IJELS Educating for the Future

International Journal of Education & Literacy Studies
ISSN: 2202-9478
www.ijels.aiac.org.au

AIAC Flourishing Creativity & Literacy

Handwriting: Developing Pupils' Identity and Cognitive Skills

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ARTICLE INFO

Article history
Received: February 08, 2019
Accepted: April 29, 2019
Published: April 30, 2019
Volume: 7 Issue: 2

Conflicts of interest: None
Funding: None

ABSTRACT

This paper synthesises some of the recent studies that have made links between handwriting as an orthographic-motor strategy and the quality of pupils' learning and literacy skills. A poor standard of literacy is evident in many British school leavers and, in some cases, university graduates. The paper outlines the implication of this situation for educationalists, policy makers and future interventionist programmes. It also highlights a stark incongruity in British schooling. For instance, after primary school there is no legal requirement in the National Curriculum for teachers to teach handwriting skills. Despite that good handwriting improves pupils' level of literacy, enhances creative skills and develops their sense of identity, the process of abandoning the teaching of handwriting altogether has already begun in some countries. With reference to some key studies, this polemic paper puts the case that handwriting should be in the foreground not only at primary school stage but throughout pupils' secondary school education.

Key words: Handwriting, Literacy, Primary School, National Curriculum

INTRODUCTION

In the UK 1/5th of our secondary school leavers' reading age is that of an 11-year-old whilst another 5 million adults have 'below functional' literacy skills (Sippett, 2015). This translates into 1 in every 7 working people. Similarly, in 2012 a government report stated that out of just over 650,000 secondary school leavers, almost 20% are 'functionally illiterate' (DfEE, 2012). This means that they cannot handle much more than straightforward questions relating to any given text (Shepherd, 2010). In other words, they cannot decipher interrogatives at the lower end of the Bloom's taxonomy (who, what, where, when etc.) but not the higher imperatives (such as explain, analyse, apply, evaluate etc.) which would require a more detailed set of reading skills. It is, therefore, very unlikely (and, according to UK's *The Guardian* 'impossible') that many will understand such GCSE features as allusion and irony (Shepherd, 2010).

Understandably, this situation has raised eye-brows for policy makers (Morgan, 2016). For instance, there is a concern that a significant group of British people do not gain the level of competence needed in writing in order for them to be successful in school, the workplace, or their personal lives (Feder & Majnemer, 2007; Graham & Perin, 2007; Saperstein Associates, 2012).

However, this particular report does not lay claims to establishing a correlation between literacy (the ability to read and understand a text) and writing (the ability to convey clarity and structure of thoughts and ideas). The two discrete components are, more often than not, taught in relation with one another because the English subject (its delivery and assessment) does not make clear distinctions between these two entities.

A common explanation for why youngsters do not write well is that schools do not consider the intricate complexities involved in teaching handwriting skills (Thomassen & Teulings, 1983) nor do they have effective strategies, resources or investment that might assist in their imparting these skills (Kerr, 1975). Many schools do not fully appreciate the processes involved in the acquisition of skills for legible handwriting (Ellis, 1982) nor do they make links with progress and achievement. Yet there are multiple layers of sophistication and orthographic-motor skills inherent in handwriting (Van Galen and Teulings, 1983; Roaf, 2001; Van Galen and Meulenbroek, 1986). Orthographic-motor integration is the ability to call to mind and write letter shapes, groups of letters and words efficiently without allocation of cognitive attention (Berninger, 1994 as cited in Andrew, Hoffman & Wyse, 1994). These are aspects that are overlooked by schools. In a simplified way:

> (Handwriting) mostly involves control and coordination of the muscles and fingers, hand and arm, subject to visual guidance and monitoring and requires the simultaneous monitoring of the flexion or extension of the thumb and fingers of the writing hand and the abduction and adduction of the hand around the wrist joint (Kao, Hong, Wah, 1986, p. 47).

Some findings state that handwriting is causally related to writing (Graham & Perin, 2007; Graham, 1996; Gra-

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http://dx.doi.org/10.7575/aiac.ijels.v.7n.2p.177

ham, Harris, & Fink, 2000). By 'causally' they mean that bad handwriting habits lead to a poor quality of writing skills. They highlight the point that explicit and supplemental handwriting instruction is an important element in preventing writing difficulties in primary school (Van Galen & Teulings, 1983; Graham et al., 2000). Such studies highlight an ontological difference between 'learning to write' and 'learning handwriting skills' (Graham et al., 2000). The former is related to literacy and involved specifically with the ability to formulate letters and words with pen and paper whilst the latter is concerned with the efficiency and speed of writing. These are two distinct pedagogical imperatives.

Although the process of teaching handwriting in the UK is conducted with some enthusiasm at primary school level, it soon vanishes or is pushed onto the side-line when pupils enter secondary school education (Medwell & Wray, 2008). This is because there is an assumption that after primary school pupils have mastered handwriting simply because they can write and thus no longer require further tuition in this area (Nicholls, Beuers, Pettit, Redgwell, Seaman, & Watson, 1989; Wyse, 1998). Whilst grammar, punctuation and spelling have regained prominence in literacy/English lessons (indicated by OFSTED and examining boards like AQA and the directives in the white paper*, The Importance of Teaching*, 2010 (which became the basis of the Education Act, 2011), very little emphasis is placed on handwriting skills for teenagers (Medwell & Wray, 2008). Yet there have been some studies both in the USA and the UK that indicate the importance of handwriting (especially various forms of cursive writing) in developing pupils' cognitive abilities (Van Galen & Meulenbroek, 1986; Yates, Berninger, & Abbott, 1994). Good handwriting skills can assist in pupils' academic success especially in relation to spelling and vocabulary building (Cripps & Cox, 1989; Ellis, 1982; Peters & Smith, 1993). Studies have defined some correlation with pupils' quality of writing and their mental capacity to process and retrieve information.

