidence of limited access to schooling; once the EGS was introduced, local communities established an average of over 40 primary schools daily in 1997 alone. This led to increased enrollment, with 42% of schools established in tribal areas and particularly benefitting girls. Such data prompted state support in terms of financing, training and infrastructure, resulting in the establishment of 26,527 EGS schools with 1.3 million students (Gopalakrishnan & Sharma, 1998). Although EGS schools addressed the challenge of access, they failed to provide quality education due to failures in contextualizing curriculum and relevant teacher training programs.

Another example of an innovation driven by evidence is the NaliKali system in schools in Karnataka. To mitigate challenges brought forth by teacher shortage at primary level and based on evidence of positive effects of play-based learning in early stages as disseminated through Rishi Valley School's Rural Extension Centre, Nali Kali was established in 1995 as a multi-grade, multi-level classroom, comprising Grades 1, 2 and 3, and continues to this day, (Periodi, 2020) exhibiting good amount of success.

Finally, *evidence in education enables stakeholders to make increasingly informed and objective choices about curriculum design, instructional techniques, assessment methods, and educational strategies and programs for specific contexts and audiences.* Such decision-making

[3] Based on figures from 1950-51 to 2010-11: Ministry of Human Resource Development, Government of India (website: http://mhrd.gov.in/statist)

can be achieved by prompting educators, policymakers, program designers and other stakeholders answer some questions such as :

1. What teaching methods are most effective in promoting student learning?
2. How does a particular educational program impact student outcomes?
3. What are the best practices for improving student engagement in school equitably?
4. Are specific educational policies achieving their intended goals?

The following examples elucidate the impact of evidence-informed decision-making in education. The Japanese Lesson Study method (Doig & Groves, 2011) is a collaborative professional development approach where teachers systematically work together to plan, teach, and reflect on a single lesson. Through observation, discussion, and refinement, educators aim to improve instructional techniques, curriculum design, and learning outcomes. This evidence-based process ensures a degree of objectivity in pedagogical decision-making, relevant to a specific classroom and subject. This method has multifold benefits; not only does it promote continuous improvement in teaching practices based on evidence, it also ensures that an optimal lesson plan is executed to promote learning.

The Early Literacy Initiative by Tata Institute of Social Sciences (TISS) is an example of a program that employs evidence-based strategies to create an engaging learning environment for young students. The evidence is generated through action research, study of local communities surrounding the school as well as historical study of literacy practices in India. It finds its theoretical framework in principles of second language acquisition (Cummins, 1981) and sociocultural theory of development (Vygotsky, 1978). The resulting practitioner briefs for language education are suitable for the multilingual and resource-deficient context of Indian classrooms, incorporating play-based activities, interactive teaching methods, library programs, mother-tongue based multilingual pedagogy and culturally relevant content. These practitioner briefs provide evidence to decide between existing practice of monolingual instruction and the recommended multilingual pedagogy.

Evidence-informed decision-making in education goes beyond pedagogical choice. For instance, Eklavya has been running community-based learning centers called Shiksha Protsahan Kendras (SPKs) for underprivileged children, particularly belonging to the scheduled tribes category in Madhya Pradesh. In a quantitative study that compares the language and math

achievement scores between SPK and non-SPK students (Eklavya, 2014) conducted over two years, it was found that the students who had access to an after-school learning center showed significantly improved scores in the post-test, particularly in language. The evidence of success of SPKs have been attributed to the collaborative nature of SPKs between Eklavya and the community, and the opportunity for students to engage in activities beyond academics. Such evidence is useful in the design and development of after-school programs.

However, can all decisions be based on evidence alone?

