

Article

A Designed Framework for Delivering Systems Thinking Skills to Small Business Managers

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Abstract: Many small businesses suffer from inadequate management skills which can lead to poor business performance and unsustainable businesses. Research to date has focused on traditional skills such as communication, time management and people skills, yet critically many business managers have no systems thinking skills. This paper presents a framework targeted at delivering systems thinking skills to managers of small businesses utilizing some key characteristic of small business managers. The design is also based on a systems analysis and guided by both adult learning theory and teaching theory. The quality of a training framework depends on the quality of the content design and the right training delivery methods. The systems thinking skills training framework structured systems thinking knowledge into three modules in order to meet the needs of different levels of managers. The framework advocates blended training delivery methods and it also presents possible pitfalls based on training experiences. Additionally, the framework incorporates a continuous improvement process for ongoing systemic improvement.

Keywords: small business manager; systems thinking; adult learning; systemic structure; mental model

1. Introduction

Small businesses make a significant contribution to the economic and social wellbeing of a society. For this reason, small businesses are often regarded as the backbone of the economy in many countries [1–3]. However, the small business sector continues to be plagued by relatively high failure rates and poor performance levels caused by the highly complex and dynamic business environment [1,3,4]. If a business is to achieve its desired outcomes and be sustainable in the long term, the dynamic complexity of business environment has to be successfully understood and addressed. The complexity of the business environment is not only due to multi-stakeholder involvement but also caused by the challenges from accelerating economic, technological, social, and environmental change, that require business managers to be equipped with systems thinking skills to effectively address these dynamic complexities [5–10]. For instance, in Sterman's view, effective business decision making and learning in a world of growing dynamic complexity requires business managers to be equipped with systems thinking skills to understand how the structure of complex systems creates their behaviour [8]. Unfortunately, empirical evidence suggests that the majority of business managers do not have systems thinking skills [11,12]. This is simply because our conventional education system, including schools and universities, has been focusing on teaching the traditional thinking skills of linear analysis [12]. Faced with such a dynamic and complex business environment large businesses are generally in a much better position to adapt themselves to the challenges compared to small businesses, since large businesses usually have both specialized management teams and access to the necessary resources.

There is a clear trend showing that an increasing number of universities and schools have started to provide systems thinking courses (Please also refer to other papers in this special issue) yet the capacities for such formal training are far from sufficient [13]. However, there are very limited programs that suit or which are designed for small business managers. In our experience, many of the available systems thinking workshops and seminars for business managers are generally designed to solve specific problems and mainly target large businesses able to pay for the training. Our experiences from working closely with small businesses primarily in agricultural and service industries in Australia further supports the severe lack of systems thinking skills among small business managers. When provided with a brief introduction to systems thinking, small business managers quickly recognized the value this brings in the management of their business. This need for systems thinking and the recognition of its usefulness by managers provided the inspiration and motivation to design a framework to deliver systems thinking knowledge and skills specifically targeting small business managers. The involvement by some of the authors in bidding for the establishment of a Cooperative Research Centre for Managing Complex Projects and Programs in Australia has also provided further momentum to design this framework which will be implemented in the succeeding projects. The design of this framework was based on the authors' personal experiences through teaching and research, as well as their knowledge in the systems thinking and system dynamics area.

2. Different Types of Management Issues Faced by Small Businesses

The paper starts with the examination of some of the common issues that many small businesses face. This is done through the analysis of the hypothetical business scenarios presented below.

- Scenario 1: A rental real estate agent focuses mainly on attaining more properties that he/she can manage but cares little about the interests of the tenants.
- Scenario 2: Shops invest far more on sales marketing while spending little on after sale service.
- Scenario 3: Within a team, it is not uncommon for the team leader to favour some of the team members while overlooking some of the other members of the team.
- Scenario 4: A price war between two shops can lead to negative business performance for both.
- Scenario 5: It is extremely hard for a shop to keep steady stock levels for a certain product due to differing sales from day to day.

While there are many similar cases that could be used, these five cases demonstrate some of the common issues that small businesses are facing.

