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DEVELOPING THE CONDITIONS FOR DATA DRIVEN CHANGE TO IMPACT STUDENT ACHIEVEMENT AND BUILD TEACHER CAPACITY

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Abstract

Schools have been caught up in responding to the calls of external accountability. This has challenged school leaders to establish data gathering practices that ultimately lend themselves to creating school wide instructional systems to impact teaching and learning and offer a consistent instructional approach. This paper outlines how one school established a data driven approach to improve teacher performance by focusing on key elements using a literature focused approach as a catalyst for driving new innovation. The paper considers how a data driven focus (DDF) allows leaders to intentionally and systematically improve student learning. The paper begins by unpacking the new focus on instructional leadership. It unveils how leaders are required to create the foundation to develop a DDF as a vehicle to facilitate information about student achievement within the school. The second part of the paper reports on the change process used to implement DDF as guided by key elements. It entails a 6-step cycle involving 1) developing a desire for change, 2) reflection on data, 3) aligning school programs & curricula, 4) Understanding by Design instructional practices and professional development, 5) provision of feedback, and 6)

nurturing teacher implementation. It reviews how one school, through the focus of improving instruction and intentionally using key literature-based concepts, developed a raised awareness for using curriculum and assessment data to guide decision making. This paper provides a rich example of how a school can facilitate and sustain a data-based decision-making culture in schools. The paper concludes that being a data-focused school is a possibility for each and every school.

Keywords

Data Driven Change, Teacher Development, School Leadership, School Improvement, Research Guided

1. Introduction

Schooling around the world has seen the public arena call for more accountability and transparency on student learning. This has been influenced by the rise of international league tables which has challenged educational systems to become more evidenced based in their strategic planning and decision making. Such moves have put the spotlight on teacher performance and, possibly more importantly, what schools are doing that leads to significant school improvement.

An increasing number of studies (Sims, 2016; Lee, & Reeves, 2012; Rustique-Forrester, 2005; Diamond & Spillane, 2004) have been reporting that high-stakes approach to accountability have led to a narrowing of the curriculum and instructional dynamics. Furthermore, there is the marginalization of low-performing students, and a climate perceived by teachers to be less tolerant of students with lower academic levels and presenting with behavioral difficulties. While the aim of school accountability policies is to ensure every student receives high quality instruction and attains high levels of achievement, the consequence of such policies is a narrowing of the teaching and learning.

Recent research (Piyaman, Hallinger, & Viseshsiri, 2017; Christensen & Lægreid, 2015) has been investigating differences in school organization processes associated with learning-centered leadership as a means to counteract the debilitating impact of increased accountability measures. With principals and school leaders under pressure to not only lead schools but also ensure high student achievement, the spotlight on best practice in raising attainment is beginning to shine more brightly.

During this era of high-stakes accountability in education, the need for accurately understanding student, teacher, and school data is of utmost importance. However, although schools are flush with data, the challenge for school leaders is being able to properly interpret and use the data for improving student (and teacher) learning (Valli & Buese, 2007).

2. The Role of the School Principal

In his text, Rethinking Leadership, Sergiovanni (2007) offers a critique on the complexity of leading schools and professes that schools need special leadership given the diverse roles principals must take on to effect school improvement. He draws a parallel between the principal and an architect. Like the architect who has to draw blueprints by scrutinising the many dimensions and regulations that go into developing buildings (eg electricity, sewerage, fire, construction materials, plumbing) the principal must:

- be able to forward plan and create strategic plans,
- make decisions about priorities of the school,
- understand how to use data and (most importantly) help teachers understand the data, and
- focus on purpose of the school in order to prepare students for career pathways after graduating from school

It is the third dot point that is of interest to this study. Just as the architect relies on the performance of the various teams in order to achieve building success, the adoption of principal as lead learner (Kelley & Peterson, 2007) is needed to help his/her teams build a quality curriculum, instructional and assessment practices. The principal needs to draw the school teams together to analyse the data to help make quality decisions.