The Continuous and Comprehensive Evaluation (CCE) was introduced through the Right to Education Act 2009 to address student stress and examination fears. Despite a shift to child-centered education, traditional assessments failed to reflect curricular and pedagogical reforms suggested in the National Curriculum Framework 2005. Hence, CCE aimed to enable holistic development and empower teachers, parents, and students based on international research on holistic assessments (NCERT, 2019). However, CCE's practice faced challenges due to inconsistent interpretation across schools, criticism for compromising rigor, and a lack of effective teacher training. Conventional assessment practices persisted, straying from CCE's purpose (NCERT, 2020). Teachers also felt burdened by the ongoing nature of assessments.

An overview of the implementation of CCE showcases that evidence alone is insufficient for decision-making in education. In addition to evidence, decisions must be in tandem with stakeholder's preferences and values, account for practitioner's experience and be responsive to the context (Breckon, 2016). Using evidence to inform or base decisions is one among other potential sources that enable educational practice. Practitioners draw upon various forms of knowledge, including past professional and personal experiences, intuition and popular opinion to inform their practice (Malin *et. al.*, 2020). However, the reason to foreground evidence is :

1- To avoid bias - Research as a systematic process eliminates cognitive bias, i.e., the need to establish patterns to produce coherent answers. Ethical research also demands we mitigate confirmation bias, i.e., searching for answers that confirm our hypothesis (Brocken, 2016). Research that is systematically conducted has greater rigour and higher probability of containing sound evidence, thus enhancing public trust.

2- To avoid misinformation - Research evidence is typically reported in an accountable and transparent manner, thus increasing the reliability and validity of the evidence presented. Such evidence can be easily traced back to its sources and verified.

3- To generate predictable outcomes - Evidence-based decisions or practice is more likely to yield predictable outcomes as they are grounded in data and research. Minimizes risk of unexpected consequences. Avoid mistakes and build on or contextualize proven strategies. Gathering evidence in addition provides the scope to adapt one's practices or rethink decisions.

4- To identify solutions to complex problems - In addressing complex problems such as education, evidence can inform the indicators of success, as well as provide a pathway to identify the most optimal solution by weighing the pros and cons of each, objectively.

So, how does one incorporate evidence into their practice? The following section details the same.

How can Evidence-informed Practice (EIP) be implemented?

During interactions with practitioners in CSOs, similar trends were noticeable when it came to building programs or solutions. The process of research always began with a pre-test or baseline survey. This is akin to need-sensing and this forms the basis for solutions, interventions and programs. Based on data from needs analysis, the program is designed, which includes designing tools, piloting, revision and peer review. During the implementation phase continuous feedback is taken from the stakeholders. Figure 1 below illustrates this process :

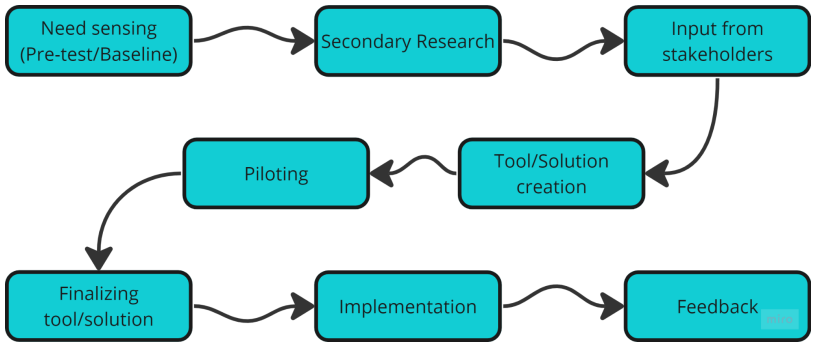

Figure 1 : Practitioner's narrative of using research in program design

When faced with the question of integrating research into the design process in the interactions with CSOs, nearly all organizations approached research as a procedural step rather than leveraging it as the foremost component to base their decisions. The CSOs conducting

secondary research to identify best practices or comprehend diverse contexts did not significantly integrate this evidence into their intervention design practice.

