

# The Schema Theory and its Application in Teaching Reading Skills: A Mixed Methods Study Based on an Online English as a Second Language Classroom for Adult Learners at a Private Institution in the Western Province

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## Abstract

Reading skills play a critical role in achieving successful educational goals at all levels. Although scholars deem the process of reading to be an interactive one, a bottom-up approach is used for teaching reading in Sri Lanka, causing a lack of proficiency among learners entering the tertiary-level education stream. This study is an analysis of the application of the Schema Theory and its impact on developing reading skills in an English as a Second Language (hereafter ESL) classroom. Based on the underpinnings of Carrell & Eisterhold (1983), it critically analyses reading skills as a 'psycholinguistic guessing game' requiring the activation of the schemas to fully comprehend a text. This study was conducted with 64 intermediate-level adult learners between the ages of 21-24 at a private institution in the Western Province following a mixed methods research approach whilst utilizing the experimental method in action research, as its design. The quantitative findings gathered using the control group pre/post-test were analyzed using inferential statistics, depicting that there is a significant improvement from the pre-test to the post-test in the experimental group. Furthermore, the qualitative data gathered from the observer's paradox, analyzed thematically, in the second research question substantiated the quantitative findings of the first research question. Thus, the findings of this study conclude that the Schema Theory in reading can be used as a theoretical basis to enhance reading skills among adult ESL learners. In terms of pedagogical implications, the study posits that the use of authentic lessons whilst activating the three types of schemas improves vocabulary and reading comprehension. For further research, the study suggests that the Schema Theory can be applied within an advanced-level ESL classroom in a school setting to practice authentic language use.

**Keywords:** Schema Theory, Teaching Reading, Mixed Methods, Adult ESL Learners

## 1. Introduction

With the emergence of globalization, the need for English has become a mandatory requirement in both work and education. As stated by Carrell, “reading is by far the most important of the four skills in a second language,” and it is the most pivotal skill for “students to learn the language” (p. 1). Traditionally deemed as a “mechanical and passive process” (Li & Zang, 2016, p.14), the contemporary theories on L2 reading refute this ideology, describing the skill as a “selective process” (Goodman, 1970)<sup>84</sup> which is “active and...interactive” (Goodman, 1967).<sup>85</sup> L2 reading in the modern day, as highlighted by Carrell & Eisterhold (1983), postulates a Schema Theoretic approach to reading emphasizing that “the ability to anticipate” what is “not been seen... is vital in” L2 “reading.” In line with this statement, Al-Issa (2006) explains “reading” as “a multileveled and interactive process in which readers construct a meaningful representation of text using their schemata” (p.41). Overall, this is the nature of L2 reading in the modern day. However, cultural distinctions, the lack of exposure to English, and the limited use of various innovative skills when teaching reading in L2 due to the reliance on a bottom-up view have called for an interactive viewpoint to facilitate, enhance, and reach the ultimate goal of reading comprehension.

The main aim of teaching English in Sri Lanka is the attainment of “exam results” (Indrarathne & McCollough, 2022, p. 26), and hence, it is understood that reading comprehension is not given importance other than for examination purposes. The contemporary theory about L2 reading is the notion advocated by Goodman (1967) which states that “reading is a psycholinguistic guessing game.”<sup>86</sup> However, in Sri Lanka, “the teacher is expected to ‘read’ and the students are expected to ‘listen’” (Indrarathne & McCollough, 2022, p.27), proving that the teachers advocate the bottom-up view of reading causing a lack in proficiency.

Over the years, L2 reading has become “both a reading problem<sup>87</sup>...and a language problem” as it is an “interactive compensatory process” (Sood, 2015, p. 41). Contrary to the popular opinion that reading is one of the skills that receive the most attention, Jayasundara (2014) states that “reading... is paid the least attention in the second language teaching and learning process in secondary as well as the tertiary level education” (p.338) in Sri Lanka. Moreover, in Sri Lanka, “although the English curriculum stresses the practice of all four language skills” giving “the assessment of language knowledge<sup>88</sup>” more importance, an evident “over-emphasis” on “linguistic accuracy and memorization...at the expense of authentic language use” (Indrarathne & McCollough, 2022).

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<sup>84</sup> As cited in Ensam (2021, p. 76).

<sup>85</sup> As cited in Carrell (p.1).

<sup>86</sup> Carrell & Eisterhold (1983, p.554).

<sup>87</sup> “As a set of reading strategies” (as cited in Sood, 2015, p.41).

<sup>88</sup> (grammar and vocabulary)

This situation later affects both the higher education and labor markets of Sri Lanka. However, with the skill of reading being taught predominantly by using a bottom-up process<sup>89</sup> rather than an interactive one,<sup>90</sup> limited opportunities are given for the learners to create a relationship between one's background knowledge<sup>91</sup> and the text, thereby, causing hindrance in reading comprehension among adult learners who wish to practice reading for general purposes in Sri Lanka. Hence, the need for interaction between background knowledge and the text to facilitate comprehension is vital.

The scope of this research is based on the notion that reading is a psycholinguistic guessing game<sup>92</sup> requiring the activation of the schemas<sup>93</sup> to ensure the successful use of the reader's background knowledge to fully comprehend a text. Significantly, this study is conducted among adult learners, and this group is "exposed" less "to authentic language input" (Indrarathne & McCollough, 2022, p.27), as a bottom-up approach<sup>94</sup> has been used to teach reading skills in schools. Furthermore, the application of the Schema Theory to teach reading paves the way for adult learners to "practice language in authentic situations" (Indrarathne & McCollough, 2022, p.27). The originality of this study lies in the research gaps that it addresses through its findings and methodology. The notable research gaps that it addresses are, that very limited studies that study the direct impact of applying the schema theory as a theoretical framework to teach reading skills within an online classroom<sup>95</sup> within the Sri Lankan ESL context, and also that most of the studies in this area are "limited because of relying on experimental procedures rather than...classroom-based settings."<sup>96</sup>

Thereby, this study will create an understanding that reading comprehension occurs "when the reader knows which skills and strategies are appropriate for the type of text...understands how to apply them to accomplish the reading purpose" (Jayasundara, 2014, pp.338-339). Further, the study provides insights as to how directly applying the Schema Theory improves reading skills within an online classroom. Moreover, this study will also provide and substantiate the theoretical basis that is necessary for teaching reading skills within the Sri Lankan ESL context.

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<sup>89</sup> Lower order Skills

<sup>90</sup> Both higher order and lower order skills

<sup>91</sup> Carrell & Eisterhold (1983) explaining the Schema theoretic approach to reading emphasizes that "the ability to anticipate" what is "not been seen... is vital in reading" English within a Second Language context.