By using a systems thinking approach to analyse these scenarios we can easily identify that the problem in Scenarios 1 and 2 originate from small business managers' lack of holistic thinking when it comes to their business operation and management or their failure to truly understand the boundaries of their business systems. For example, in Scenario 1, the real estate agent does not realise how the unhappy tenants affect his/her business performance in the long run. Similarly, in Scenario 2, the shop manager does not recognise how the after sales service quality could affect his/her business performance in the long run.

There are commonalities among Scenarios 3, 4 and 5 which require systems tools to understand and structure the causes of these issues. However, Scenarios 3 and 4 can be addressed by using qualitative modelling techniques.

For example, the root causes can be identified through modelling using causal loop diagrams. Scenario 3 can be clearly explained by using the systems archetype of "success to the successful" while Scenario 4 can be effectively examined with the systems archetype of "escalation" [10]. When it comes to Scenario 5, qualitative systems modelling techniques will not help as much but instead quantitative systems modelling tools can be utilised.

In fact, these five examples can be categorized into three levels of typical business issues that small businesses are experiencing.

- The first level can be addressed by forming a holistic view and gaining basic knowledge of the systems nature (Scenarios 1 and 2).
- The second level of issues is more complex and addressing them requires not only a holistic view but systems tools to structure the issues (Scenarios 3 and 4). However, qualitative systems modelling tools are sufficient.
- Scenario 5 belongs to the third level of issues which is the most complex and requires quantitative systems modelling tools to unravel their dynamics and complexities.

3. The Design of the Framework

The design of a systems thinking knowledge delivery framework itself also uses a systems thinking approach [5]. A system analysis on the systems thinking knowledge delivery framework has been conducted which involved the key steps of identifying the key stakeholders, understanding the interactions among identified stakeholders, understanding the systemic structure and how different factors affect the system dynamics and system behaviour [5]. In this case, key stakeholders are mainly

the designers of this framework, the knowledge recipients which are the small business managers, and the trainers who will deliver the systems thinking knowledge to the recipients. Interactions among these key stakeholders are mainly through the teaching, learning and assessment activities.

The design of a systems thinking delivery framework has taken the characteristics of small business managers into full consideration [4,14]. First of all, small business managers are commonly adult learners, thus the design process has been fully guided by adult learning theory [15]. It is understood that adult learners have characteristics that set them apart from “traditional” school or college learners. They come to courses with a range of experiences, both in terms of their working life and educational backgrounds and this impacts how and why they participate in learning. There is also an emphasis on structuring the systems thinking knowledge in the content design section [2]. Accordingly, the systems thinking skill delivery framework has the following characteristics.

- (1) *Packaging systems thinking knowledge across different modules.* By structuring systems thinking knowledge into three modules, different levels of needs as well as different educational backgrounds can be better catered for to suit learners.

In this case, systems thinking knowledge is modularized into three levels which are in line with the identified three types of business issues. The modularisation of systems thinking knowledge is also conducive to the effectiveness of teaching and learning flexibility [16,17]. The need to modularize systems thinking knowledge is also supported by our research experiences. For example, one small business manager acclaimed that the most important innovation that happened in his business was attributed to a workshop which enabled him to see the business with a holistic view, which is to say a deeper understanding of the interactions between system components and system behaviours enabled him to manage his business in a more sustainable way. Similarly, we also came across business managers who possessed a systems view but who preferred to suffer a tentative heavy financial loss in order to achieve a healthy farm condition for sustainable business. In contrast, we have also come across businesses developed for short term financial gain but who jeopardize the sustainability of their business in the long run [18]. All these cases made us firmly believe that a model of systems thinking knowledge which enable small business managers to form a holistic view of their business is absolutely essential. As will be further explained in the later sections, because humans often lack the capability and inclination to deal with complexity, appropriate tools are needed to facilitate thinking to successfully address complexity and dynamic business issues [19]. Thus, two levels of systems thinking knowledge were aimed to address business issues with different levels of complexity and dynamics.