Implementing evidence-informed practice in education is a transformative process which hinges on rigorous research findings and empirical data. This section of the paper delves into the strategic framework required to effectively incorporate evidence-informed practices into educational contexts. Based on the Evidence-Building Framework for Education suggested by Owen *et. al.* (2022), outlined below are the steps, considerations, and guiding principles essential to realizing the full potential of evidence as a catalyst for educational reform. Although represented linearly, the process can often take a circular pathway, ie, one may return to previous phases to develop robust designs.

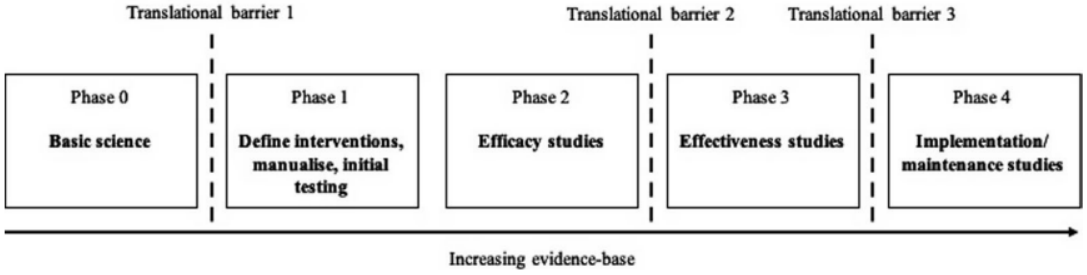

Figure 2 : The Evidence-Building Framework For Education: Conceptualising Evidence Review And Generation (Adapted From Thornicroft Et Al., 2011)

To illustrate the phases, let us take an example of a School Library Program, with the intended outcomes of developing the library infrastructure and improving literacy of students through engagement with the library.

Phase 0 *(Basic Science)* primarily entails assessing existing approaches and interventions to ascertain their logical foundation and potential promise. Practitioners (including teachers, curriculum developers, program designers etc.) conduct a critical examination of existing research, practices or programs with outcomes similar to what is intended by them to assess the current status of the interventions and/or identify areas requiring further evidence. In the case of a School Library Program, this includes critically analysing the activities, results and factors for success/failure of existing library programs, such as the Open Library at Centre for Learning, India Literacy Project, contextual research on impact of school libraries on academic achievement and so on. In this process, it is recommended that one also explore unpublished material such as dissertations or documented interventions by organizations to avoid only engaging with evidence that is generalized and/or contains synthesized data.

If a suitable approach or intervention is not available, researchers or practitioners can explore wider principles, or theories in psychology, curriculum and pedagogy, organizational theory and other disciplines that are relevant to their purpose to formulate a logical basis for a new approach/intervention. This may include exploring Krashen's arguments for "free voluntary reading" (1993), Luken's perspectives on children's literature (1999), language acquisition theories etc. Through an intensive engagement with the current evidence on school library programs, an intervention may be replicated or gaps and needs may be identified.

Phase 1 *(Designing and Planning)* involves defining, manualizing, and testing the approach/intervention. Once the evidence from other approaches/interventions or underpinning theory is found to be successful and true, practitioners begin to develop and test an approach/intervention, based on the evidence gathered from the previous phase. Here, it is important to ensure that the intended outcomes, indicator for success and the practitioner's tasks are unambiguous, that all assessments are reliable and valid, and that there is early evidence captured through the assessments to suggest that the approach/intervention will have promising results in the specific situation. Figure 3 demonstrates how Phase 1 will look like for a Library Program :