Although very little evidence makes explicit assertion about handwriting to produce academically gifted pupils, the probability of pupils doing well in exams, as a direct result of their handwriting, is increased. The acquisition of good handwriting skills helps with pupils' spelling and 'visual regularity' (Peters, 1985; Peters & Smith, 1993). For instance, it is argued in some quarters of education psychology, that good cursive handwriting enables pupils to connect with the workings of their language (Kao et al., 1986; Van Galen & Teulings, 1983). In particular, it develops pupils' automaticity. Automaticity is a technical term that refers to pupils' ability to reproduce correct shapes of words with letters, loops and joins without the persistent need to recall and check their accuracy (Feder & Majnemer, 2007; Jones & Christensen, 1999; Saperstein Associates, 2012). Automaticity (how quickly pupils retrieve and record the language from the brain to the page) is different from orthographic-motor integration since the latter relies on the hand and wrist movement and/or manipulation. In turn, and together, these skills are likely to improve pupils' writing speed (Peverley, 2006).

One possible strategy might be for schools to put a handwriting programme in the forefront of literacy lessons. With this in mind, educationalists and policy makers could refocus their pedagogical objectives not only to improve pupils' literacy, but to heighten their sense of creative connectivity in a wider social context. This would also tie in with UK government's concerns about embedding British values in pupils' learning. The teaching of handwriting is important (Cripps, 1989). Every country has established its history and its cultural characteristics through writing. The recording of thoughts and ideas is a form of reflective activity. All philosophical ponderings and scientific discoveries have been preserved by handwritten scripts which, in turn, have become the blueprints for differing cultures. The art of writing was once performed patiently by monastic scribes. They acknowledged a certain beauty and nobility inherent in the glide and flow of the nib and ink on paper.

On another level, handwriting can be revelatory. It is a forensic indicator like a signature that gives the external world signs of individual personalities and characters (Quigley, 2016). It is interchangeable with fingerprints; it is almost a part of our individual DNA. As such, teachers need to enhance pupils' sense of *who* they are by examining *how* they write and what their style of writing reveals about them. How do they project themselves to the outside world? As graphologists (experts in the study of handwriting) would concur, handwriting says so much implicitly. Apart from character, it can reveal a strong sense of human connectedness and stark intimacy. Steve Carell, the American comedian, put it well when he stated: 'My mom is the only one who still writes me letters. And there's something visceral about opening a letter – I see her on the page. I see her in her handwriting' (O'Dell, 2016). In scrutinising someone's pattern of writing, the reader can visualise and sense them as living entities even if they are historical figures. One can 'feel' their closeness.

With this in mind, it seems only sensible for schools to devise a coordinated set of strategies for literacy that puts handwriting in the forefront of teaching and learning.

Moreover, a handwriting programme for secondary school pupils would tie in with teachers' embedding of equality and diversity, safeguarding and citizenship. Along with building pupils' confidence in their use of language (Kao et al., 1986; Van Galen & Teulings, 1983; Sassoon, Nimmo-Smith, & Wing, 1986) and 'emotional self' (Yates et al., 1994), these are components that are currently prominent in the National Curriculum which government and policy makers have highlighted in the form of legislation and directives. Teaching writing skills could be a way of focusing on the pupils as individuals (such as their learning needs, their weaknesses etc.). The quality of a pupil's handwriting can reveal not only aspects relating to hand/eye coordination but other problems such as dyslexia and ADH – Attention Deficit Disorder (Yates et al., 1994; USA Department of Education, 2004).

By looking at the current situation and the historical background in which handwriting has played a pivotal role in educating pupils in various cultures, this paper argues for a re-examination of our attitudes to the teaching of

handwriting skills. It makes the case that schools need to-formulate robust teaching and learning strategies to address pupils' ability to record information by hand. In the Programme for International Student Assessment (PISA, 2012) results, the top 5 countries were from the Far East. Is it a coincidence that these countries systematically teach handwriting up to the age of 16? Whatever one might interpret, it is the case that Britain, in comparison, is lagging behind. At present (out of 68 countries) United Kingdom is 23rd in Reading, 26th in Mathematics and 20th in Science. These existing figures may concern educationalists even if a new report is being compiled for 2020 to take into account any changes. The paper concludes with recommendations to teachers and policy makers on how and why handwriting needs to be the focus of schools' literacy lesson.

CURRENT SITUATION

Between my finger and my thumb
The squat pen rests; snug as a gun…
I'll dig with it.
Seamus Heaney, 'Digging', *Death of a Naturalist,* 1966

Many people of the pre-1990s generations will have some memories of their English teacher standing against the blackboard equipped with a piece of chalk and wooden duster. They will recall faint horizontal lines on the board on which the teacher would demonstrate the hoops and loops in the shapes of letters. Countless literacy hours would be spent in the demonstration of the reversals and conjunctions; the strokes and exits in cursive writing which the pupils would then have to imitate in their exercise books by using pencils. It was only after they had proved themselves that they were elevated to the rank of 'pen-competent-pupils' (Hallows, 2009).