- (2) *Course content aimed at practical knowledge.* Considering small business managers have abundant practical knowledge and life experiences, the course content is practical knowledge oriented. This is to say the course content utilizes examples from the related businesses as a vehicle to deliver systems knowledge. Our interview with many small business managers in agriculture in Australia revealed that small business managers show much less interest in theoretical course content compared to practical ones. This was largely due to many small businesses being unwilling to risk their limited resources in trials, thus preferring to access verified knowledge and innovations [20–22].

- (3) *Right length of systems thinking knowledge modules.* In terms of the size of the course contents, it needs to be able to be delivered in short time frames to suit the multiple roles of small business managers. The duration of each module is limited to two to three days because most small business managers are not only required to perform their management roles but also have to do the majority of the daily tasks themselves which means they are generally very busy [23]. Therefore, it is very difficult for them to allocate longer time periods to learning. Making things worse still are the uncertainties related to the global economy which forces small business managers to work longer rather than hire more staff in order to cut costs.
- (4) *Paying attention to the systems thinking delivery process.* This can be achieved by selecting the right trainers, and training the trainer to make sure the knowledge can be delivered efficiently. The key is to select the right trainers who not only have high credibility to the trainees but also have the capability to use appropriate delivery methods to create a dynamic training and learning environment [24,25].
- (5) *Working closely with industry to make use of industry networks as a vehicle to deliver the systems thinking knowledge.* There are several advantages of delivering training through industry bodies which include aligning the training to the industry needs, finding trainers with high credibility, possible cost sharing, large scale impact on industry and huge time savings in organizing a training activity.
- (6) *Combine a continuous improvement process in the framework for further improvement.* Teaching and learning are two interactive aspects of the same process, while teaching aims to facilitate learning, in return learning results reflect the effectiveness of teaching. The quality of the designed framework will be further enhanced by the continuous improvement process through periodical review and reflection activities [26].

4. Elaborating the Framework

The designed framework consists of three interconnected components which are the content design, the training delivery design and continuous improvement for further improvement.

4.1. Modules of Systems Thinking Knowledge-Content Design

In this framework, one key component is to group systems thinking knowledge into three modules to target learners of primary, intermediate and advanced levels. The theory which underlie modularizing systems thinking knowledge is that “the most basic thing that can be said about human memory, after a century of intensive research, is that unless detail is placed into a structured pattern, it is rapidly forgotten” [2], (p. 24).

4.1.1. Primary Level

This level of systems thinking knowledge aims to equip small business managers with a holistic view through understanding the connectedness and interaction of components within a business-to-business system [27]. To achieve this, the module needs to cover knowledge on the right

system boundaries, teach deep thinking about business issues using four levels of thinking and create an appreciation for the laws of systems thinking. The primary level of systems thinking knowledge is elaborated on later in this paper considering that research has shown that an understanding of fundamentals make a subject more comprehensible. Furthermore, understanding fundamentals appears to be the main road to adequate “transfer of training” [2].

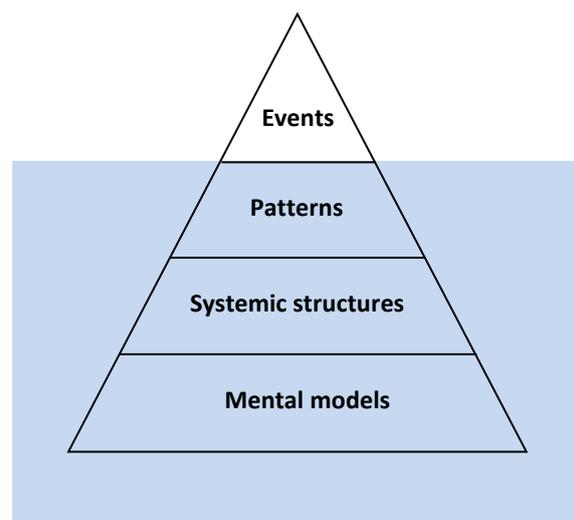
- Defining the right system boundaries for a holistic view

While it is relatively easy for people to understand the inter-connectedness among different parts of the physical world, when it comes to the management area, the connections among different components of a system are no longer so obvious. However, correctly defining a system’s boundary is of critical importance when using systems thinking to analyse complex issues [28]. The reason for this is that defining appropriate system boundaries determines whether a holistic view can be achieved. On the one hand, too small system boundaries mean that only part of the system can be examined and analysed. On the other hand, too large system boundaries result in wasted resources from non-value adding activities. More often people are inclined to define smaller system boundaries than is required (such as Scenarios 1 and 2 presented in Section 2).