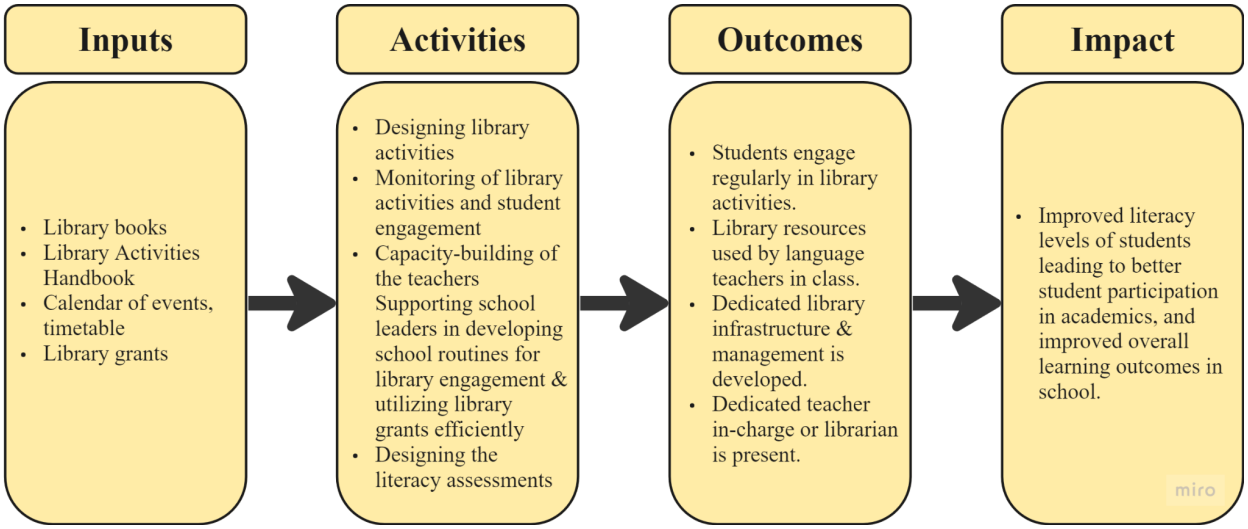

Figure 3 : Pipeline Model of a School Library Program (indicative)

Additionally, it is important to test the approach/intervention and seek feedback to support its development. This feedback can help to refine the approach/intervention and ensure that it is based on sound logic and/or promising theory. Furthermore, it is important to consider

the longevity of the efforts and to report any findings about factors that impact the outcomes and/or prevent movement between phases.

Phase 2 *(Efficacy Studies)* within the evidence-building framework is studying the approach/intervention in optimal conditions. This is not too different from scientific testing that occurs in order to examine outcomes and the factors influencing these outcomes when implemented in a controlled and ideal environment. These factors are (but not limited to) aspects of the intervention design such as the activities chosen and their implementation, which are either aiding or hindering the achievement of the outcomes. During this phase, the practitioner gathers evidence on what works and what doesn't with an approach or within the design of the intervention itself, when administered with a high level of fidelity to the design/plan as outlined in Phase 1. This evidence helps understand whether the approach/intervention yields the intended outcomes and what aspects are necessary and sufficient for the same. The practitioner then uses this evidence to better their approach/intervention. Moreover, well-structured efficacy studies can serve as a means to identify any barriers that might influence outcomes or impede the translation of research findings between different phases.

In the example of a Library Program, conditions for efficacy would involve the following:

1. School principals are invested in developing a targeted program that involves the use of libraries to improve the literacy levels among students.
2. A trained teacher in-charge or librarian is present to facilitate suggested activities (such as book talks, readers' theatre) and events (such as book fairs, book-making workshops) and undertake responsibility of library management (which includes updating books, cataloging and process of issue, return and maintenance)
3. Library infrastructure is present which includes age-appropriate and diverse books, designated reading area.
4. A library routine is established through the school's timetable and academic calender.
5. Language teachers regularly use library resources for supplementing literacy teaching-learning in the classroom.
6. All activities designed for the program are implemented as planned, and the outputs are achieved. For instance, this would mean the planned frequency of implementing library activities is achieved (eg. once a week), in the manner it has been planned.

The program designer must observe and record the quality of these efficacy factors, and delineate if they contribute to the desired outcomes (improved literacy levels), and what aspects are necessary and sufficient to do so.