<sup>92</sup> Goodman., (1967)

<sup>93</sup> Content, formal and linguistic

<sup>94</sup> During the years of schooling, second language reading is taught in a manner where "the teacher is expected to 'read' and the students are expected to 'listen'" (Indrarathne & McCollough, 2022, p.27) whether in a physical or online setting.

<sup>95</sup> In Sri Lanka and other ESL/EFL contexts.

<sup>96</sup> McVee et al. (2005, p.539)

## 1.2. Objectives of the Study

- To identify how the application of the Schema Theory would impact the improvement in reading skills among adult learners between the ages of 21-24 from a private institution in the Western Province.
- To investigate the connection between Schema Theory<sup>97</sup> and reading skills through the viewpoint of a peer observer.

## 1.3. Research Questions

1. How does the application of the Schema Theory impact teaching reading skills in an online ESL classroom for adult learners at a private institution in the Western Province?
2. What perceptions does the peer observer have regarding the application of the Schema Theory in teaching reading skills in an online ESL classroom for adult learners at a private institution in the Western Province?

## 2. Literature Review

According to Jayasundara (2014), “reading<sup>98</sup> is considered as one of the significant skills needed to be developed to master the target language as it is being a receptive skill which” results in “writing as well as speaking skills” (p.338) as the end product. Elaborating further, Koda (2005) states that reading “comprehension occurs when the reader extracts and integrates various information from the text and combines it with what is already known.”<sup>99</sup> However, applying the schema theory in teaching reading skills is seemingly a viable solution that may further assist readers in making a connection between one’s “background knowledge and the text”<sup>100</sup> within an online classroom<sup>101</sup> in Sri Lanka.<sup>102</sup>

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<sup>97</sup> “Independent Variable” (Bielska, 2011, p.95).

<sup>98</sup> Thus, the “active involvement of student as reader” is of utmost importance (Mughtar, 2019, p.1).

<sup>99</sup> (As cited in Grabe, 2009, p.14)

<sup>100</sup> Carrell & Eisterhold (1983, p.556)

<sup>101</sup> Moreover, Chung (2012) states that an “online virtual reality... changes the single-track approach that characterizes traditional teaching into a hybrid learning that takes place both ‘within the classroom’ and ‘online’<sup>101</sup>” (p. 255).

<sup>102</sup> For adult ESL learners.

### 2.1. Difficulties Second Language Learners Face when Learning Reading

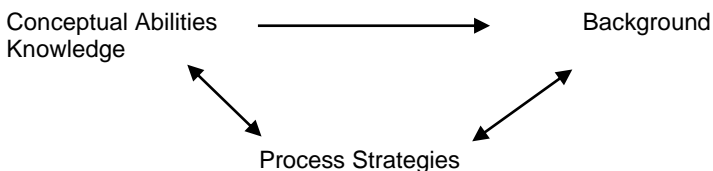
According to Grabe (2009), “L2 readers have... very limited exposure to L2 prints which comes from L2 classroom contexts” (p.134). Furthermore, Grabe (2009) states that “L2 readers, in many contexts around the world are reading texts that often are very difficult” and hence are “often limited to developing language skills rather than building academic skills” (p.135). Moreover, a “potential source of reading difficulties may be that the reader has a consistent interpretation for the text, but it may not be the one intended by the author” (Carrell & Eisterhold, 1983, p. 559). Notably, an L2 “reader’s failure to activate an appropriate schema (formal or content) during reading results in various degrees of non-comprehension” (Carrell & Eisterhold, 1983, p.560).

### 2.2. Goodman’s Theory of Reading as a Psycholinguistic Guessing Game

Taking into consideration the above-stated difficulties, Goodman (1967) mentioned that “reading is a psycholinguistic guessing game” (Carrell, p.2). Goodman (1967) further states that this process instigates “an interaction between thought and language” (p.2). Elaborating further, Goodman (1967) states that “efficient reading does not result from precise perception and identification of all elements, but from skill in selecting the fewest, most productive cues necessary to produce guesses” (p.2). Thus, through this model, it is emphasized that “the ability to anticipate that which has not been seen...is vital in reading” (Goodman, 1967, p.2). Despite a very critical basis rather than a practical overview being presented, Goodman (1967) depicts the relation of reading with the Schema Theory providing a pivotal basis for other scholars to build on the theoretical framework further. Moreover, Coady (1979) presents the “model of the ESL reader”<sup>103</sup> as follows. As McVee et al (2005) state, Goodman (1967) presents the “inner workings” of the mind.

**Figure 1**

*Coady (1979) Model of the ESL Reader*



<sup>103</sup> As cited in Carell & Eisterhold (1983, p.555).

### 2.3. The Schema Theory in Teaching Reading Skills

As defined by Rumelhart (1980) “schemata... represent all levels of our experience, at all levels of abstraction” and “all... generic knowledge is embedded in schemata.”<sup>104</sup> Taking Goodman’s Theory of “Reading as a Psycholinguistic Guessing game” as its basis, Carrell and Eisterhold (1983) express that “the role of background knowledge in language comprehension has been formalized as schema theory<sup>105</sup>”<sup>106</sup> (p.556). Furthermore, the theory<sup>107</sup> emphasizes that “text, any text, either spoken or written, does not by itself carry meaning.”<sup>108</sup>

Providing a more practical overview of the application of the Schema Theory within the ESL classroom, Carrell and Eisterhold (1983) state that there are **three types of schema** according to the theory. **Content schema**,<sup>109</sup> according to Carrell & Eisterhold (1983) is the “content schematic knowledge... is claimed to be background knowledge about the content area of a text” (p. 560). **Formal schema**<sup>110</sup> is the “background knowledge about and expectations of, differences among rhetorical structures, such as differences in the genre”<sup>111</sup> (Carrell & Eisterhold, 1983, p. 560). Moreover, the **Linguistic Schema**<sup>112</sup> “is about the language, knowledge of vocabulary, grammar, syntax, and usage” (Patnaik & Davidson, 2018, p.24). Understandably, “reading comprehension results when the reader knows which skills and strategies are appropriate for the type of texts, and understands how to apply them to accomplish the reading purpose”<sup>113</sup> (Jayasundara, 2014, pp.338-339).

<sup>104</sup> As cited in Carrell & Eisterhold., (1983).

<sup>105</sup> The “psycholinguistic model for reading” which was introduced by Goodman (1976) being the basis (Carrell & Eisterhold, 1983, p.556).

<sup>106</sup> Also cited in (Bartlett 1932, Rumelhart and Ortony 1977, Rumelhart 1980).