- Four levels of thinking as a guide to deep thinking

There is another dimension of systems thinking which consists of four levels of thinking shown in Figure 1.

Figure 1. Four levels of thinking (Adapted from: Maani and Cavana [5], p. 16, Figure 2.1).



The four levels of thinking shows the depth of thinking in a vertical way by focusing on events, patterns, systemic structures and mental model levels [5]. The analogy of an iceberg is used to describe the four levels of thinking where the only visible part is the events level which often requires immediate attention [5]. In most situations, managers prefer to address issues at the events level because they are visible. However, the level of events thinking is the shallowest; actions based on events thinking are all reactive which can only temporarily address symptoms. A deeper level of thinking that reveals the

pattern of events provides more insight into the whole “story”. Interventions considering the pattern of the events are more effective than those based purely on a single event or at the events level. Interventions based on the pattern of events are characterized as adaptive. Further examination reveals that it is at the systemic structure level where the interplay of the systems components combines to cause the events and produce the pattern of the events. Interventions based at systemic structure level are characterized as generative, which are much more powerful than those based on events and their patterns. However, this is still not the root cause for any issue and the deepest cause lies in the main actors’ mental models within the systems. The basis for sustainable interventions requires the full consideration of the mental models of different actors in the systems of interest.

- Laws of systems thinking

Other key components of the primary level of systems thinking knowledge are the laws of systems thinking. The influential systems thinking work by Senge [10] has suggested the following 11 systems laws that help people understand systems better.

- *Today's problems come from yesterday's “solutions”.* In most cases, if solutions were not based on fully understanding the systems, they could merely shift problems from one part of a system to another often without being noticed. It is often the case that those who “solved” the first problem are different from those who inherit the new problem.
- *The harder you push, the harder the system pushes back.* This happens when well-intentioned low leverage interventions which were not based on fully understanding the dynamics of the research system, result in responses that offset the benefits of the intervention. Once this scenario happens, people tend to push even harder in order to achieve the expected results because people also hold the belief that hard work will overcome all obstacles. In fact, it is the pushing of the system in the wrong direction that produces the obstacles.
- *Performance grows better before it grows worse.* When low-leverage interventions are used to address systemic problems, symptoms disappear after a short time but problems will return after a certain period and, in most cases, problems will become even worse. This shows how the time delay between actions and the results explain why systemic problems are so hard to recognize.
- *The easy way out usually leads back in.* People tend to apply familiar solutions to problems encountered. Because root problems are seldom obvious, treating the symptoms by intervention cause the problems to reoccur. People tend to “stick to what we know best” but the system then usually becomes dependent on the intervener or the intervention, and the problem becomes chronic.
- *The cure can be worse than the disease.* When people do not really understand the cause of problems, all those well-intentioned efforts can actually make things worse. Non-systemic solutions increase the need for more interventions to the deteriorated problems.
- *Faster is slower.* Quick fixes to a systemic problem never last long. The problem will come back soon and leave the system fundamentally weaker than before and even more in need of further help.

- *Cause and effect are not closely related in time and space.* In many cases, people just simply mistake a symptom for the cause of the problem. However, a common fundamental characteristic underlying all of the complex problems is that “cause” and “effect” are not closely related—both in time and space.
- *Small changes can produce big results but the areas of highest leverage are often the least obvious.* Systems thinking shows that small, well-focused actions can sometimes produce significant, enduring improvements, but only if they are in the right place called “leverage points”. Unfortunately, there are no simple rules for finding high-leverage changes, but there are ways of thinking that make it more likely. Learning to recognise the underlying “structures” rather than “events” is a starting point. Systems archetypes suggest areas of high leverage change.
- *You can have your cake and eat it too, but not at the same time.* It is rare that one change in a complex system will produce immediate results. In fact, a series of interventions are often required for achieving the overall result. In many cases, people need to be prepared for deterioration of the situation before the improved system shows better results.
- *Dividing an elephant in half does not produce two small elephants.* A system needs to have integrity and the character of a system depends on the whole system rather than part of it. It is always helpful to keep the big picture in mind because most of time people get into trouble due to only focussing on a small part of the picture.
- *There is no blame.* This simple statement is meant to remind people that encountered problems and their causes are part of the same system, even in cases where there is obvious competitive intent. The implication is that people have to recognize the power of systemic structure in influencing their choices and behaviour.