Governing this pedagogical practice was a thought that the quality of a written expression was not just to do with *what* pupils wrote but *how* they wrote it. It was believed that cursive writing, in which letters are joined up with one another, led not only to a neat record of a text but it also accentuated fluidity and speed (Perverley, 2006). It developed pupils' wrist manipulation, strength, flexibility and effective penhold/grip (Sassoon et al., 1986). Such orthographic-motor skills developed pupils' knowledge of literacy, spelling and vocabulary (Cripps & Cox, 1989; Peters, 1985). Through daily or regular handwriting exercises pupils acquired confidence in the written language and an attachment with words. Some studies even report that quite often failure to attain handwriting competency during the school-age years, has negative effects on both academic success and self-esteem (Feder & Majnemer, 2007; Saperstein Associates, 2012). Feder and Majnemer (2007), in particular, establish a strong correlation between academic achievement and pupils' overall confidence and motivation at school (Yates et al., 1994).

Fine motor control, in-hand manipulation, visual perception, sustained attention, and sensory awareness of the fingers are some of the component skills studies have identified (Thomassen, & Teulings, 1983). Poor handwriting is detrimental to pupils' performance in classwork and examinations and may also be related to certain intrinsic factors, which refer to pupils' actual handwriting capabilities (Briggs, 1970; Markham, 1976). For instance, the physical movement of the hand with the pencil is neurological; it connects with the part of the brain that records the shapes and letters with automaticity. Saperstein Associates (2012) analysed brain activities of pupils by using Functional Magnetic Resonance Imaging (FMRI) and discovered that pupils who struggle with handwriting are less efficient in engaging their brains when learning to write new letters. The connection with writing process helps pupils to visualise and memorise sequencing of letters (spelling). This also aids their automaticity, the ability to formulate words without thinking too much about the letter-order, their cursive shapes and curvatures. Forming letters by hand also engages the pupils' thinking brain, allowing them to explore, analyse and synthesise textual information. This is likely to have a positive impact on pupils' performance in controlled/assessed activities such as exams where speed, legibility and correct formulation of words and letters ultimately help pupils to secure good grades; So, as one of the objectives of schooling is to instigate brain activity amongst our pupils, then schools should employ handwriting instructions in class to unlock pupils' potential.

Ultimately handwriting skills aid pupils in written examinations. Here candidates are required to demonstrate their understanding in controlled conditions in which handwritten scripts have to be produced (Briggs, 1970; Butler & Stevens, 1979; Markham, 1976). Many candidates do not perform well because they have not practised using the pen enough. A lack of practice in class contributes to poor handwriting skills which in turn affects educational attainment. Exams in most countries still come in the traditional form.

In this respect, older generations of people fare better. This is partly because during their school years, it was not uncommon to copy texts or reproduce words hundreds of times, usually as a form of correction or chastisement (Hallows, 2009):

At my primary school in the 1970s, whole classes were devoted to work being "written up for best" and I remember a narrative piece coming back unmarked because I had crossed out a single word (Hallows, 2009).

In regard to speed and legibility, there is a commonly held belief that older generations of people (schooled during the 1990s or before) have better handwriting styles, coordination, eligibility and speed than many of our pupils today. It also assumes that they are inclined to spell more accurately and display a better understanding of syntax, punctuation and grammar than their modern counterparts. On this point, Ziviani's study (1984) investigated whether the ability of pupils to write fast was related to their ability to write legibly and whether a pupil's left or right handedness made any difference. Although it recorded no significant differences in speed on the basis of laterality (the side of the brain that is most dominant), it did note that girls wrote faster than boys and that speed, accuracy in spelling and legibility were clearly related (Ziviani, 1984). There is, some correlation between automaticity and orthographic motor integration and pupils' ability to write with speed and accuracy.

However, it is not the fault of our young people that they demonstrate certain literacy deficiencies. Some reports indicate that the teaching of handwriting skills started losing its popularity perhaps as early as 1970s. This was due to a discernible shift in educational circles that self-expression was more important than collectiveness and uniformity. This became a part of a pedagogy termed as *emergent writing* (Hall, 1987; Teale & Sulzby, 1986) and *process approach* (Graves, 1983). The quality of pupils' handwriting would suffice as long as it was legible. In this school of thought, less attention was given to speed (Perverley, 2006) and automaticity (Jones & Christensen, 1999). It could also be argued that teaching pupils to spell phonetically, which became prominent in the early 1970s, may have hindered their literacy development. Coupled with pupils' overt reliance on IT from the latter part of the 1990s, there is no doubt that there was a decline in the importance of handwriting skills.

Today literacy levels amongst our school leavers are poor though how poor depends on which study you reference. But, it is the case that despite the attempts of recent UK's governments on addressing pupils' standard of literacy, little impact has been discernible. According to newspaper editorials, standards are more or less the same as they were in the latter part of the 1990s. Even the Department for Education and Employment have conceded that 110,000 pupils have a poor level of literacy (DfEE, 2013).

Recent reports suggest that educationalists need to re-evaluate the current situation which is contributing to low achievement at each of the 4 Key Stages (Joseph Rowntree Foundation, 2007; National Literacy Trust, 2016). But before this is undertaken, the subject of teaching handwriting needs to be put into some context in order to identify the main concerns.

HANDWRITING

A Gateway to Learning

It has been reported that Finland is in the process of abandoning the teaching of handwriting in favour of typing and keyboarding skills whilst in the USA over 75% of the schools no longer prioritise writing skills in their literacy lessons (Russell, 2015). To such countries, actual writing (with pen/pencil) is an anachronistic activity that sits incongruously in modernity. In some respects, social media and its demands have overtaken traditional skills pupils used to learn at school. Even in the UK handwriting is no longer prioritised in literacy education in the way it used to be 20-30 years ago (Hallows, 2009).