<sup>107</sup> “Schema theory foregrounds the role of individual cognitive processes, socio-cultural theories, particularly the work of Vygotsky (1978, 1986)” (McVee, 2005, p. 533).

<sup>108</sup> (Carrell & Eisterhold, 1983, p.556).

<sup>109</sup> “Contains conceptual knowledge or information about what usually happens within a certain topic, and how these happenings relate to each other to form a coherent whole” and it “works two ways” either being “area-specific information” or “conventional universal knowledge” (Patnaik & Davidson, 2018, p.24).

<sup>110</sup> It “helps the readers to grasp the main idea and the logical relationship between the paragraphs and thus form a correct foresight further (Patnaik & Davidson, 2018, p, 25).

<sup>111</sup> “The structure of fables, simple stories, scientific texts, newspaper articles, poetry” (Carrell & Eisterhold, 1983, p. 560).

<sup>112</sup> It is “prerequisite that the reader needs to understand the discourse” and “without language schema a reader cannot utilize content schema and formal schema” (Patnaik & Davidson, 2018, p.24).

<sup>113</sup> Carrell & Eisterhold (1983) state that L2 “reader’s failure to activate an appropriate schema (formal or content) during reading results in various degrees of non-comprehension” (p.560).

The Schema Theory according to Carrell & Eisterhold (1983), revolves **around two methods of “information processing”** (p. 557). Carrell & Eisterhold (1983) state that “the process of interpretation” follows “the principle that every input is mapped against some existing schema and that all aspects of that schema must be compatible with the input information” (p. 557). Hence, “**bottom-up**”<sup>114</sup> **processing** “emphasizes that readers” utilize “reading materials as information input...and then” collaborate “information continuously to accomplish”<sup>115</sup> the “reading activity” (p.22). **Top-down processing** is “the system” that “makes general predictions based on higher level, general schemata and then searches the input for information to fit into these partially satisfied, higher order schemata” (Carrell & Eisterhold, 1983, p. 557). However, it is evident that “comprehending a text is an **interactive process**”<sup>116</sup> between the reader's background knowledge and the text” (Carrell & Eisterhold, 1983, p. 556).<sup>117</sup>

## 2.4. The Application of the Schema Theory within the ESL Reading Classroom

### 2.4.1. The Phases of Reading in a Schema-based Lesson<sup>118</sup>

According to Gilajkani & Ahamadi (2011), “reading activities...promote strategic reading behaviours by students at pre-, while-, and post-reading stages” and “can” also “promote interpretation ...through the interaction between the reader and the text” (p.142). Moreover, these stages will “play a vital role in schema activation” while “facilitating comprehension” (Gilajkani & Ahamadi, 2011, p.142). Thereby, the phases described below assist in activating the types of Schema that have been presented by Carrell & Eisterhold (1983).

<sup>114</sup> It is a “decoding process rather than comprehension” (Patnaik & Davidson, 2018, p.22) which is the main process followed when teaching reading in Sri Lanka.

<sup>115</sup> “Lower- order schemata” (Carrell & Eisterhold, 1983, p.557).

<sup>116</sup> As Sood (2015) acknowledges “reading... is an interactive compensatory process” (p.41).

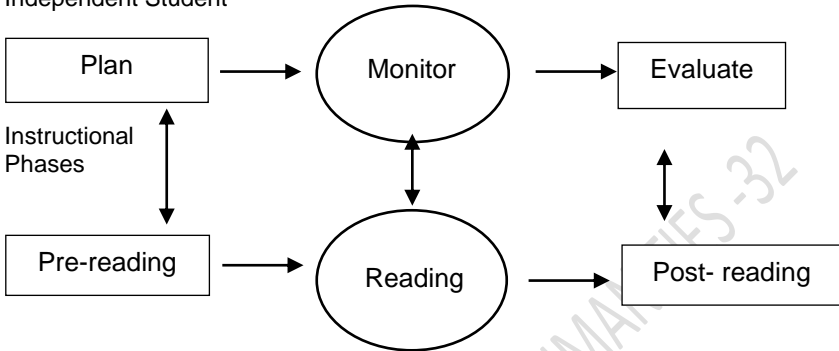
<sup>117</sup> Hence, in **interactive processing**, it is stated that “an important aspect of top-down and bottom-up processing is that both should be occurring at all levels simultaneously” (Rumelhart 1980 as cited in Carrell & Eisterhold, 1983, p.557).

<sup>118</sup> This section of the review of literature will provide a theoretical rationale for the format and structure of the lesson plans that will be used in this study.

**Figure 2:**

*Moorman & Blanton's (1990) Conceptual Framework for Information Text Reading Activity*<sup>119</sup>

Independent Student



#### 2.4.1.1. The Pre-reading Phase

This “stage is important as it helps students focus on the task at hand, encourages predictions to be made...and provides for gaps in background knowledge to be identified and filled in” (Dalby, 2019, p. 16). Furthermore, “helping” students “build background knowledge on the topic prior to reading through appropriate pre-reading activities<sup>120</sup>” such as “previewing, pre-questioning of whole class discussion (Carrell 1988b)”<sup>121</sup> is important during this stage.

#### 2.4.1.2. The While Reading Phase

Dalby (2019) reveals that “while-reading activities” are used to “build upon pre-reading activities so that learners check earlier predictions, identify key vocabulary and monitor the skills and strategies<sup>122</sup> incorporated “while they read” (p.23). As noted by Grabe & Stroller (2002), “reading to learn, reading to integrate information” and “reading for general comprehension” are intended to “be practiced” during this stage.<sup>123</sup>

<sup>119</sup> As cited in Cahyono & Widati., (2006).

<sup>120</sup> “Introduction and discussion of key concepts or vocabulary...visual aids, and key-words/key-concepts” (Ensam, 2021, p.88).

“Questioning, previewing, providing a pictorial context and/or using ‘brainstorming’ technique find out what students bring to the reading text as prior knowledge” (Ensam, 2021, p. 89).

<sup>121</sup> As cited in Ensam., (2021, p.88).

<sup>122</sup> “Read... to find main ideas, or skimming and, finally again to find details, or scanning” (Dalby, 2019, p. 22).

<sup>123</sup> As cited in Dalby., (2019, p.22).



### 2.4.1.3. The Post- Reading Phase

Here, most tasks take the form of “a discussion or debate on the text or the issues raised in it” and hence, “readers can be encouraged to describe what they got from the text or how they interpreted it” (Dalby, 2019, p. 23). These activities sharpen “comprehension skills as well as encouraging a reader’s ownership of the text” (Carrell, 1984, p.337).