While it goes without saying, school principals are pivotal in building and fostering a data driven decision making culture. Numerous studies (Mandinach & Honey, 2008; Young, 2006; Wayman, Stringfield, & Yakimowski, 2004; Diamond & Spillane, 2004) indicate a principal's importance in this arena can be categorised into a number of key priorities:

1. Setting the goals for data use within school,
2. Outlining the vision for the need of data driven decision making (DDDM),
3. Establishing distributed leadership for DDDM to take hold throughout the school,
4. Modeling effective data use and in enabling teachers to use technology to record and track data,

5. Providing ongoing learning opportunities for teachers to discuss and analyze their students' data, and
6. Ensure professional development and teacher collaboration time is 'protected and focused on data use.

3. Sustaining School Improvement

However, adopting the principal position as a leader learner is not sufficient and is only part of the equation. Aligned with the challenges of how to improve schools is the additional challenge of sustaining improvement. The call for sustainability, which depends upon a school's internal capacity to maintain and support the work of teachers, is gathering momentum. Sustaining student improvement is achieved through capacity building and preparing teachers themselves to lead innovation and development (Harris, 2002). This supports the inference that, the significant purpose of leadership distribution is in generating and sustaining improvement in schools.

Sustaining school improvement requires the leadership capacity of many staff members in the school in contrast to the traditional view of leadership where only a few appointed people lead (or manage the work of those below them). For developing such leadership capacity, there is anecdotal evidence that specific factors are necessary. Teacher commitment is a major contribution to improving the quality of teaching (Hargreaves & Fullan, 2012). It is suggested that analysing the work function of teachers is the first step to introducing strategic structural change and improvement.

Analysing work functions of teachers and developing leadership structures are crucial as research highlights the effects of economic rationalism and government pressures now placed upon schools. School leaders are required to address different forms of accountability and address the external expectations placed on the school. If the promotion of student learning is the core mission of schools, developing successful structures to reach high learning goals is incumbent upon all members of the school community.

Katzenmeyer & Moller's (2001) research on teacher leadership, an emerging trend in the study of leadership, looks beyond the principal toward teachers who are, either consciously or unconsciously, taking on leadership roles in schools. Many teachers, by collecting information about what goes on in their classrooms, and by analysing and evaluating this information, identify

and explore the impact of their own teaching practices. Acting on this then leads to changes and improvements in their teaching.

4. The Rise of the Instructional Leader

While the teacher is the biggest influence of student achievement within the school (Hattie, 2012; Marzano, 2012), it is the responsibility of the school leaders to establish the working conditions and organisation structures to help support the teacher. In some circles this focus on instructional leadership is gaining momentum.

The rise of the principal as instructional leader began with school principals assuming a more targeted instructional role across the school (Marks & Printy, 2003). An initial step in this has been the engaging of teachers in focused (teaching and learning) tasks. More than simply directing teachers, the principal is actively involved in conducting ongoing walk-throughs and formal classroom observations. Add to this the engaging in dialogue with teachers and prividing feedback about successful (and unsuccessful) instructional strategies and the provision of teacher development, the resulting impact on student outcomes is well documented (Lynch, Madden & Knight, 2014).

As schools become more "evidenced based" the role of leaders is becoming more fixated on data, and its analysis. Although, responding to student achievement data is becoming a key indicator of school quality it is only part of the instructional role of the principal. Hallinger (1983) introduced the Principal Instructional Management Rating Scale (PIMRS) comprising of 50 statements on principal instructional leadership behaviours. These statements are categorised into three key dimensions; defining the school mission, managing the instructional program and developing the school learning climate.

However, in recent times, Robinson, Lloyd and Rowe (2008) found that the impact of instructional leadership was up to four times greater than that of transformational leadership. However, given that school leadership is a difficult concept to define, the term "leadership for learning" has an eclectic tone and includes features of instructional leadership, transformational leadership, and distributed leadership. Thus, leadership for learning relies upon a broader distribution of school leadership practices (Robinson et al, 2008). With the complexity of school life, the principal needs the support of a team (of leaders) to achieve the school's vision. The

question asked by principals of their colleagues in high performing schools is typically around "how do we do it".