To some extent, this can be evidenced with reference to recent policy such as the National Curriculum for England, the concerns of the Qualification and Curriculum Authority (the body that oversees quality of examinations and assessments in the UK) and the accompanying frameworks and directives set out by the government for schools. For instance, *Developing Early Writing* (DfEE, 2001) advises teachers on teaching basic writing skills to 4-7 year olds. However, as a directive, it acts as a mere guideline because there is no compulsion on the part of teachers to adopt it (Wyse, 1998). This is apparent even at Key Stage 2. Although there are one or two directives about the formulation, orientation, size and consistency of pupils' letterings, little detail is given about the cursive styles, movement and speed. In reality, handwriting is neither assessed nor measured with any real standard of criteria, rigour, compulsion or obligation. As Medway and Wray (2008) observe in regard to Level 4 criteria, as long as the candidates' scripts are fluent, joined and legible no other demand is made of pupils. There is no mention of neatness, control, standardisation or formulation of letterings.

Generally, this is the total sum of the requirements for handwriting at primary school. By the time pupils enter secondary education, an assumption is made that they know how to write. It is just assumed that the effective formulation and efficiency of letterings have been mastered and hence no further instructions are necessary. This view is also reflected by the numerous resources and accompanying strategies on teaching handwriting skills at primary school stage. However, there is almost a complete absence of such resources, directives and programmes at secondary school level. Yet, and quite rightly, all other skills such as spelling, grammar, vocabulary-building, reading comprehension, syntax continue to be taught and assessed.

This assumption that pupils no longer require tuition in handwriting, is flawed. It is estimated that out of more than 650,000 school leavers over 100,000 have poor English/literacy skills (DfEE, 2012). Employers and further educational institutions perennially despair at pupils' level of competence in literacy. Statistically, British pupils are falling behind the world in literacy skills. According to the PISA results (PISA, 2012), out of 68 countries in the league table the UK is 20th whereas countries of the Far East like Japan, Hong Kong, Singapore and Taiwan occupy the top 4 positions. These are countries that the former UK's Education Minister, Michael Gove, referenced in his Education Act, 2011. He deduced some correlation between these countries that place great emphasis on traditional pedagogical skills and our own teaching and learning strategies. For instance, many countries in the Far East (China, Japan, Taiwan, Singapore etc.) rely on handwriting as a key discipline in providing a structured mind, cognitive skills and the ability in pupils to possess and retrieve textual information. In such countries, handwriting is the linchpin of the curriculum and the schools' programme.

In addition, there is evidence to suggest that handwriting leads to the improvement of spelling. Although this must be approached with a note of caution (Barnett et al., 2006), there is little doubt that the hand movements involved in lettering help pupils to relate to language and develop the concept of a word (Cripps, 1988). This is because kinaesthetic learning has some bearing on pupils' cognition. For instance, it has been evidenced that there is a strong relationship between visible tracing of hand movements and the clarity and fluency of handwriting (Jones & Christensen, 1999). Some reports suggest that effective learning depends on the quality of pupils' instructions on handwriting (Sassoon et al., 1986; Kao et al., 1986; Van Galen & Teulings, 1983) gained in primary school and developed during secondary education.

So the current dispensing with the teaching of handwriting in secondary schools is ill-advised because pupils are effectively denied a tool for further education. This will have some effect on their attitude and attainment and, which in turn, will have repercussions on employability and social mobility. For instance, a report (*Every Child: A Chance Trust*, 2009) stated that at 16 years of age, over half of the boys with poor literacy skills thought that school was a waste of time. The implications for pupils' future prospects and social mobility are obvious because low educational attainment means lack of opportunities. If pupils think that secondary schooling has no value, then what chance have teachers got in helping them gain skills and knowledge for the job market? But just as significant is the expense to the economy:

On this basis, the total resulting costs to the public purse arising from failure to master basic literacy skills in the primary school years are estimated at between £5,000 and £43,000 per individual to the age of 37, and between £5,000 and £64,000 over a lifetime. This works out at a total of £198 million to £2.5 billion every year (*Every Child: A Chance Trust*, 2009:15).

Apart from the actual costs, there is also evidence to suggest that the longer the pupils are left to write as they please (without instructions), the more challenging it is for them to readjust in later school years (Graham et al., 2000; Christensen & Jones, 2000). In other words, it becomes more difficult to correct pupils' style of handwriting for the purpose of clarity, presentation, speed and legibility when they have picked up bad habits/techniques.

Despite all this, the popularity of handwriting declined as an orthographic-motor strategy about 20-30 years ago with the emergence of the 'creative process' in which the teacher is merely a facilitator not an instructor (Emig, 1988; Murray, 1982). The emphasis on classroom technology and new learning tools such as the teaching of phonetics or phonics have shifted our focus on the type of skills schools expect from pupils. Writing, not unlike art, is regarded as fluid; it breaks the rules; it refrains from slavishly following a set formula for expression. In this school of thought, pupils' creativity outweighs the quality of the tools they exhibit in expressing their imagination: As Medwell and Wray point out:

> Children were encouraged to write freely and to use their emerging but incomplete, understandings of language and writing skills to express themselves with a pen (Medwell & Wray, 2008, p. 37).

Similarly, a head teacher reports:

> These days, the shape of a child's ovals, loops and slants matters less than what they write. Content is everything. The emphasis is much more on having a go, and expressing yourself, and getting the ideas down. Letter formation is still taught in the early years of primary school, but the appearance of handwriting takes less of a priority as children get older (Mark Brown, head teacher of St Mary's Catholic Primary School in Axminster, as cited in Hallows, 2009).