## 2.5. Previous Studies on the Topic

In terms of research done on the applicability of the Schema Theory in the ESL classroom,<sup>124</sup> the most influential study that is also used as a theoretical base in most modern research studies is that of Carrell & Eisterhold (1983)<sup>125</sup>. Furthermore, “Anderson et al. presented music students and weightlifters with ambiguous passages and found that the student’s experiences and knowledge influenced their interpretations of the passages.”<sup>126</sup> According to Heath (1983), this study shows that “although” learners “come...with pre-existing knowledge structures, in many cases the knowledge and learning processes that the children possess is not the same as, and may even conflict with, the types of knowledge and knowledge construction emphasized” (as cited in McVee et al., 2005, p. 557).

Moreover, research studies<sup>127</sup> on the topic have been conducted as experimental studies predominantly within English as a Foreign Language contexts.<sup>128</sup> For instance, Che (2014)<sup>129</sup> and Liu (2015) have conducted experimental studies in which both conclude that when the Schema Theory is applied, the experimental groups show a higher success rate in terms of “accuracy level”<sup>130</sup> and understanding “the meaning of the passage”<sup>131</sup> respectively.

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<sup>124</sup> As cited in Nelson (1987), “Johnson (1982) found that after ESL students had participated in the American holiday Halloween, they recalled significantly more about an article on Halloween than before their participation, demonstrating the importance of personal experience in reading comprehension” (p. 425).

<sup>125</sup> “Schema Theory and ESL reading pedagogy”

<sup>126</sup> (As cited in McVee et al., 2005, p.557).

<sup>127</sup> It is notable that most studies have gone on to discuss the application and suggestions rather than practically applying the theory in a classroom setting. Ensam (2021), Stott (n.d.), Dalby (n.d.), are a few studies that propose suggestions as to how the schema theory can be applied to obtain productive results rather than practically applying it.

<sup>128</sup> EFL hereafter

<sup>129</sup> The “application of the schema theory to teach English newspaper reading” (Che, 2014, p.444).

<sup>130</sup> The “experimental group” showed an “accuracy level” of 80% whereas the “controlled group” displayed an “accuracy level of 41%” (Che, 2014, p.444).

<sup>131</sup> Qualitative analysis revealed that the students provided with relevant schema would comprehend the meaning of the passage significantly better than those without, revealing the facilitative role of schema in readers’ extraction of meaning” (Liu, 2015, p.1352).

Yet, both these studies solely use the experimental method only. Thereby it is notable that there is a methodological gap that calls for a holistic method, such as the “experimental method in action research” which will assist in “enabling teachers to make, evaluate, or justify their choices concerning classroom instruction...related to the contextualized use of pedagogical procedures” (Bielska, 2011, p.88).

In terms of teaching reading to adult learners in the Sri Lankan ESL context<sup>132</sup>, Wickramaarachchi (2014) studies “writing-reading relationships” where the Schema theory is an underlying theory of the study. Jayasundara (2014) has also conducted a study on “acquiring reading skills by second language learners” within the Sri Lankan context. A very limited number of studies within the Sri Lankan ESL context have addressed the practical application of the Schema Theory while using it as the prominent theoretical basis. Moreover, a very limited number of studies on teaching reading in the Sri Lankan ESL context address the online classroom setting.

## 2.6. The Research Gap

In terms of the research gap, very limited studies within the Sri Lankan ESL context study the direct impact of applying the Schema Theory to teach reading skills. There was also a limited amount of research on the application of the Schema Theory to teach reading skills within an online classroom.<sup>133</sup> In terms of the methodological gap, most studies have been conducted experimentally and are “limited because of relying on experimental procedures rather than...classroom-based settings and tasks.”<sup>134</sup> The relevance of the current study is that it provides a solid theoretical basis to teach reading within the Sri Lankan ESL context and also within an online classroom setting and attempts to overcome the methodological gap by conducting action-based experimental research where learning experiences are used along with an observer’s paradox to gain the viewpoint of an observer, which is not observed in many studies.

## 3. Research Methodology

### 3.1. The Research Design

This study follows a mixed-methods approach, as Creswell (2014) states that “qualitative data tends to be open-ended without predetermined responses” and

<sup>132</sup> Furthermore, once more Wickramaarachchi., (2017). studies “the Impact of the Difficulty of Texts on ESL Reading Comprehension.”

<sup>133</sup> In Sri Lanka and other ESL/EFL contexts.

<sup>134</sup> McVee et al., (2005, p.539)

“quantitative data usually includes closed-ended responses” such as” those “found on questionnaires or psychological instruments.” This is further justified by the data collection instruments used in this study.

In line with the mixed-methods research paradigm, this study takes as its premise the “experimental method in action research design” as proposed by Bielska (2011). Defining this method, Bielska (2011) states that this method “serves the purpose of enabling teachers to make, evaluate, or justify their choices concerning classroom instruction...related to the contextualized use of pedagogical procedures” (p.88). This design is particularly important for this study due to its “methodological flexibility,” and as Harley (1989) states, it assists in “assessing the effect of a whole range of classroom activities which together combine a cluster of theoretically motivated characteristics...in an educationally viable way.”<sup>135</sup>

### **3.2. The Theoretical Framework used as a basis for the Research Design and Selected Instruments**

The theoretical framework selected for the study is the Schema Theory which is based on the definitions and theoretical perspectives provided by Carrell and Eisterhold (1983). Based on the categorization of the three types of Schema by Carrell and Eisterhold (1983), the phases of the lesson plans<sup>136</sup> were designed to be taught during the intervention process done for the experimental group. Furthermore, the selection of this theoretical perspective by Carrell and Eisterhold (1983) assisted in selecting both quantitative and qualitative research instruments to facilitate the “experimental method in action research design” by Bielska (2011).

### **3.3. The Sample and the Sampling Methods used in the Study**

Voluntary participants for the study were gathered using non-probability “convenience sampling” where the “convenience of the researcher” was considered “an “important criterion” (Dörnyei, 2007, p.98). Taking into consideration the fact that adults “leaving school and entering the workforce lack the proficiency in English expected by employers<sup>137</sup>” (Indarathne & McCollough, 2022), adult learners of ESL were selected as the participants.

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<sup>135</sup> As cited in Bielska (2011, p.89)

<sup>136</sup> (Gilajkani and Ahamadi, 2011; Dalby, 2019)

<sup>137</sup> (Dundar et al., 2017; Brunfaut & Green, 2019b)

71 participants volunteered,<sup>138</sup> out of which 64 participants were eligible after the “diagnostic test”<sup>139</sup> (Bates, 2011), and students that obtained 5 and less than 5 out of 10 marks were considered “less proficient” (Wickramaarachchi, 2014) and excluded from the study. Furthermore, the “block-randomized technique”<sup>140</sup> (Phakiti, 2014, p.76) was used for “random assignment”<sup>141</sup> (Bielska, 2011, p. 96) when dividing the learners into control and experimental groups, each group having 32<sup>142</sup> participants, respectively.