Mastering the law of systems thinking [10] facilitates the learning of casual loop modelling techniques which are planned to be the key knowledge and skills transmitted at the intermediate level. Our experiences with teaching systems thinking courses to university students showed that fully understanding the laws of systems thinking is essential for students to be able to identify system archetypes. The successful identification of archetypes in causal loop models is a key step to reveal the systemic structures of systems being studied [5,10,29].

4.1.2. Intermediate Level

Forrester [30] asserted that the human mind is incapable of truly understanding the behaviour of complex social systems without the assistance of tools and technology. At this level, the systems thinking knowledge is about using qualitative systems tools to unravel complex issues [5,31].

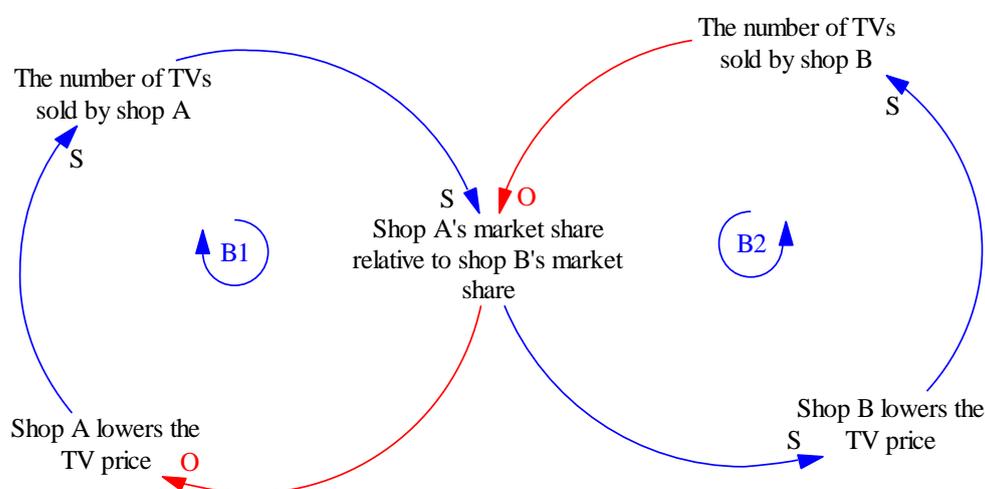
The flexible and useful tools are causal loop diagrams which are diagrams used to demonstrate the feedback structure of systems in any domain by showing the causal links among variables with arrows from a cause to an effect [8,31]. Causal loop diagrams are qualitative systems tools that enable complex systems to be described in terms of cause-and-effect relationships [5,10]. The use of causal loop diagrams to describe the complexity of real systems highlights the connectedness of the component parts which also provides a platform for discussion, communication, and policy formulation. Causal loop

diagrams can also help people identify the most appropriate way of influencing the system of interest by using systems archetypes and their associated mental models for leverage points [31,32]. As a result, poor decisions like quick fixes can be avoided.

Systems archetypes are generic systems models or the templates that represent a wide range of situations. Systems archetypes provide a high-level map of dynamic processes. Systems archetypes can provide valuable hints for systems intervention normally referred to as leverages [10,32]. The contents of this level of systems thinking knowledge is designed to teach small business managers how to use qualitative systems tools such as the causal loop diagrams to model complex issues in order to understand the feedback systemic structure. Causal loop diagrams are excellent for quickly capturing stakeholders' hypotheses about the causes of dynamics; eliciting and capturing the mental models of individuals or teams; communicating the important feedback that people believe is responsible for a problem [8].