Phase 3 *(Effectiveness Studies)* within the evidence-building framework for education focuses on whether an approach/intervention can produce desired outcomes in the real-world context. In such contexts, fidelity to the intervention may be less stringent, and the evidence contributing to its success may cease to be reliable. This is so as real-world settings may provide varying levels of complexities in terms of the beneficiaries' attitudes, priorities, resources available and so on. Thus, effectiveness studies are pivotal in gauging whether an approach/intervention can achieve success in diverse contexts and settings, and to delineate what conditions can be achieved in the real-world to secure the desired outcomes. Secondly, they serve as a means of comprehending the real-world factors that influence intervention outcomes, encompassing aspects like implementation fidelity, environmental conditions, and contextual variables; such evidence is useful in developing the design of the approach/intervention to make it amenable to real-world challenges and opportunities in order to secure the desired outcomes. Lastly, it informs decisions regarding post-research investment and enables comparisons across similar interventions, contributing to a more comprehensive understanding of an intervention's real-world impact.

In the case of implementing a Library Program, the real-world conditions that present itself may include and are not limited to :

1. Lack of exclusive library structure, including age-appropriate books
2. No dedicated teacher for library, and/or for language education
3. No dedicated time for students to systematically engage with library resources, or library resources are only provided for browsing during school hours intermittently
4. School principal does not recognize the value of the library in improving literacy levels of students, and/or deprioritizes the same for syllabus completion, drill methods and so on.

A library program implemented through external procurement of resources (books and librarian, as they are fundamental to the success of the program) may still yield significantly different results from the efficacy studies, due to the design of the program or the context itself, or both. Such evidence helps in reorienting aspects of the intervention that are suitable and

responsive to effect change in real-world settings. It not only helps the practitioner to establish clear correlations between their activities and outcomes, as well as provides information about the degree of replicability and generalizability of the approach/intervention.

Phase 2 and 3 can happen simultaneously or one after the other. The purpose is to test the approach/intervention in ideal and real-time situations in order to gather evidence of what works and what doesn't in the design/plan developed in Phase 1, and accordingly improve the design of the approach/intervention, before implementing it at the desired scale and contexts.

Phase 4 (Implementation, Monitoring and Evaluation) involves the implementation of the evidence-based/informed approach or intervention in real-world settings, such as schools and classrooms, and the monitoring and evaluation of its progress. During this phase, practitioners should consider the theoretical coherence, efficacy, effectiveness, cost, ease of use, and acceptability of the approach or intervention. Testing one's logic and assumptions gathered through Phases 3 and 4 must continuously be integrated into the monitoring and evaluation plan. This phase also involves listening to those who have used the approach/intervention and thinking systematically about how to mitigate and overcome any challenges. Additionally, they should consider the translational barriers that may hinder the application of findings from one phase to the next. Finally, this phase should help practitioners make better informed decisions about how to invest resources for maximum impact on the intended outcomes.

For a Library Program, there should be a clear evaluation of students' literacy outcomes before and after the intervention, and monitoring of the library activities and language classrooms in order to course correct and yield the desired outcomes. Collection and documentation of such monitoring and evaluation data which answers "What works/doesn't work?" and "Why does/doesn't it work?" to assess the intervention as well as track progress and outcomes is valuable for future programs in the same domain, geography or with the same stakeholders. Thus, the evidence generated through the intervention not only informs itself but also becomes a founding element for future educational programs and practices.