5. Data Driven Focus

In an era of information being at our fingertips through an explosion in assistive technologies, schools have struggled to harness and interpret the vast amount of information gathered. (Goren, 2010; Shen & Cooley, 2008; Shirley & Hargreaves, 2006). Moreover, as Shen & Cooley (2008) illustrate, many teachers do not have the necessary knowledge and skills to engage in data-driven decision making that supports their teaching and learning. Helen Timperley (2009) states:

> "For teachers to respond to student learning needs they need detailed information about what their students know and can do through high-quality assessment data, but they also need opportunities to develop their knowledge as they delve into assessment information"

Consequently, teachers who are data driven, utilise multiple measures when assessing school and student success. They are able to articulate the five key components of effective data-driven education (Marsh & Farrell, 2015). These elements interact to enhance student learning and to inform teacher practice. The five major elements of data-driven instruction, while self-explanatory are not linear in their implementation. These elements interact to enhance student learning and to inform teacher practice. They are:

- having good baseline data to begin the "thinking" about building student (and school) improvement plans,
- designing measurable instructional goals to impact learning,
- undertaking frequent formative assessment to keep the teacher updated in student progress towards the learning goals (and to re-teach as necessary),
- participation in professional learning communities to discuss student data and to moderate both work samples and instructional techniques, and
- providing focused instructional interventions to meet the specific needs of each individual student.

Implementing a DDDM framework builds a pathway to meet the ever-increasing accountability expectations for improving student achievement.

6. Professional Development

The purpose of professional development is to improve knowledge and skills in order to facilitate individual and school wide improvements. For teachers and school leaders to be as effective as possible, they need to continually expand their knowledge and skills to implement the best educational practices. At the centre of this intent is increasing student outcomes both in the academic and non-academic arenas.

However, while the expectation placed upon schools to raise student attainment standards is increasing, it is also evident that teachers do not have the appropriate skill set nor the mindset to tackle a data collection, analysis and implementing informed decision making instructional practices (Halverson, Grigg, Prichett & Thomas, 2007). To support teachers, the provision of targeted job embedded professional development is seen as a more effective means of supporting teacher development. More specifically, job-embedded professional development (JEPD) refers to teacher learning that is grounded in day-to-day teaching practice (Hunzicker, 2012). JEPD is crafted by school leaders (and teachers themselves) to enhance content-specific instructional practices. The heart of JEPD is the work of teachers identifying, assessing and developing solutions for authentic and immediate problems of practice as part of a cycle of continuous improvement (Hirsch, 2009).

7. School Context

The school has a 25-year history beginning as an Elementary school in a previous location. With the move to a new site, the introduction of Middle school followed and in the last two years has introduced Grades Nine and Ten. The final two years of school (Grade 11 and Grade 12) will be registered over the next two years. The School is an inclusive school and the majority of students enter school life below expected standards across most grades but make good progress relative to their starting point.

Students come to school from not only the local area but also from neighbouring suburbs. The school has increased its population by 41% since 2016 with approximately half the students travelling past closer schools, crossing suburbs to attend the school. There is a strong demand for KG1 (first year of school). The school population is predominantly Emirati.

While the enrolment is considered large for a (current) K-10 school, the school prides itself on having a ‘small school’ feel. The school is organised into learning communities based on the

American curriculum. With Elementary (K-5) Middle School (6-8) and High School (9-12) being the three sections. The school aims to engage students in learning communities with a focus on personalised learning.

8. Staff Diversity

Teachers at the school come from over 20 different countries, ranging from 3 years to 30 years of teaching experience. A majority of the teaching staff hold a Bachelor's Degree (84%) while 15% hold a Masters Degree and 1% have a doctoral qualification. While the school is an English speaking school, UAE Ministry of Education mandated subjects (Arabic, Islamic Studies and UAE Social Studies) are taught by Arabic speaking staff. Some members of the Arabic faculty have very limited English.

Initial teacher performance measures, including formal appraisals, highlighted a diverse approach to instruction in classrooms.

9. Research Questions

The focus of this paper is the impact of an educational change process leading to the developing of a data driven decision making culture. The following questions guided the development of the data driven decision making framework for the school:

1. How does the school leadership, in using literature, develop a culture of using data to drive instructional practices?
2. To what extent do teachers use the data gathered on their classroom delivery to make improvement in their teaching practice.