The criteria that were included when sampling was proficiency, age, “availability at a certain time, easy accessibility, and willingness to volunteer” (Dörnyei, 2007, p.99). Alongside this, a needs analysis was used to analyze the needs of the learners within the online classroom before the sessions. In terms of exclusion criteria, the participants who did not fit the proficiency and age range were excluded.

### 3.4. Intervention Process

Pertaining with the selected method, “randomly assigned treatment and control groups” were used for the “intervention study” (Brown, 2004, p.482). The duration of this study was three weeks, and “six intervention sessions” of “one hour” were conducted.<sup>143</sup> Pre-test and post-tests were done during two sessions, two sessions for the control group<sup>144</sup> and two sessions for the experimental group<sup>145</sup> were conducted. Lessons were based on passages taken from a global textbook<sup>146</sup> for multi-level learners and “international language testing benchmarks”<sup>147</sup> (Indrarathne & McCollouch, 2022, p. 31) were used for assessment.

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<sup>138</sup> A participant information sheet was circulated to 78 students within a private institution in the Western Province out of which 71 students responded.

<sup>139</sup> Will be used only to gauge the proficiency level of learners, to make the factor constant in the study and “gauge students’ area of strengths and weaknesses” (Bates, 2011).

<sup>140</sup> The site <https://www.randomizer.org/> will be used.

<sup>141</sup> “Assigning subjects to the comparison groups included in the experimental design in that each member of the study sample should” have a fair opportunity “of being included in any of the experimental or control groups used in the study” (Bielska, 2011, p.96).

<sup>142</sup> Dörnyei., (2007). states that in an “experimental study” there should be at least “15 participants in each group” (p.99).

<sup>143</sup> Complying with the duration of the study of Wickramaarachchi (2014)

<sup>144</sup> “Control group receiving the unmarked (or standard) treatment” (Bielska, 2011, p.96).

<sup>145</sup> “Experimental group” is “subjected to the treatment under investigation” (Bielska, 2011, p.96).

<sup>146</sup> Lindeck, J. et al., (2011). Focusing on IELTS: Reading and Writing

<sup>147</sup> IELTS Reading for General Training marking Rubric

### 3.5. The Process of Data Collection Followed in the Study

This study includes primary data which “requires conducting one’s own data-based investigation...and drawing conclusions based on the gathered data,” along with secondary sources as the study “necessitates examining what other researchers have said about a particular issue...an essential form of inquiry” (Al Alami, 2015, p.1332).

#### 3.5.1. The Instruments used for Data Collection in the Study

According to Dörnyei (2007), “a mixed method study...integrates” both “quantitative” and “qualitative” instruments (p.163). The instruments used in the study were categorized in a manner where “sequential and concurrent data collection” was “possible” (Wisnewska, 2011, p. 69).

##### 3.5.1.1. Instruments used in the First Research Question

###### 3.5.1.1.1. Control group Pre-test/ Post-test design

#### Figure 3

*Control Group Pre-test/ Post-test Design (Bielska, 2011, p.99)*

“Pretest Y (Dependent variable) (C- control group) — X1 (Independent variable) — Posttest Y(C)”  
 “Pretest Y (Dependent Variable) (E- experimental group) — X2 (Independent variable) — Post-test Y (E)”

“Test scores” are “continuous variables” (Bielska, 2011, p.93). Hence, the researcher went on to “take a group of learners and do something special with...measuring their progress” and went on to “compare their results with data obtained from another group that is similar” and “did not receive the special treatment” (Dörnyei, 2007, p.116).

##### 3.5.1.2. Instruments used in the Second Research Question

###### 3.5.1.2.1. Peer Observation

Here, “peer observation” in action research, an “observation by and with... supervisors” (Burns) was conducted. A qualified teacher engaged in the observation and provided insight using an “observation scheme”<sup>148</sup> along with “open-ended questions” (Dörnyei, 2007).

<sup>148</sup> An observation scheme modelled according to the Communicative Orientation in Language Teaching observation scheme, which is an author’s construct was used to gather data qualitatively.

This teacher also acted as a rater eliminating the “Hawthorne effect” (Dörnyei, 2007, p.53) in the study. This facilitated in the gathering of the “observer’s paradox”<sup>149</sup> (Hazel).

### 3.6. Quantitative Data Analysis

#### 3.6.1. Control group Pre/Post-test (Question 1)

The SPSS software was used to obtain inferential statistics based on the test scores. Here, “the appropriate statistical test” was deemed to “be the t-test for independent groups” (Bielska, 2011, p.106) where the “independent variable” (Bielska, 2011) was considered as schema and the “dependent variable” (Bielska, 2011) being the reading skill. A “comparison of...two independent samples” (Bielska, 2011, p.106) was done, and “the level of significance is expressed” using “a decimal fraction where  $p < .05$  means that there is less than five percent probability that...the results arose by chance” or if “ $p < .01$  means that there is less than one percent probability that...results arose by chance” (p.105). Furthermore, “a paired-samples t-test”<sup>150</sup> was used “to determine whether they differed statistically” (Phakiti, 2014, p.194).

#### 3.6.2. Qualitative Data Analysis

##### 3.6.2.1. Observation Data (Question 1), Data from the Open-ended questionnaires and Semi-structured Interviews (Question 2)

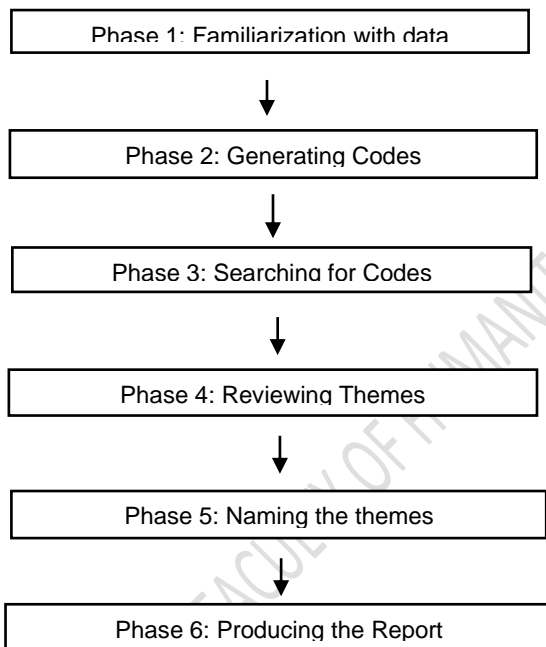
The qualitative data was analyzed using “thematic analysis” where “organizing and grouping” perceptions “into similar themes or ideas” (Ibrahim, 2012) was done. Thematic analysis was done based on Gibbs (2007) “phases of coding in thematic analysis.”<sup>151</sup>

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<sup>149</sup> As cited in Hazel, “for Labov, the presence of the researcher, the ‘observer’, was deemed to cause the ‘natural’ linguistic features to be subsumed by something else, having the ‘paradoxical’ effect of rendering invisible to observers that which they had set his sights upon”

<sup>150</sup> For the results of the Experimental Group

<sup>151</sup> As cited in Khokhar et al. (2020).