In effect, the assessment of control, neatness and quality of formulation of pupils' letterings have almost been relegated to the side-line. Yet the presentation of pupils' responses in written examinations do have bearings on the grade they are awarded (Hughes et al., 1983). Moreover, the planning, drafting, revising and proofreading of a piece of work and the commentary on the process through which it is devised (assessed features at A' Level English) are carried out wholly on computers. As such they have taken attention away from the importance of pupils' quality of presentation. Yet it could be argued that pupils' drafting work by hand might, lend itself to a fuller detailed analysis of language. Moreover, secondary pupils are expected to learn, understand and apply dense textual information for examinations (Briggs, 1970; Markham, 1976). Teachers have often complained that the use of IT, especially computers in English/literacy lessons, have led to pupils' lack of engagement, connection and association with the written text (Doug, 2016 b).

Pupils are offered fewer opportunities to present handwritten assignments because teachers invariably insist on typed out work. This is partly because developing pupils' competency in Information Technology has been identified as a key area for improvement. It is a part of employability skills and so all teachers are expected to embed this by creating appropriate learning resources and opportunities for pupils to utilise classroom technology.

It has also been evidenced that there is a strong relationship between orthographic-motor integration related to handwriting and students' ability to produce creative and well-structured written text (Christensen, 2005; Roaf, 2001). This is related to the cognitive load which results when attention is required by pupils to write on paper. The lack of automaticity in orthographic-motor integration means that pupils do not have sufficient cognitive resources to accomplish the more demanding aspects of text production such as ideation, text monitoring, and pragmatic awareness (Roaf, 2001). It has been argued that a systematic handwriting programme can significantly improve the quality of written text by pupils experiencing problems with orthographic-motor integration (Christensen, 2004). This can also have a strong bearing on pupils' spelling ability. For instance, Peters (1985) identified an important feature in spelling, suggesting that there is a link not so much with the consistency in sound and spelling (grapho-phonemic regularity) but with the probability of letters occurring together. The study makes an important link between visual and kinesthetic learning of spelling. It concluded that speed of writing is integral to the improvement of spelling. In other words, in writing of any kind there is a prominence of visual regularity and coordination. Yet this aspect is rarely brought into the equation when teaching spelling or handwriting skills to our pupils (Cripps & Cox, 1989).

In the USA another study (Christensen, 2004) investigated the effectiveness of an interventionist handwriting project designed to remediate older students' problems in orthographic-motor integration. The programme explored ways to enhance pupils' written language skills. Two groups of students in Grades 8 and 9 (13 and 14 year olds respectively) were provided with either practice in handwriting or required to complete written journal entries daily. There was no difference between the two groups at pre-test. At post-test, however, the handwriting group had significantly higher scores in orthographic-motor integration as well as

for the length and quality of the text they wrote. It led the researchers to conclude that effective intervention in the form of comprehensive strategies can alleviate some problems relating to pupils' low attainment especially in the context of written assessments and exams.

Some researchers acknowledge that handwriting is a very demanding task, requiring the orchestration of a variety of cognitive resources. In one study (De La Paz & Graham, 2002), secondary school pupils were taught strategies that would enable them to carry out various handwriting tasks. Through a carefully designed programme, they were also taught the knowledge and skills needed to complete these tasks. A month after following instructions, the pupils were tested. In comparison to peers in the control group, students in the experimental group produced essays that were longer, contained more mature vocabulary, and were qualitatively better in terms of presentation of ideas and their sequencing.

It is also the case that pupils work more effectively and require minimal differentiated tasks/outcomes if they have a good depth of capacity (Kellogg, 1999; Hayes, 1996; Gathercole, Pickering, Knight, & Stegmann, 2004). This is the ability to consume information about the structure, shape and patterns of words; it helps pupils to become independent workers. A similar point is argued by Medway and Wray (2008) who state that there is a correlation between capacity (the ability to store information) and automaticity (to retrieve information onto the page). It is also the finding in a report published by Saperstein Associates, 2012. In the latter, it was concluded that both components (capacity and automaticity) enhance the pupils' ability in language and hence improve the quality of their ideas. Improving pupils' handwriting, therefore, has some bearing on their ability to upload and down load information from the brain.

In another study, in the field of neuroscience (Longcamp et al., 2008), it was concluded that learning a new language that is graphically different from English (such as written Chinese, Japanese or Hindi) enhances pupils' ability to absorb a range of spelling variants. It also aids memory and recognition of the different patterning of words:

> Greater activity related to handwriting learning and normal letter identification was observed in several brain regions known to be involved in the execution, imagery, and observation of actions, in particular, the left Broca's area and bilateral inferior parietal lobules. Taken together, these results provide strong arguments in favour of the view that the specific movements memorised when learning how to write participate in the visual recognition of graphic shapes and letters (Longcamp et al., 2008, p.802).

In the same study (Longcamp et al, 2008), respondents were asked to distinguish between a set of new characters and a mirror image of them. They did this after producing characters using pen and paper and a computer keyboard. The results were that respondents writing by hand had a stronger and more lasting recognition of the characters' proper orientation. This helps us to deduce that specific movements memorised when writing, aids the visual identification of graphic shapes and patterns. In other words, working on pupils' handwriting can assist in developing their reading skills. Similar findings are reported by other studies (Saperstein Associates, 2012) including research at Washington University (Berninger, 2006) in which psychologists found a clear link between sequential finger movements and brain activity. Berninger (2006) found that:

> direct handwriting instruction with visual cues and verbal mediation led to improved automatic handwriting (rate of writing legible letters) and improved word reading;
>
> orthographic-motor training did improve performance on a grapho-motor planning task for sequential finger movements that is relevant to composing (Berninger, 2006, p.3).

Although the study found that there is no value added to reading per se, such evidence does suggest a correlation between writing by hand and an increase in accuracy in pupils' orientation and formation of words. It could be argued, therefore, that our side-lining the teaching of handwriting skills in recent decades may have contributed to the decline in pupils' attainment. At the very least, its absence has not enhanced pupils' automaticity nor developed their capacity to register and memorise a range of spelling variants and the shape of words (Cripps & Cox, 1989; Peters, 1985).