Therefore, the process of generating relevant and robust evidence, as well as, making decisions based on the same involves responding to the questions illustrated below (Figure 4):

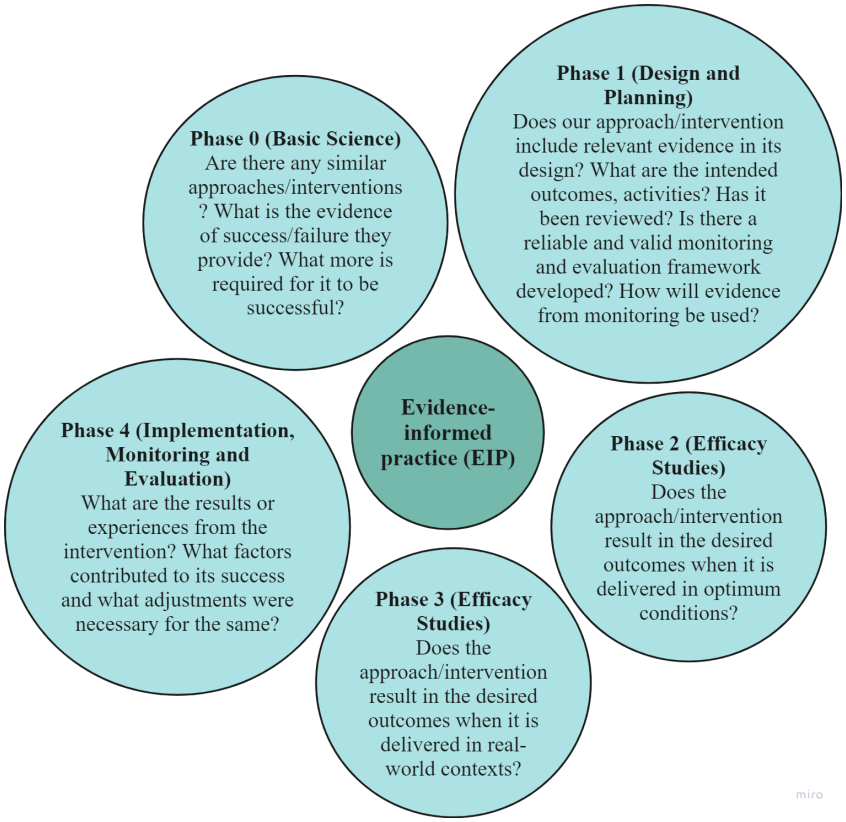

Figure 4 : Questions for a Practitioner to integrate EIP in their work

Translational barriers emerge at various phases of the process, which may impede the movement of the process from one Phase to the next. The first barrier arises after phase 0, suggesting that study results may not extend to the broader population due to potential flaws in the underlying theory. The second barrier surfaces between phases 2 and 3, signifying a disconnect between research outcomes obtained in controlled efficacy designs and their applicability in real-world settings. This relates to the transition from controlled research conditions to routine, practical scenarios. The third translational barrier emerges between phases 3 and 4, making the effective implementation of evidence into practice more challenging. It occurs when intended stakeholders fail to adopt or sustain the intervention beyond the research study, despite the intervention having a solid evidence base.

What are some factors that often limit or hinder movement from research to practice? What are some factors that influence the adoption of evidence-informed practice? The following section describes the same.

What are some enablers and disablers to Evidence-informed Practice (EIP) in education?

EIP as a strategy should replace current practices of fire-fighting when a problem arises; and provide direction to setting achievable goals, implementation strategies and mechanisms to review, document and disseminate success and failure. However, having a structure to implement evidence-informed practice is insufficient; several factors can propel or hinder this practice in education. The following diagram (Figure 5) summarizes the broad categories that determine success or failure of EIP.