**Figure 4***Phases of Coding in Thematic Analysis (Gibbs, 2007)***3.7. Internal and External Validity**

Data was collected and analyzed both quantitatively and qualitatively<sup>152</sup> as “the collection of both quantitative and qualitative data neutralized the weaknesses” (Creswell, 2014) of both types. Bielska (2011) states that “including a control group...eliminates some...threats to the internal validity”<sup>153</sup> (p.99). Moreover, “validity and reliability of scores...lead to meaningful interpretations of data” (Creswell, 2014). Random assignment<sup>154</sup> improves “the internal validity... and, indirectly, its external validity” (Bielska, 2011, p.96).

<sup>152</sup> Following a concurrent and sequential structure.

<sup>153</sup> “By introducing the baseline for comparison” (Bielska, 2011, p.99).

<sup>154</sup> “Random assignment is to eliminate any pre-existing differences between the comparison groups in order to assure their equivalence, so that any effects found in the study can be attributed to the independent variable” (Bielska, 2011, p.96).

This was done to “establish such links in a valid and generalizable manner within “the experimental design” (Bielska, 2011, p.96).

### 3.8. Ethical Considerations

In terms of ethical considerations, the “researcher” followed the principles by Burns and collected “informed consent from... participants” and “colleagues.” Furthermore, consent was also obtained from the observer who engaged in the observer’s paradox. Moreover, the “purpose...as well as assurances of anonymity, voluntary participation, and withdrawal from the research without penalty” (Burns) were also given to the participants.<sup>155</sup>

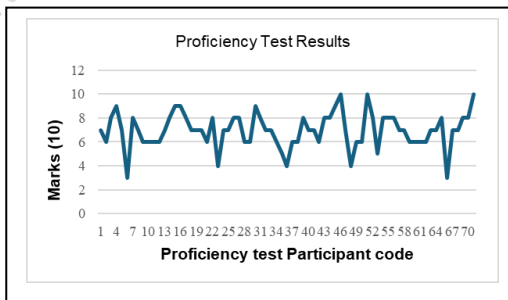
In-depth descriptions and justifications have been made on the research methodology which is the crux that ensures the success of the study when obtaining results. Furthermore, the sample data collection methods, study instruments, methods of analysis, validity, and ethical considerations followed were highlighted and discussed to depict how the methodological gap was overcome.

## 4. Findings and Discussion

The analyzed data is presented based on the two research questions to achieve the purpose of the study, which is to identify how the application of the Schema Theory would impact the improvement in reading skills among adult learners between the ages of 21-24 from a private institution in the Western Province. 71 students volunteered to be a part of the sample group, out of which 64 were selected following the proficiency test.<sup>156</sup>

**Figure 5**

*Proficiency Test Results*



<sup>155</sup> By conducting a separate session was held to brief students about the sessions via zoom.

<sup>156</sup> Results have been presented in Figure 5



#### 4.1. Analysis of Data for Research Question 1

##### 4.1.1. Control Group Pre-test/Post-test Results

The statistical results were obtained by comparing the test scores<sup>157</sup> of both the control and experimental groups using an independent samples t-test initially and a paired samples t-test to further affirm the data of the experimental group.

##### 4.1.1.1. The Pre-test Results of the Control and Experimental Groups Using the Independent Samples T-test Method of Analysis

**Table 1**

*Group Statistics for the Pre-test*

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-Test	<i>Control</i>	32	30.25	2.064	.365
	<i>Experimental</i>	32	30.44	2.257	.399

Table 1 indicates the mean values of the pre-test for both control and experimental groups. According to the results, there is no significant change in the mean values<sup>158</sup> of the pre-test between both groups. Thereby, as these results were obtained before the intervention sessions, the mean values of both groups are nearly similar

<sup>157</sup> (Bielska, 2011)

<sup>158</sup> Control group mean 30.25 and Experimental group mean 30.44

**Table 2**

*Independent Samples T-test of the Pre-test between the Control and Experimental Groups*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre-Test	<i>Equal variances assumed</i>	.420	.519	-.347	62	.730	-.188	.541	-1.268	.893
	<i>Equal variances not assumed</i>			-.347	61.510	.730	-.188	.541	-1.268	.893

Table 2 depicts the statistical results of the independent samples t-test for the pre-test of both control and experimental groups. The two-tailed significance value of the pre-test for both groups is 0.730, thus claiming that the significance value is greater than 0.05. Usually before the intervention sessions, it is believed that the means of both control and experiment groups for the pre-test should be nearly similar, and the above table indicates this notion.

**4.1.1.2. The Post-test Results of the Control and Experimental Groups Using the Independent Samples T-test Method of Analysis**

**Table 3**  
*Group Statistics for the Post-test*

	Group	N	Mean	Std. Deviation	Std. Error Mean
Post-Test	<i>Control</i>	32	30.34	1.977	.350
	<i>Experimental</i>	32	32.91	2.716	.480

Table 3 depicts the group statistics of the post-test for both groups. With the Schema Theory being applied to the experimental group<sup>159</sup>, the post-test results depict that the experimental group has a mean value of 32.91, whilst the control group denotes a mean value of 30.34<sup>160</sup> after the intervention. Thereby, it is evident that there is a significant improvement among the adult learners in the experimental group.