Related to this is an important point that needs to be reinforced: the recording of textual information by hand (a kinaesthetic tool) as opposed to tapping on the keyboard does assist in creating long term memory. The feel, the shape, the movement in the recreation of words on paper etc., suggest there is a correlation between memory, capacity and coordination of hand movement that employ kinaesthetic tools (Saperstein Associates, 2012). This is certainly the view held by a number of researchers/critics working in this field (Cripps & Cox, 1989; Berninger, 2006). They argue that honing in on handwriting can only assist in raising pupils' performance and attainment in text-based subjects in social sciences and humanities (such as Religious Education, History, Geography). Handwriting is a pedagogical tool that acts as a conducive gateway to learning.

HANDWRITING AND THE SELF

At present schools in the UK do not have any legal compulsion to teach handwriting skills post-Year 4 (when pupils are aged 9). Yet, there are some studies that make a link between letter formations, joins and penhold and ease of expression (Berninger, 2006; Longcamp et al., 2008; Sassoon et al., 1986). In particular, Sassoon et al. (1986) and Cripps and Cox (1989) demonstrated that there was a strong connection between the visible trace of hand movements and the clarity and pupil's fluency of handwriting. They found that a structured programme of intervention into pupils' cursive skills from the outset, could enhance their potential and ability in various subjects that rely on literacy skills.

However, over the years, the teaching of handwriting skills has been abandoned in the UK. Despite the Education Reform Act of 1988 introducing the National Curriculum and providing an overhaul of the education system, there were no directives and nor were there objectives in such sub-

sequent documents as NLS Framework for Teaching (DfEE, 1998) to impose a particular style of cursive handwriting upon pupils. It is, as Medwell and Wray (2008) point out, naturally assumed that pupils no longer require instructions in this skill after primary school.

Today's situation regarding the under achievement of our pupils in literacy encapsulates the trend from the past. It has heightened and deepened the disparity between the performance of girls and boys in the production of their written work (Ziviani, 1984). It is argued that boys do not engage with the writing process the way girls do and so perhaps schools need to think about the different ways they teach handwriting to these sexes. However, this is not a statement of intelligence or academic ability. It simply requires a consideration of specific pedagogy and strategy. This situation has also polarised the teachers' need to nurture pupils' creative impulses to strengthen their quality of expression, ideas and thoughts and their need to standardise their pupils' written production. Yet, despite the overwhelming evidence, little research is being conducted in this area at secondary school level.

The situation is also concerning in relation to teacher training courses. For example, there is no requirement for prospective English teachers to focus on handwriting as a pedagogical necessity. So, little time is set aside for the teaching of 'traditional' literacy tools, such as handwriting skills (Roaf, 2001).

Coupled with an apparent lack of teaching resources that deal specifically with handwriting and a lack of directives designed to instruct and assist secondary school teachers on how to evaluate and correct pupils' handwriting, teachers refrain from making 'personal' criticism of pupils' quality of handwriting in the way they might refrain from correcting their vernacular, dialect or accent. It is, more often than not, seen as a criticism of who they are or their sense of cultural identity (Doug, 2016b).

This is in contrast to some other countries. In France, for instance, flowing, joined-up handwriting is considered fundamental, a physical skill that, once mastered, unlocks the mind (Thomas, 1997; Cotton, 1990). In both primary and secondary schools:

> A longer time is devoted to developing the fine and gross motor skills needed for joined handwriting. Once these are in place we see a new quality in our children's work both in the communication of their thoughts and in their presentation – speed, spelling, punctuation and grammar. It is as though, having automated the hand, the children's minds are 'liberated' to release their ideas more effectively and creatively on paper (Thomas, 1997).

The idea that pupils should be 'liberated', so that they can release their ideas stored in their head onto the paper with ease and efficiency, is nothing new. It was identified in the Select Committee Report to the House of Commons on Education and Employment, 2000 looking specifically at skills for secondary school pupils. The report made recommendations to the government to focus the teaching of literacy to embody the centrality of handwriting. Its effectiveness in the development of motor coordination skills in the early years has already been documented. Although it would be disingenuous and fallacious to make any associative comparisons with pupils' quality of written expressions and their attainment in timed assessments, it would be fair to say that our lack of focus on handwriting has disadvantaged pupils when they sit GCSE examinations in Year 11 (15-16 year olds). This is particularly the case with pupils who are less able learners, who in the class require differentiated tasks/outcomes (Chow, S and Tseng, 2000). One of the common complaints amongst this group is that they could not complete the assessment/examination because they ran out of time. Graham (1992 as cited in Graham & Weintraub, 1996) states pupils need to know how to write quickly and eligibly. Therefore, schools could improve pupils' attainment by aligning classroom strategies with examination techniques. Studies (Bashore, 1982; Peters, 1983; Peters, 1987; Schneck, 1991) indicate that in using a pen to write, pupils write faster (speed) and a lot more in terms of text (quantity) than when using a keyboard. These studies also show that pupils have a better connection with the shapes and patterns of words when they are writing than when they are typing.

There is also evidence to indicate that handwriting aids memory. Through writing, pupils' ability to record and retrieve information learnt is much more discernible. For instance, pupils invariably revise by recalling and writing down facts. It is the most convenient and accessible method of digesting textual knowledge. Very few pupils revise by typing on the keyboard. This report carried out a basic survey amongst teachers. The aim was to find out how many of them had used a pen to write more than half a page of A4 paper in the last 6 months. Out of 15 respondents chosen randomly only one person laid claim to this. That is effectively 5%. So if the pen is an alien tool to professionals directly involved in education, how unfair is it that schools and educationalists expect pupils to perform well in written examinations with no instructions on handwriting skills or guidance on how to hold a pen?