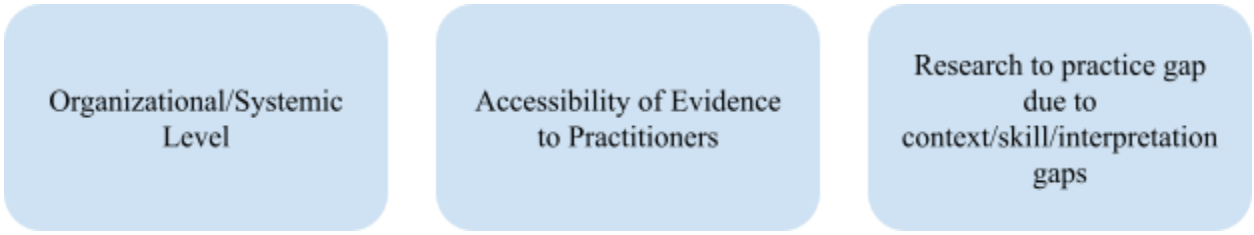

Figure 5 : Enabling and Disabling factors for EIP in education

Successful implementation hinges on the dominant culture within an organization or educational system, and on institutions that value and encourage evidence-informed practice in education. Development of favorable conditions within teams, among teams and the organization's structure, goals and policies are foundational to adopting EIP for pedagogy, programs and policies. These conditions include access to resources, time, staff, and conducive collaborations to extend the institution's capacity (be it a school or an organization working with educators or the school system itself) to develop and practice evidence in daily life. What evidence is accepted and developed into practice is also influenced by larger social and political processes such as how the institution is organized or managed, opportunity for creativity and autonomy, opportunities for healthy collaboration between decision-makers and implementers, and the accountability structures to build a systematic culture of evidence.

Educational practice is driven by socio-politically dominant perspectives on the aims of education, what should be taught and how, and what is prioritized as educational reform during a particular time and place. This can often influence the opportunity to engage with, and conduct systematic studies for evidence. For example, teacher training is often influenced by overarching state and/or national priorities at a given point of time, which may not always be suitable to local geographies and school conditions. This may hinder the implementation of context-responsive, evidence-informed pedagogy, where the evidence is generated systematically in their own

classrooms. Dominant and broad perspectives can often weaken or bias the practitioner's ability to engage critically with evidence, and make them passive recipients of generalized knowledge derived from metadata and perhaps, irrelevant research. Thus, an organizational culture of decentralized decision-making and participatory approach to educational reform can enable evidence-informed practice.

In order to make decisions and prioritize, more and better research needs to find its way into the hands of practitioners. This enables them to combine and balance evidence, professional judgment, experience and contextual factors to work towards educational goals systematically. Concomitant to this is the dissemination of evidence - accessibility, reliability, validity, possibility of replication. Accessibility refers to where (journals, newspapers, books, manuals etc) and how the evidence is disseminated (online, offline, frequency/periodicity etc) as well as the ease of language (complexity, technicality, English vs local languages) and mode of representation (articles, news, infographics, comics etc.). Often practitioners may not be aware of the available evidence because they do not have the knowledge, time or desire to read it. This highlights the importance of adopting a common approach to make the 'key messages' from research accessible and easy to interpret, including the consistent use of terminology and an explanation of key concepts.

Along with emphasizing the results and outcomes, one must report enough context to allow practitioners to draw their own conclusions about the comparative results they could expect in their own contexts (Nelson & Campbell, 2017). Practitioners must develop the capabilities to ensure a keen analysis and logical judgment to select the right evidence for their purposes. For example, in order to enable engagement and dissemination of evidence, routes to continuing professional development of teachers have been suggested in NCFTE 2009[4] which includes on-year sabbaticals for teachers to study and engage in action research, as well as provision of forums to disseminate such research (p. 68-69, NCTE, 2009). Events conducted by ResearchED in the UK prioritize grassroots engagement and provide educators with opportunities to present their research and innovative practices to a wide audience of teachers and educational professionals (Malin et. al, 2020).

The complexities and contingencies surrounding educational practice contribute to relatively weak and conditional research-practice links in education. The following conditional

[4] The National Curriculum Framework for Teacher Education (NCFTE) 2009 is a draft created by the Government of India to propose changes and updates required in the National Council for Teacher Education.

factors make it challenging to establish a unified body of research informing interventions or program design.