These questions were addressed using case study data from the K-12 international school. This case study data was collected within the school over a three-year period from 2017-2019. Interviews with the school leadership team and 40 teachers from Kindergarten, Elementary and Middle/High School in a combination of interviews and focus groups were held. In addition, the observation of classrooms and the observation of grade/subject level meetings focused on data use was embarked upon in order to collect data to triangulate findings. This was followed by classroom observations of visible learning taking place, the teachers' use of differentiation, instructional approach, how the teachers organised their classrooms for learning and how they engaged with students. Finally, the analysis of school-based documents pertinent to the study was undertaken.

10. Building a framework for DDF

As a new principal appointed to a rapidly growing school, initial observations and walkthroughs yielded some startling data around teaching practices. Subsequent professional development on instructional design and lesson delivery instituted the school's pedagogical framework for teaching and learning at the school known as "the 8 elements of an effective lesson". The school, in taking this reflective notion further, has instituted a Teacher as Researcher/Reflective learner (TAR) program to interrogate instructional practices across the school.

The problem is nested in the lack of skills teachers have in this area of inquiry learning. Given that many teachers, particularly those that have completed their undergraduate studies over five years ago, have not had much engagement or professional development in this arena, school leaders have to intervene and meet teacher needs. Which leads me to our overarching research question? How does a school develop the conditions to effectively use DDDM to enhance teacher performance?

Given that the role of the school leader is to develop and sustain school structures and cultures that foster individual and group learning (Bulach & Lunenburg, 2008; Lunenburg & Ornstein, 2008), creating a framework where the focus on instructional data could flourish became a priority for school leadership. The consequence of this priority was the establishment of an environment in which new data from information and instructional practices can be discussed, promulgated and evaluated.

As demonstrated in Figure 1, culminating from the study, rose the data-driven instructional program. This framework unveiled six logistical functions: 1) developing a desire for change, 2) reflection on data, 3) aligning school programs & curricula, 4) Understanding by Design instructional practices and professional development, 5) provision of feedback, and 6) nurturing teacher implementation. The school principal, senior leaders and teachers integrated these functions to turn student data into informed decision making for teaching and learning.

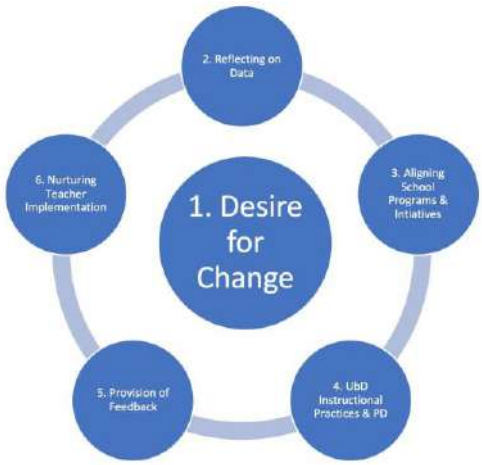

Figure 1: *Relationship between Key Elements*

Let's briefly unpack each of the elements:

10.1 Developing a Desire for Change

This study highlighted that change can only be successful if staff not only accept it but rather initiate and embrace it. There is plenty of evidence that concludes that imposed change from the hierarchy is often unsustainable, with teachers continuing to "keep doing what they've always been doing". Resistance and obstruction to change will occur if leaders are unable to bring teachers along with them.

At the School, there were three intentional processes undertaken to help create the desire for change:

- *Developing an understanding of the nature of the proposed change:* Teachers were immersed with clear rational, evidenced by school wide data and were given time to reflect on how proposed initiatives would impact them.
- *Supporting the educational context where the change will take place:* Knowing that teachers need to have "buy in" to ensure effectiveness and sustainability of the change, leadership ensured the school facilities supported the changes. This included provision of targeted learning resources, rearrangement of learning spaces and the purchase of appropriate furniture.
- *Addressing individual teacher circumstances:* Each teacher is unique and has their own professional (and personal) nuances that impact upon how they perceive the change initiatives. Teachers reported that addressing, (or more precisely, removing)

> obstacles and barriers was seen as an important part of helping teachers understand and then accept the change. Whether it be from providing flexible timetables to providing different nursing hour options or from offering improved remuneration packages to changing teaching workloads; addressing teachers' personal motivational attitudes was key to helping build staff "buy in".

These elements resonate with the work undertaken by Lynch & Smith (2016), Lynch, Smith & Menter, (2016) and Lynch, Smith, Provost, Yeigh & Turner (2017). Practical implementation of this work was introduced at the School. Noting that most schools focus on implementation of new programs and initiatives as the first step to introducing educational change, this study supports the findings that greater success can be achieved when the principal establishes a 'readiness for change' culture as the beginning point (Madden, 2017).