It is the view of this report that specific instructions in handwriting, and in particular cursive writing, would enhance the pupils' ebb and flow of written expression. It would help to deepen pupils' capacity and accentuate their written efficiency and speed. Clearly there is bias in favour of neatness and presentation of pupils' responses (Alt, Bottenberg, Greifeneder, Seele & Zelt, 2012; Sweedler-Brown, 1999). This is also the finding of a study in the USA which examined the way learners with a slow handwriting speed performed in written tasks (Chow & Tseng, 2000). It concluded that slow and normal speed handwriters responded to handwriting demands through different perceptual-motor system. Whereas upper-limb speed and dexterity seems to play an important role with handwriters with normal speed, handwriters with a slow speed rely more on visually directed processes, including sequence memory and visual-motor integration. Early training and/or a longer period of instruction may help to remedy this problem significantly.

Similar findings were also evidenced by a major study carried out on slow learners at Lord Williams' School (Rutherford, 1996). The study was based on the premise that

speed and legibility of handwriting are key factors in pupils' capacity to do well in school work and examinations. It found that slow learners with severe difficulties were very concerned about the appearance of their work. They had low self-esteem and were under-achieving because they could not retain, retrieve and produce a set of information in a given time (Yates et al., 1994). Rutherford (1996) concluded that this was because they had not had enough practice in writing with a pen, relying almost wholly on producing work on computers. This, in turn, impacted on their hand coordination, style, speed and efficiency in writing.

But all this can be alleviated.

By focusing pedagogical concerns on pupils' handwriting skills, teachers will not only help them to attain and secure better marks but it will also define their individuality and help them to improve their expression and creative abilities. Perhaps it was easier some 20-30 years ago when there were fewer distractions and when the main form of recording thoughts was writing.

There is also emotional connectivity associated with handwriting something which typing removes through the printed fonts. Handwritten notes convey certain sincerity and feelings. It establishes the character of the one holding the pen. Essentially, there is an idea that handwriting presents not just the text but feeling, mood, and, particularly where there are crossing outs, thought processes. On this point, the British Library expressed concerns that more and more authors are resorting to writing their drafts on computer by using typing/keyboarding skills. As a result, the Library argued that a significant element of the creative process, evident in edits, drafts and revisions, is being lost. Some archivists believe that such a loss denies the reader of the intimacy with the author, the time, the place and the thought process. With the printed text, one merely gets something unified, homogenised and clinical.

Despite the growing number of studies into handwriting since the 1980s (Askov & Dobbie, 1995), schools give little time to forms like letter writing. Such modes of communication have almost become obsolete especially amongst many of our pupils (Hallows, 2009). We are in a world of printed texts (emails, smartphones and social media) and instant communication. Modernity and IT has almost displaced traditional writing skills that, today, written texts in public are rare.

In the light of UK government's concern about attainment, social mobility and the employability aspect of our pupils' education, focusing on the teaching of handwriting will help pupils to prepare for the demands made by formal assessments and exams. In recent years, there has also been a notable decline in pupils' standard of spelling, punctuation and grammar. In this regard, some research indicates that handwriting improves spelling and punctuation accuracy (Cripps & Cox, 1989). It will help pupils to gain better grades which, in turn, will help to increase their employability factor and/or secure places in further and higher education.

The current situation, where 20% of our school leavers have a poor level of literacy (DfEE, 2012), will have serious implications for the economy and social mobility. It is estimated by the World Literacy Foundation that this situation costs the UK's economy is about £38b per year (Anderson, 2015). Handwriting can develop pupils' technical accuracy and accentuate their identity and cognitive skills. Prioritising the teaching of handwriting skills will aid educationalists and policy makers to define and develop their pupils' progression into the world of work and provide the market economy with prospective employees who are academically functional. At the moment, prospective employers (CBI, 2014; Macey, 2013) are critical of the literacy standards of their new recruits who have insufficient skills to grapple with long texts or to decipher key ideas, make sense of them and apply them in differing contexts.

Teaching handwriting skills can also lead into an exploration of pupils' imagination by developing their sense of self and identity.

For instance, cursive writing in the form of signatures might also hint at how pupils reflect themselves to the world. Handwriting is also important because it is usually one of pupils' first encounters with literacy. Pupils often learn about the world of print by first learning to write their name As such, handwriting is the tool for personal expression of a child's growing literacy skills (Askov & Dobbie, 1995; Doug, 2016a). For instance, how many pupils idly practise their signatures to get the right shape and style? Such a preoccupation in class is almost on par with 'selfies' where young people take numerous pictures of themselves just to get the right pose, that ultimate shot. They know that the way they write their name like their picture, has bearing on what image they are presenting to the world. Their signature says something about fashion, styles and trends of the day.

Similarly, graphologists like Elaine Quigley (Chair of the Institute of Graphologists UK) argue that the style of a given handwriting can reveal characteristics and personality traits of its writer (Quigley, 2016). Sometimes they can highlight emotions and thought process especially if there are traces of crossing outs. A particular style of handwriting can reveal personality and emotions.