<sup>159</sup> Bottom-up teaching followed with control group

<sup>160</sup> Following the bottom-up process

**Table 4**

*The Independent Samples T-test of the Post-test between the Control and Experimental Groups*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post-Test	Equal variances assumed	3.063	.085	-4.314	62	.000	-2.563	.594	-3.750	-1.375
	Equal variances not assumed			-4.314	56.654	.000	-2.563	.594	-3.752	-1.373

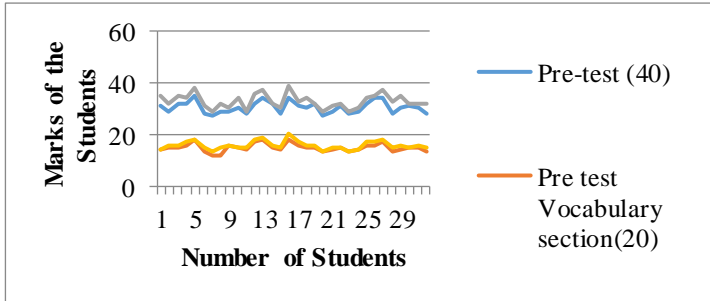
In Table 4, the independent samples t-test of the post-test for both groups indicates a two-tailed significant value of 0.000, depicting that “there is less than one percent probability that...results arose by chance” (Bielska, 2011, p.105). Thereby, the statistics prove that applying the Schema Theory to teach reading skills within an online ESL will improve the reading skills of adult learners.

#### **4.1.1.3. The Paired Samples T-test Results for Both Pre and Post-tests of the Experimental Group**

Figure 6 depicts the interpretation of the marks of the experimental group, further denoting the improvement in the post-test after the intervention sessions using a graph.

**Figure 6**

*Pre-test and Post-test Results Distribution of the Experimental Group*



**Table 5**

*Paired Samples Statistics of the Experimental Group*

Pair 1		Mean	N	Std. Deviation	Std. Error
Pre-Test	Pre-Test	30.44	32	2.257	.399
	Post-Test	32.91	32	2.716	.480

According to Table 5, it can be identified that in the experimental group, the mean value of the pre-test is 30.44 and 32.91 for the post-test.<sup>161</sup> Yet again, it denotes that there is a change in the mean value following the application of the Schema Theory to the experimental group.

<sup>161</sup> Pre/Post- test that was graded out of 40 marks.

**Table 6***Paired Samples T-test for the Pre and Post-test of the Experimental Group*

Pair	Pre-Test Post-Test	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Interval Difference Lower	Confidence of the Upper			
1	-	-2.469	1.414	.250	-2.978	-1.959	-9.877	31	.000

As observed in Table 6, the significance value of the paired samples test is 0.00, which is less than 0.01 for the experimental group, which further substantiates that the application of the Schema Theory improves reading skills among adult ESL learners.

## 4.2. Analysis of Data for Research Question 2

### 4.2.1. Analysis of the Observer's Paradox

#### 4.2.1.1. Findings from the Observation Scheme

The observation scheme was used to qualitatively note down and identify, the activities, the reading skills practice, and the types of schemas used.<sup>162</sup> It was observed through the notes made based on this scheme that the three types of schema were used in all three stages of the lesson plans as follows.

<sup>162</sup> The interaction patterns, and the multimedia tools used.

**Table 7***The Use of the Three Schemas as Observed in the Lessons by the Observer*

Name of lesson	Stage of lesson	Reading skills practiced	The schema used at each stage
Seven ways to fast-track success	Pre-reading	Brainstorming	Content
		Making predictions	Content
		Vocabulary check (Drag and drop the word) <sup>163</sup>	Linguistic
	While-reading	Reading for information (True/False)	Formal
		Skimming and scanning (Summary)	Linguistic and Formal
		Reading for meaning (Select features and write personal perceptions)	Content, Formal, Linguistic
Post-reading	Role-play of a panel discussion	Content, Formal, Linguistic	
The Pursuit of Happiness	Pre-reading	Brainstorming/ Visualization Prediction of topic Vocabulary Check (MCQs) <sup>164</sup>	Content Content Linguistic
	While-reading	Reading for information (Yes/No/Not given) Drawing a mind map (Skimming and Scanning) Reading for meaning (Summarizing )	Formal and Content Formal and Linguistic Content, Formal Linguistic
	Post-reading	Paragraph writing (Writing a paragraph on the personal perception of happiness)	Content, Formal Linguistic

#### 4.2.1.2. Observer's Perceptions about the Application of the Schema Theory

In terms of schemata activation in the pre-reading stage, the observer highlighted that content schema played a major role in understanding the universal topics and that the pre-reading activities facilitated activating the schemata.

Observer: *"Yes, it was done adequately...Background knowledge was used to answer the conceptual questions...Culture and worldly knowledge played a huge role in this section because both the topics in concern were universal topics and not specific to Sri Lanka"*

<sup>163</sup> WordWall

<sup>164</sup> Kahoot

A vocabulary improvement was observed through the results of the paired samples t-test that was done to check vocabulary improvement which was marked out of 20.

**Table 8**

*Paired Sample Statistics for Pre and Post-Vocabulary Test of the Experimental Group*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreVoc	14.88	32	1.641	.290
	PostVoc	15.81	32	1.655	.293

According to the results of paired sample statistics of pre and post-vocabulary tests of the experimental group, there is a significant change in the mean values<sup>165</sup> between pre and post-vocabulary tests, which were marked out of 20.

**Table 9**

*Paired Samples Test Results for Pre and Post-Vocabulary tests of the Experimental Group*

Pair		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	PreVoc - PostVoc	-.938	.759	.134	-1.211	-.664	-6.984	31	.000

<sup>165</sup> Vocabulary Pre- test mean 14.88 and Post-test mean 15.81



According to the results, the two-tailed significance value is 0.000, which is less than the standard value of 0.01, depicting that there is an improvement in vocabulary.<sup>166</sup> Furthermore, it was noted by the observer that the use of vocabulary games was a new experience for the adult learners and created more interest in participating in the lessons. Moreover, during the discussion of word meanings, insightful ideas were expressed, enhancing the process of vocabulary learning.

Observer: *“Friendly competition tends to improve...interest in learners... as it was a “refreshing experience” as an adult to practice new words... Students even brought out points about new words added into the language...e.g. Primitive = Boomer which was very insightful.”*

The observer further expressed that the students were exposed to different structures during the lessons which enhanced the practice of formal schema.

Observer: *“Both lessons followed a newspaper article structure which the students...identified after the discussions... in the breakout rooms. The pre/post-test had...advertisement structures which... exposed to different structures of texts.”*

Thereby, it is observed that the data of the second research question has been analyzed concurrently, using both quantitative and qualitative data, further proving that applying the Schema Theory to teach reading skills within an online ESL will improve the reading skills of adult learners.