10.2 Reflection on Data

The purpose for gathering data is to analyse and to use the analysis to make the best-informed educational decisions for student learning. While schools have collected and stored student data for many years researchers contend that the use of data to inform and improve educational practice is not the norm in schools. Furthermore, researchers argue that a major obstacle to using student data lies in the technical domain (Wayman, Stringfield, & Yakimowski, 2004). The adage that schools are data rich, but information poor is based on the premise that data is generally stored in schools in ways that are not accessible to teachers.

Results from this study highlight that as teachers reflect on their practice, they are more focused on collecting and storing their own data. With improvement in technology and the accessibility of data collecting apps (eg See Saw, Edmodo, Kahoot, various classroom observation software) teachers are being more precise in what they are collecting and sharing.

Key questions used by teachers in this study are:

- What data do I need to inform progress & attainment?
- How reliable is the data I'm gathering?
- How will the data be analysed?

The drive here was to engage the teacher in reflection and to question their impact on the learning agenda. However, teachers needed to develop the linkage between what data is needed and where to get it from.

10.3 Aligning School Programs & Curricula

This study identified the important role of aligning the curriculum (although complex and time-consuming), requires the cooperation and collaboration of teachers. It was important to teachers that the collection of student data guided the school's scope and sequence of learning for each subject.

In undertaking curriculum alignment across all grades, teachers had to formally evaluate the quality of the scope and sequence of learning to address the changing needs of students and the workforce. Teachers collaborated to develop the curriculum to ensure there were no gaps that might inhibit student attainment.

In this process, teachers reported that what mattered most to them was feedback on student work and the provision of regular assessments (for checking for understanding). Data gathered by subject heads helped critique the learning programs.

The undertaking of curriculum alignment also provided key data on what teachers were (or were not) planning. It was found that in some grade levels the coverage of curriculum standards was below par and needed attention. Further analysis led to the development of targeted teacher directed professional development.

10.4 Understanding by Design Instructional Practices and Professional Development

In order to improve student learning, the premise that effective professional development for teachers needs to (as stated above) relate directly to classroom practice in order to develop "buy in" teachers. Given that the teacher is the most important influence on student achievement at school (Hattie, 2012), improved teacher learning should equate to improved student learning.

Reframing teacher planning through the notion of Covey's (2004) habit "Begin with the End in Mind", the focus on the principles of Wiggins, Wiggins & McTighe's Understanding by Design (2005) lead to the re-creation of teacher lesson plans. Underpinned by the school's "8 Elements of an Effective Lesson" framework, an online teacher "Google Classroom" approach was instituted. Staff undertook a series of workshops aimed at upskilling their instructional practices.

This integrated job embedded professional learning enterprise has moved the School away from the one-off workshop experience. With the provision of targeted online courses built specifically to support teachers in understanding school expectations (eg lesson delivery and curriculum planning) engagement in teacher professional learning has increased.

10.5 Provision of Feedback

Formal teacher appraisal, informal classroom walkthroughs and even peer to peer conversations inherently provide feedback to teachers on performance matters (Marzano, 2012). Selection of key teaching strategies based upon data gained from formative and summative assessment tasks, trial and error in student engagement strategies and listening to student voice offer the teacher reflection fodder to make informed teaching and learning decisions.

Building a formalised feedback framework at the school yielded some key consequences. The school was able to collect trend data around the instructional practices of the teachers which lead to targeted job embedded professional development for teachers. Additionally, one of the key aspects of the focus on providing teacher feedback on instructional performances was the dialogue on best practices and supporting teachers to align their own practice. The consequence of the dialogue included teachers being more prepared in order to be observed by their peers, lessons were pitched at higher levels and teachers, over time developed new teaching strategies. It also helped focus the establishment of the professional learning communities' concept.

In this study, teachers not only self-reported improvement in the teaching practices after acting upon the feedback provided but also noted improvement in student benchmark scores in English and Maths.