Essentially, handwriting aids and accentuates the creative process. Writers are used to drafting and editing hand-written poems. The pen and paper have a certain centrality in the production of art. They use the pen because the process allows them to "feel" the words. It gives them a sense of the shape of the language and hence the "shape" of the idea. So learning handwriting skills helps pupils to think about the subject of their writing. It helps them to reflect on the language, to consume its variants, size, shades and tones. Ultimately, cursive handwriting can provide pupils with a sense of who they are, a journey of exploration. In the shape and construction of the printed words, it can open their imagination and reflect their identity. It helps pupils to develop self-esteem. This ties in with the recent *Every Child Matters* (Green Paper, 2003) and the subsequent safeguarding directives from the government and policy makers. Handwriting does not only develop pupils' ability in the subjects but gives them confidence in themselves (Yates et al., 1994). In doing well at school, pupils are more inclined to feel good about themselves (emotional self); it accentuates pride, self-worth

and self-esteem. As such, pupils are also more likely to be open-minded and consider questions about cultural identity by adopting an inclusive perspective.

So, in denying our pupils this means, schools are denying them the process to individualise their identity and emotional self.

RECOMMENDATIONS

This paper has synthesised existing research studies to establish a link between handwriting skills and pupils' ability to perform well in timed activities such as exams. It suggests that pupils would perform better if teachers taught, encouraged and allowed their pupils to develop and practise their handwriting skills up to their final year at secondary school.

The paper has also identified research that suggests there is a link between pupils' orthographic-motor integration skill and brain activity.

The following recommendations are made not only to enhance pupils' emotional self and their sense of identity but to improve their literacy skills, brain activity, creativity and imagination:

Instructions in handwriting should continue into secondary schools and teachers should not assume that evidence of pupils' writing denotes evidence of *good* or *acceptable* quality of writing

- Schools need to align classroom tools with exam tools. Studies indicate that in using a pen to write, pupils write faster (speed) and a lot more in terms of text (quantity) than when using a keyboard. These studies also show that pupils have a better connection with the shapes and patterns of words when they are writing than when they are typing. Similarly, schools need to focus on revision techniques by making handwriting prominent in class**.** There is evidence to indicate that handwriting aids memory. Through writing, pupils' ability to record and retrieve information learnt is much more discernible. Pupils invariably revise by recalling and writing down facts. It is the most convenient and accessible method of digesting textual knowledge. Very few pupils revise by typing on the keyboard;
- The connection with writing process helps pupils to visualise and memorise sequencing of letters (spelling). This also aids their automaticity, the ability to formulate words without thinking too much about the letter-order, their cursive shapes and curvatures. Forming letters by hand also engages the pupils' thinking brain, allowing them to explore, analyse and synthesise textual information. This is likely to have a positive impact on pupils' performance in controlled/assessed activities such as exams where speed, legibility and correct formulation of words and letters ultimately help pupils to secure good grades;
- Handwriting helps pupils to develop self-esteem. This ties in with the recent *Every Child Matters* (Green Paper, 2003) and the subsequent safeguarding directives from the government and policy makers. Handwriting does not only develop pupils' ability in the subjects but gives them confidence in themselves (Yates et al., 1994). In doing well at school, pupils are more inclined to feel good about themselves (emotional self); it accentuates pride, self-worth and self-esteem. As such, pupils are more likely to be open-minded and consider questions about cultural identity by adopting an inclusive perspective;

Give the teaching of handwriting skills prominence on teacher training courses

- Although training providers focus on literacy, they do not instruct prospective teachers to prioritise the teaching of handwriting through a set of effective strategies with specific frameworks and criteria (Roaf, 2001). There is almost an absence of a coordinated writing programme other than the standard literacy programme for Key Stage 1 and 2. Teacher trainers need to support trainee teachers to devise handwriting programmes for the classroom. This has to be carried out in a strategic, systematic way during their teacher training course;
- Handwriting needs to be developed with formal tuition and regular practice. Progress needs to be made in understanding the processes involved in teaching handwriting control as well as focusing on pupils with coordination difficulties. Skills such as pupils' pen hold, speed, cursive writing, should not be dismissed as inconsequential (Bashore, 1982; Peters, 1983; Peters, 1987; Schneck, 1991). They are an integral part of literacy at both primary and secondary schools. This aspect needs to be emphasised to prospective teachers;

More research is needed on the teaching and learning of handwriting skills

- At the moment, the focus for researchers in literacy skills lies mainly in 'learning to write' at primary school level. There are very few extensive research studies amongst pupils and a distinct lack of resources for teachers especially for those in secondary school. So this paper also recommends further comprehensive research into the writing habits of secondary school pupils to identify a correlation between pupils' quality of handwriting, their engagement with their subjects and their performance in examinations.

CONCLUSION

This paper concludes that there is a major problem of underachievement amongst our school pupils (DfEE, 2012; PISA report, 2012). It suggests that schools and educationalists are missing out on an opportunity to raise pupils' attainment levels. Their current side-lining of handwriting as an inconsequential learning tool (Bashore, 1982; Peters, 1983; Peters, 1987; Schneck, 1991), especially in secondary school, denies our pupils the opportunity to do well in written assessments and external examinations (Briggs, 1970; Markham, 1976). If educationalists, our government and policy makers want to raise pupils' literacy skills, they would be advised to focus their attention on handwriting as the linchpin of the schools' curriculum and pedagogical practices.

This focus on handwriting would also tie in with policy makers' desire to follow the model set by some countries in the Far East who spend a relatively large proportion of their

literacy time on handwriting, not only in primary school but secondary school as well (Cotton, 1990; Thomas, 1997).

In addition, this paper advocates that a system is put in place to ensure that any student entering secondary school with substandard handwriting can be brought up to speed quickly. To this end, teachers need to consider the enforcement of effective, whole school handwriting policies. These would be aided by a specific framework with a standard set of criteria which recognises the importance of motor-coordination, capacity and speed. Apart from targeting functional illiteracy (DfEE, 2012), such policies will also address the needs of pupils with orthographic-motor coordination difficulties. This has also been identified by Roaf (2001) who concludes that developing a handwriting policy should be a core priority for secondary schools.

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