For demonstration purposes, scenario four is modelled using a causal loop diagram. Assuming two shops are A and B and their price war relates to selling TV sets. The model is shown in Figure 2.

Figure 2. TV price war between shop A and shop B. Legend: S (same direction), O (opposite direction), B (balancing feedback loop) Arrows: (cause or affect relationship).



The model in Figure 2 shows an “escalation” archetype [10] of which the competition between two shops is going to damage both shops’ business performance. Considering the implications for intervention based on this archetype, we need to examine whether perceptions of the opponent’s intent is accurate. Instead of competing with each other, both sides should understand that overcoming this structure requires cooperation toward a larger goal that benefits both competing parties.

Nine systems archetypes were summarized by Senge which are the results of different combinations of two basic feedback loops, namely the reinforcing loop and the balancing loop [10]. To learn the causal loop modelling techniques, Sherwood’s work was found to be very useful due to the case-based step-by-step illustration on how to use causal loop models to model business issues [31]. Plenty of examples can be found where real life complex issues have been successfully addressed by using causal loop models [5,8,10,29,33].

4.1.3. Advanced Level

The key shortcomings of causal loop diagrams are that they are static and cannot be used to describe how the properties of a system evolve over time [8,31,34]. This is because most problem structuring methods yield qualitative models showing causal relationships but omitting the parameters, functional forms, external inputs, and initial conditions needed to fully specify and test the model [8]. In contrast, addressing many management issues require more than just structuring the complexities, and eliciting and mapping the participants' mental models. In fact, it requires many of the inputs in quantitative formats for an optimized scenario. In these circumstances, system dynamics simulation becomes the only reliable way to test hypotheses and evaluate the likely effects of policies. Therefore, the systems thinking knowledge covered at the advanced level is about how to simulate business management issues quantitatively using system dynamics modelling techniques [35].

The key advantage of system dynamics computer models is that it enables the time-dependent behaviour of complex systems to be explored under a range of different assumptions [5,8,31,36]. System dynamics modelling allows people to simulate how a complex system, which is expressed as a causal loop diagram, is likely to evolve over time. The scenario analysis serves the same function as a laboratory, but this laboratory is about the future of the system under consideration. System dynamics modelling enables people to test the likely consequences of different actions, decisions, or policies before really committing to them [31,36]. In comparison, causal loop diagrams emphasize the feedback structure of a system while system dynamics simulation emphasizes their underlying physical structure.

To fully understand scenario five requires system dynamics modelling, however it needs different data sets to populate the model and those data sets are not accessible here. However, there is a classic "Beer Distribution Game" model which is referred to in several textbooks [5,8,34]. Nevertheless, there are also plenty of cases available on the use of system dynamics to address dynamic and complex issues [37–40].

4.2. The Training Delivery

Equally important to the content design is the process to deliver the content. Key issues of delivering the content are choosing the most suitable delivery methods, training the trainers and making good use of industry networks as a vehicle to improve training efficiency.

4.2.1. Choosing the Delivery Methods

The choice of the delivery methods is fully guided by the teaching theory [15]. Choosing the delivery methods basically concerns when and how to deliver the training contents. While there are various delivery methods available for training, their effectiveness depends on the contents to be delivered and the characteristics of the trainers and participants. While most training methods have their pros and cons, past experiences from various training programs indicate that using blended delivery methods for each training session appears to be the most effective way to help participants learn and retain information. Key experiences when delivering different modules of systems thinking knowledge were:

- Instructor-led training is necessary for delivering each of the three modules in order to get the key messages through to the participants.
- Small group discussion is the most effective way to enhance understanding.
- Case studies with issues from their own business are the most preferred part of the training.
- After training, support is crucial and communication technologies have made this very easy and effective.

Thus, the training methods require the trainers to be able to shift their roles gradually from presenters from the beginning of the training sessions through to active facilitators towards the end of the training sessions.