1. Lack of collaboration between researchers, educators, and institutions widens the gap between research and practice. Some practitioners believe that research does not directly translate into their context—particularly if their geography or demography differ significantly from the research context. Without effective mechanisms for knowledge exchange and dialogue, valuable insights remain underutilized.
2. Time and resource constraints restrict the stakeholders' ability to engage deeply with research and implement evidence-informed practices. Scarce resources, both in terms of funding and access to research materials, can hinder stakeholders from accessing the wealth of knowledge available.
3. Incentivizing practitioners to actively engage with evidence can be another factor influencing evidence translation to practice. Without proper motivation, they may not find it compelling to invest time and effort in integrating research findings into their work. The establishment of incentives that recognize and appreciate evidence-based practices is crucial for driving change.
4. The inherent complexity of conducting research systematically poses a significant challenge. Practitioners must navigate research methodologies, data analysis, and interpretation—an endeavor that often requires specialized skills and training. This complexity can be a barrier to the widespread adoption of evidence-informed practices.
5. Resistance to change within organizations can be a formidable obstacle. Overcoming this resistance necessitates a shift in culture towards a more open and adaptive approach to educational reform and practice.

By recognizing the time and resource constraints, fostering collaboration, offering incentives for research engagement, simplifying research processes, and negotiating with resistance to change, the education community can forge a more harmonious and productive relationship between research and practice.

Conclusion

Evidence in education is a powerful tool that has the potential to transform educational theory and practice, the impact of which is evident through numerous examples in educational initiatives in India and worldwide. It offers a systematic, objective, and explicit foundation upon which decisions about curriculum design, instructional techniques, assessment methods, and educational strategies and programs can be made. The process of implementing evidence-informed practices, as highlighted through practitioner experiences and the Evidence-Building Framework for Education, underscores the importance of rigorous research, data-driven decision-making, and the continuous feedback loop between research and practice. An evidence-informed approach encourages higher quality decision-making, develops expertise and ensures implementation of effective and sustainable practices in these fields.

However, it is important to acknowledge that while evidence plays a crucial role in shaping education, it cannot stand alone. Decisions in education must also consider stakeholders' preferences, values, practitioner experience, and the unique context of each educational setting. Evidence should complement these factors rather than replace them. Additionally, schools, education systems and organizations working on educational problems must be acutely cognizant of external factors and barriers in engaging in evidence-informed practice, and strive to mitigate its effect on the process. This can be achieved by improving our understanding of evidence's role in educational practice collectively, and a commitment to foster a culture of evidence-informed decision-making within schools, school systems and various organizations. By embracing evidence-informed practices, education systems can better address the needs of diverse learners and schools, improve educational outcomes, and ultimately contribute to the development of more effective and equitable education systems.

Going forward, the next steps in the exploration of evidence in education should focus on three key areas:

1. Enhanced Research and Data Collection : Education systems should prioritize the collection of high-quality, relevant data to inform evidence-based decision-making. This includes conducting rigorous research studies, monitoring program effectiveness, and regularly evaluating the impact of educational initiatives.
2. Capability-Building and Professional Development : Practitioners should be equipped with the skills and knowledge to interpret and apply evidence effectively in their work.

For instance, teacher training should emphasize evidence-based teaching practices. Professional development of program designers should develop the research acumen required to adapt their everyday activities, based on evidence gathered through their own practice and initiatives.

3. Policy and Program Evaluation : Policymakers should continue to use evidence as a guiding principle in the development and assessment of education policies and programs. Regular evaluations should be conducted to determine whether initiatives are achieving their intended goals, to identify areas for improvement as well as to analyze the reasons for success and failure of these initiatives.

In conclusion, evidence in education is a valuable tool that can drive positive change and innovation in the field. It is imperative that educators, policymakers, researchers, and practitioners work collaboratively to bridge the gap between research and practice in education. By integrating evidence into program design, promoting research-based decision-making, and fostering a culture of evidence-informed practice, we can create educational systems that are more effective, equitable, and responsive to the diverse needs of learners. Evidence serves as the foundation upon which we can build a brighter future for education, one that empowers students, enriches teaching practices, and ultimately contributes to the betterment of society as a whole.

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