Incidentally, from a student perspective, the student lesson survey responses indicated a majority of students (75%) claimed that having a one-on-one meeting with the teacher was the most effective means of receiving feedback as opposed to reading comments in copybooks (8%) or whole of class overview (3%). This resonates with a study by Montgomery & Baker (2007) on the impact of teacher-written feedback and the perceptions of students.

10.6 Nurturing Teacher Implementation

Supporting teachers to use data to inform instructional practice is an ongoing task for the school leader. Teachers reported they became more proficient at differentiating their instruction and using student data to careful craft learning plans for the students when they had to meet regularly with their grade groups. In essence this is the building of teacher professional learning communities.

As purported by Hargreaves & Fullan (2012), schools need to ensure the focus on the three capitals (social, human and decisional) through various personalised professional learning plans, reward/affirmation strategies and the opportunities for teachers to take risks in their teaching. To

often the school improvement focus of schools is on the provision of continuous professional development and training (human capital). However, this study demonstrates that to impact school improvement, you need to encourage people to work together, discuss and share ideas from the professional development (in essence build the social capital), and then, choosing the relevant and appropriate teaching strategies (decisional capital) to impact student learning.

11. Conclusion

School based research of this scale are important for the wider educational fraternity. With the continued push for more data focused decision making in initiating school improvement, school leaders need to develop and then foster the conditions that will enable teachers to teach effectively. Given the right tools in a timely manner coupled with the content knowledge and pedagogical expertise, this paper has shown that schools focused on whole of school implementation can have significant impact on student achievement.

11.1 Research Limitations

However, the findings of this study have to be seen in light of some limitations. This has been a single school and there could be concerns on the size of the sample and caution may need to be taken to the extent to which the findings can be generalised beyond this one school.

The second limitation stems from this study's use of purposive sampling (Merriam, 1998). Not all teachers from the school participated in the "Teacher as Researcher program. Only the teachers actively involved in the program were chosen for the interview process.

11.2 Study Overview

This paper outlined the impact of a school's leadership team's reflective practices on establishing a data driven decision making culture in an international school. Arguably effective data use enables a school to understand its effectiveness, pinpoint successes and challenges, identify areas of improvement, and help evaluate the effectiveness of its programs and instructional practices.

However, teachers who regularly participated in the Teacher as Researcher Program, used the data gathered and wrote about their experiences, made measurable improvements in their teaching practices and students became the beneficiaries of their ongoing expertise.

The setting up of a framework, entrenched in literature rich research, enabled a school wide approach to improving teacher performance. The fact that many teachers at the school are engaged in action research, this study concurs with Hattie's (2008, p 251) statement that:

> *"..innovation occurs when the teacher makes a deliberate action (not necessarily new) method of teaching, curriculum, or strategy that is different from what he or she is currently using".*

Through the use of data informed practices where teachers take ownership of data collection and analysis and refine their teaching practices improved student learning occurs. As evidenced in this study, teachers who take deliberate action to engage in data driven decision making, are provided with timely and appropriate professional learning, are offered regular feedback on their practice and nurtured throughout their learning journey tend to improve their instruction and raise student attainment levels.

A data driven mindset builds a teachers' capacity to meet the learning needs for each individual student. Inherent in building a model for using data as a change mechanism to improve instructional practice, is the need to include guidelines for goal-setting, implementation, assessment, analysis and feedback. As written elsewhere (see Madden, 2012) for this to occur, a distributed teacher leadership focus is required to enable the above foundational stones to be put into structures that move from testing students to influencing teacher instructional practice. This paper offers a proven framework for schools wishing to create a culture of data decision making to not only guide instructional practices but ultimately lead to improved student outcomes.

11.3 Scope of Future Research

As found in this study, improving school performance through the provision of targeted conditions enhanced the intentional use of a research-based data decision making framework. Given the findings of this study and its relevance to school leaders globally, the following recommendations for further research are offered.

- This study focused on one school's approach. Upscaling the model across a system of schools would provide greater insight into not only school improvement but the intentional decision-making processes used would enhance the finding of this study.
- Continued research is warranted in the field of data collection and analysis as a means to improve the teaching process. Focusing on instructional practice and the

role senior leaders take in developing the capability of teachers to undertake DDDM is needed.

- It is important for school leaders to understand how the school environment impacts school improvement and in turn, support student learning. Further research into environmental conditions and their impacts on teacher performance would be beneficial.

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