4.2.2. Train the Trainers

There needs to be a train the trainer procedure in place to ensure the quality of the training delivery. The critical point is more about choosing the right trainers than training them, because we found that all trainers can easily grasp the designed training content and training methods. However, the effectiveness of the training delivery was largely affected by how the group of trainees judge the trainers' credibility. Our survey conducted in the agricultural area showed that when it comes to trainers, the following factors negatively affect the efficiency of the training delivery and are therefore important to keep in mind.

- Young graduates as trainers lack credibility due to a lack of on the ground experiences.
- Academics from research organizations also suffer from lack of on the ground experiences.
- Private consultants were regarded as profit oriented as well as failures (too often) in the businesses.

In contrast, government funded practitioners from the industry were highly trusted for their relatively natural roles.

4.2.3. Using the Industry Body as a Vehicle to Increase Training Impact

Many industries in Australia have their own industry bodies. Small businesses generally join the industry body that can assist them. One of the key roles of these industry bodies is to provide technical support to their members. The continuous interaction between the members and the industry body builds good relationships and over time these relationships form social networks. The social networks within industry bodies enable deep learning so that the advice and suggestions provided by the industry bodies and their networks are highly trusted by their members. The social networks of industry bodies associated with small businesses can easily increase the scale and impact of the training and they promote interactions between participants as well as ongoing learning. The design of this systems thinking knowledge delivery framework took into account the training delivery through industry bodies and national funded research and development projects, such as different cooperative research centres.

There are clear advantages of delivering training through industry bodies including increased impact and sharing the cost of training. However, importantly, by working with networks in industry bodies, the learning becomes more sustainable and it is easier to recruit trainers from these business champions.

4.3. Continuous Improvement Process to Improve the Framework

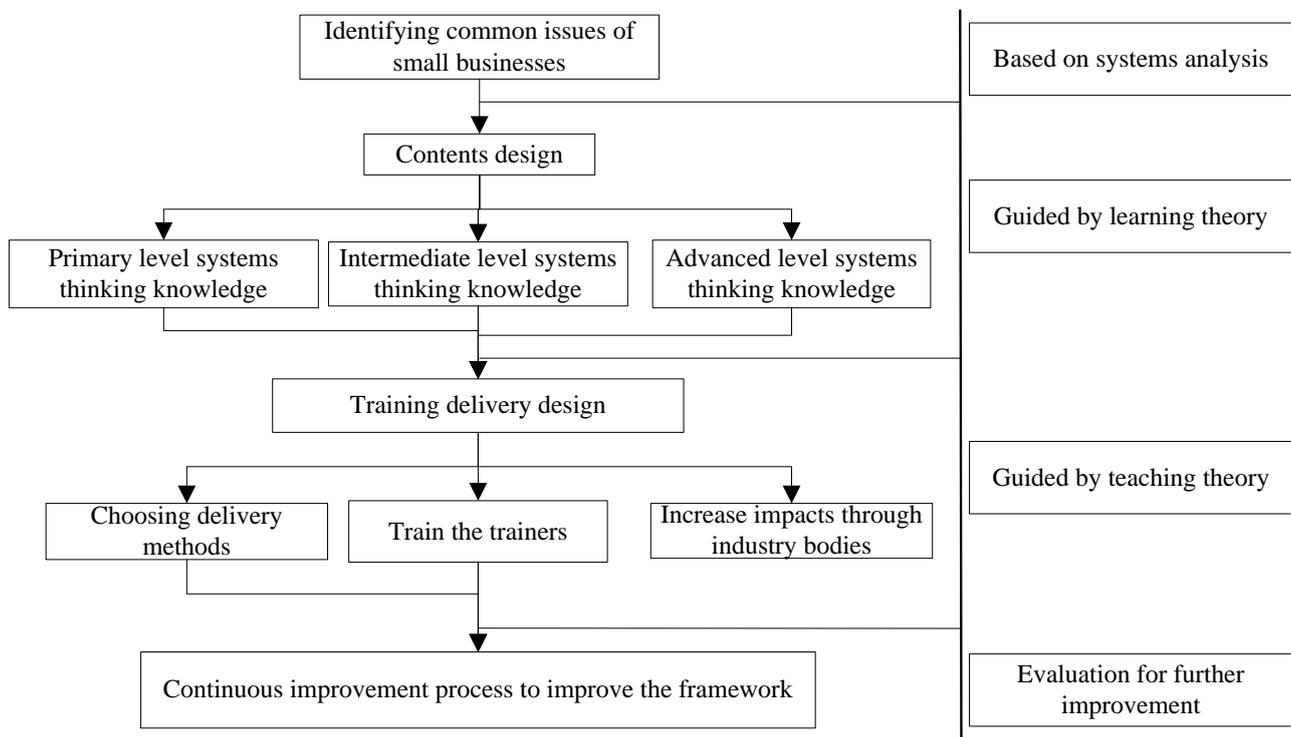
Even though the design of this systems thinking delivery framework was based on a systems analysis, it can be further improved. Therefore, the framework design itself consists of an improvement process, namely the continuous improvement process.