### 4.3. Discussion of the Findings

Reiterating, the Schema Theory is the “background knowledge in language comprehension...which” explains that “any text...written or spoken does not carry meaning by itself” (Carrell & Eisterhold, 1983, p.556). Discussing the findings of the study, it can be observed that the activation and broadening of students’ content schema, the broadening of linguistic schema, and the identification and understanding of formal schemas assist in creating a relationship between the language and the text, ensuring the productivity of applying the Schema Theory in teaching reading skills within an Online ESL classroom for adult learners.

The findings of this study were analyzed under two research questions respectively. These questions were quantitative and qualitative in nature to meet the prerequisites put forward by Bielska (2011). Summarizing the findings of the first research question, the quantitative results<sup>167</sup> depicted that the post-test results of the experimental group had improved in comparison to that of the control group.

<sup>166</sup> Experimental Group

<sup>167</sup> From the independent samples t-tests and paired samples t-test carried out.

Furthermore, the observer's paradox in the second research question substantiated the quantitative data as the observer depicted how the three schemas were used throughout the lessons along with other observations made during the sessions conducted for the experimental group. These findings led to the attainment of the two objectives of the study, thus proving that applying the Schema Theory to teach reading skills within an online ESL will improve the reading skills of adult learners.

It can be observed from the findings gathered through the pre and post-test results, and the perceptions of the observer that the activation and broadening of content schema assisted in improving the reading skills of adult learners. Further, it presents that using pre-reading activities such as watching videos, brainstorming, or visualization, discussions carried out in the schemata activation stage, and the prediction of the meanings given in the title of the passages essentially facilitate the activation of the content schema encouraging the use of cultural or worldly knowledge necessary to understand the texts based on the themes of happiness and success. Furthermore, the post-tasks of both lessons also require the use of worldly knowledge. This substantiates the notion of Chen (2019), which states that a teacher goes on to "introduce abundant background information... to broaden students' horizon and further enrich schemas in students' minds" whilst "activating ...existing schemas" (p. 630). This proves that content schema should be activated appropriately amongst adult ESL learners to comprehend the reading text.

Evidence within the study proves that the broadening of linguistic schema is essential in the improvement of reading skills amongst adult ESL learners. The quantitative analysis of vocabulary improvement alongside the qualitative findings depicted by the observer justifies this point. As Chen (2019) states, learners should not "memorize words by rote" (p.203). Hence, the lessons consisted of a drag the word and drop before the meaning and an MCQ exercise to match the meaning or identify similar words, which used gamification,<sup>168</sup> along with whole class discussions where information on new words was exchanged. This goes on to prove the statement that "without the knowledge of linguistic schemata, there will be no way to understand the words and sentences in the article" and "the more words the students know, the more confident they will be when they read" (Chen, 2019, p.203). This proves that linguistic schema should be activated appropriately amongst adult ESL learners to facilitate understanding the reading text, and the findings justify this further.

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<sup>168</sup> Wordwall and Kahoot

This study proves that the identification and understanding of the formal schema is an essential factor in comprehending the text fully. The lessons mostly used an argumentative article<sup>169</sup> structure, whilst the pre or post-test also included articles and advertisements, thereby exposing students to various structures. Hence, to fully understand the text, the structure of argumentative newspaper articles needed to be identified in the lessons, which the adult learners identified in the breakout room discussions. Within the lessons, various skills such as reading for information, skimming and scanning, and summarizing were practiced. The findings affirm the notion that practicing formal schema “trains students’ logical thinking ability but also tests students’ ability to understand and analyze articles” (Chen, 2019, p.204).

Taking all of the above factors discussed into consideration, this study posits that “the old schema will be used to build new schema and the students’ formal schema, content schema, and language schema will be further consolidated” (Chen, 2019, p.204) amongst the adult ESL learners between the ages of 21 to 24 within a Private Institution in the Western Province. The findings prove that this theory “can help students to strengthen the accumulation” and “further use schema knowledge” to “master reading strategies, and skills...effectively improve students’ English reading level” (Chen, 2019, p.204). It can be noted further that the outcomes of the findings correspond with the selected theoretical underpinnings of the Schema Theory depicting the advantages of teaching reading interactively, vocabulary improvement, and the comprehension of the text fully rather than when solely using a bottom-up approach.

## 5. Conclusion and Recommendations

As stated in the problem statement, to date, ESL reading skills are taught to learners using a bottom-up instead of an interactive approach. Thereby, the findings of the study along with the discussion depict that the findings are in line with the principles presented by Carrell & Eisterhold (1983), proving that the activation of the content, formal and linguistic schemas assist in the comprehension of the reading text, with the use of interactive activities when teaching reading skills within an online ESL classroom in Sri Lanka will improve the reading skills of adult learners. The application of the Schema Theory within this study has helped to achieve the anticipated outcomes of the study and is consistent in its practical applicability. This study proves the notion put forward by Carrell & Eisterhold (1983), which states that “reading comprehension depends crucially on the reader’s being able to relate information from the text to already existing background knowledge” (p.562).

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<sup>169</sup> Newspaper

In terms of pedagogical implications, this study provides the theoretical basis necessary to ensure the successful use of the interactive approach to teach reading skills using adult learners of ESL<sup>170</sup> in a private institution in the Western Province as its sample. Furthermore, the use of authentic lessons and teaching material to ensure the success of the interactive approach which uses the Schema Theory as its basis, allows students to activate and use previously and newly acquired background knowledge to comprehend a reading text. Moreover, through the view of both the researcher and observer, it is proven that the activation of the three schemas during the phases of reading is essential for students to understand a text completely as it also helps readers “expand... vocabularies and ... gain greater control over complex syntactic structures” (Carrell & Eisterhold, 1983, p.562). Thereby the use of the interactive approach whilst using the Schema Theory as its basis, evidently assists in improving reading skills within an online ESL classroom

In terms of limitations, it was limited to a geographic location and also to adult learners of a specific age group within a certain proficiency level<sup>171</sup>. Data gathering was limited to three weeks. Furthermore, it was limited to an online classroom setting and learners faced issues of connectivity when participating in the sessions. Finding times that were convenient for the learners to participate in lessons and interviews was also a challenge.

Focusing on aspects for future research, the researcher recommends that this theory can be tested on a larger sample group over an extended period. Furthermore, it is suggested that the Schema Theory can be used to teach reading skills within a physical classroom setting to gauge if there is an improvement within this setting. Moreover, this can also be recommended to be tested within the school setting, especially for Grade 12 and above in Sri Lankan schools, as these learners have a certain amount of background knowledge. Moreover, how exposure to authentic teaching materials will ensure the success of the teaching of ESL reading skills, using the Schema Theory as the basis to teach reading interactively.

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<sup>170</sup> Between the ages of 21-24

<sup>171</sup> Students who obtained above 5 marks in the proficiency test.

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