This is to say once the designed framework is put into practice it will be continuously evaluated by collecting feedback from both the trainer and the trainees. There is a reflection procedure to be used by the designers of this framework for further improvement that addresses identified issues. Then, the improved framework will be put into practice and continuously reviewed. This process continues to ensure better and more effective training outcomes and impact.

4.4. The Structure of the Design Framework

The structure of the designed framework can be shown by putting it into a model as illustrated in Figure 3.

Figure 3. The designed framework for systems thinking skills delivery.



5. Conclusion

Simply delivering the same traditional skills to small business managers as universities and training organisations have done in the past will see a continuation of the same problems and the same outcomes that often lead to business failure. Most traditional training packages take a modular approach to business skills training, looking at the issues facing managers from a fragmented rather than holistic stance. Systems thinking by its very nature seeks to examine business systems holistically so that a deeper and more analytical understanding of the issues the business needs to address can be achieved.

This paper has sought to describe and explain the approach taken to design a systems thinking delivery framework for managers in small businesses.

The design process used a systems thinking approach by seeking to identify the key stakeholders, understand the interactions among identified stakeholders, understand the systemic structure and how different factors affect the system dynamics and system behaviour [5]. By using this process, the framework has sought to achieve a more sustainable outcome. The need for stakeholder involvement in both the design and delivery is essential to the ongoing and sustainable success of the training delivery. The process has also been enhanced by the inclusion of a continuous improvement element that ensures the feedback from stakeholders is incorporated into ongoing improvements in the modules and in the delivery. By involving industry bodies in the design and delivery, the training was able to incorporate powerful and influential social networks that enhance learning both in the short and long term. This approach and this program address the challenge of building capacity in small businesses to rapidly analyse and understand the systemic issues facing their business by providing managers with the tools needed to address issues at a systems level in order to provide long term sustainable interventions.

It needs to be clarified that while the systems thinking knowledge incorporated in this framework belongs to system dynamics, on a broader level, systems thinking has many streams. In practice, the delivery of systems thinking knowledge can place emphasis on certain levels based on the needs and profiles of small business managers. Our limited research, training and teaching experiences in systems thinking revealed that for a large number of small business managers, the most valuable knowledge lays in the primary and intermediate level, and that majority business issues can be successfully addressed by using these levels. The important point is that fully grasping the primary and intermediate levels of systems thinking knowledge does not require sophisticated calculation and advanced computer skills. Moreover, the advanced level of systems thinking knowledge is only necessary for those small business managers who have a need to understand quantitative change or the magnitude of dynamic change.

The authors are also aware that the designed framework still needs to be fully tested to achieve credibility. However, efforts have been made to incorporate our first hand teaching and training experiences into the framework, which are also supported by the most influential teaching and training theories that overcome this limitation.

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Author Contributions

The article is based on the collective experience and knowledge of all authors. Daowei Sun conceived and was involved in the development of the framework based on his experience developing and delivering the training. Paul Hyland provided input on issues relating to the management of small business based on his experience working with farm businesses and reviewed and edited the article.

Haiyang Cui's expertise enabled refinement of the framework and assisted with integrating scenarios into the research.

Conflicts of Interest

The authors declare no conflict of interest.

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