

3. RESULTS, INTERPRETATION AND DISCUSSION

The main aim of this study was to describe the thinking style preferences of a group of communication pathologists. The results are presented, discussed and interpreted according to the formulated sub-aims. Visual graphics are used in order to simplify the discussion of the results and, where appropriate, the statistical methods employed are referred to.

3.1 Thinking style preferences of the communication pathologist using the Herrmann Brain Dominance Instrument

3.1.1 Thinking style preferences of first-year communication pathology students using the Herrmann Brain Dominance Instrument

The thinking style preferences of the group of first-year students ($N = 42$) in communication pathology were determined by the completion of the HBDI. Figure 5 depicts the *average* thinking style profile of first-year students in communication pathology.

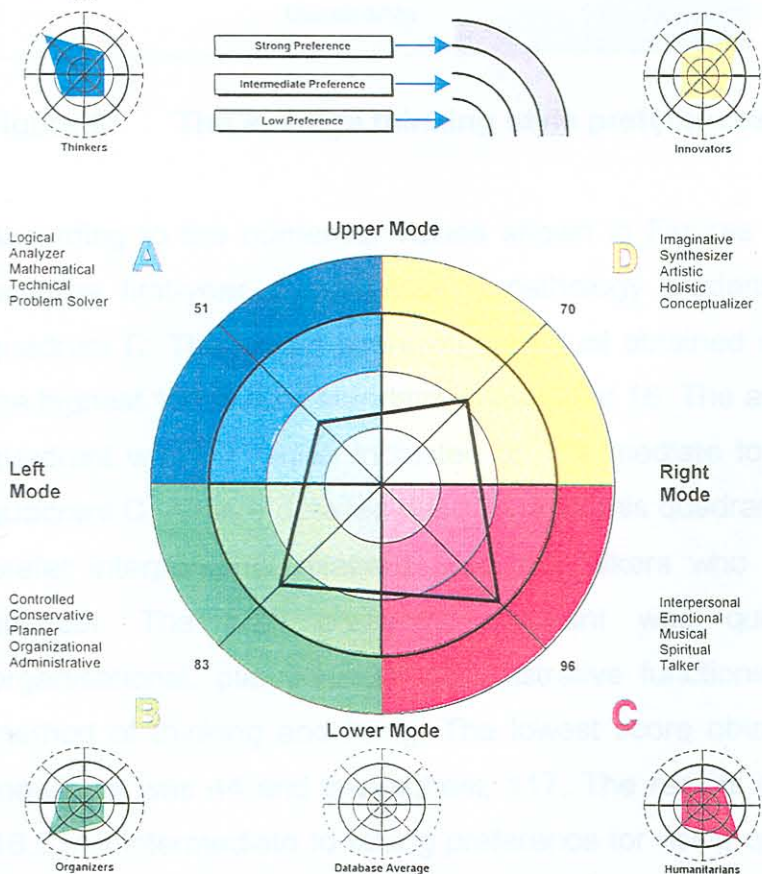


Figure 5: The average thinking style profile (first-year students).

Figure 6 provides a graphic presentation of the *average* thinking style preferences of first-year students according to the Herrmann Brain Dominance Instrument. The Friedman test of *statistical significance* shows that the results obtained were not indicative of a statistically significant value ($p = 0,0000$); statistically speaking no quadrant is more dominant than another. This study will however concentrate on the *numerical values* of the different quadrants.

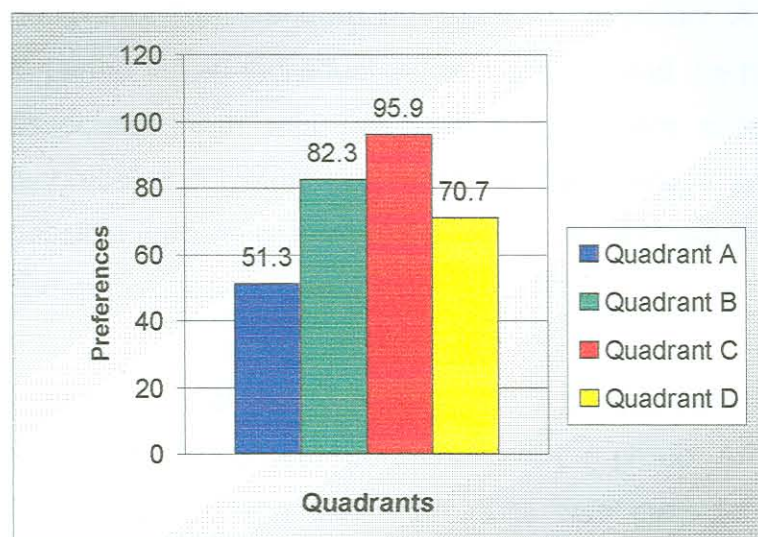


Figure 6: The average thinking style preferences (first-year students).

According to the *numerical values* shown in Figures 5 and 6, it is clear that the average first-year communication pathology student's dominant quadrant was quadrant C. The lowest score an individual obtained in this quadrant was 63, and the highest 122, with a standard deviation of 16. The average score obtained in this quadrant was 96, which indicated an intermediate to strong preference for using quadrant C. A more detailed description of this quadrant implies that these students prefer interpersonal relations, and are talkers who are emotional, musical and spiritual. The next preferred quadrant was quadrant B, which includes organisational, planning and administrative functions as well as a conservative method of thinking and living. The lowest score obtained in this quadrant for an individual was 44 and the highest, 117. The results gave a standard deviation of 16,5. An intermediate to strong preference for using quadrant B was also indicated with an average score of 83. In quadrant D, a score of 70 was obtained (an

intermediate to strong preference). Students who showed a preference in this quadrant are imaginative, synthesising, artistic and holistic conceptualisers. A standard deviation of 20,6 was found. The lowest score for an individual was obtained in quadrant D (35) and the highest was 111. The lowest score (51) was obtained in quadrant A, which indicated that the average first-year student in communication pathology showed an intermediate preference for using this quadrant. The standard deviation for quadrant A was 14,1. The lowest score obtained for an individual student was 20 and the highest was 77. Work elements associated with this quadrant are problem solving, analytical, mathematical, technical and logical skills and the low average score in quadrant A indicated a possible inability or avoidance of the use of these skills by the first-year students in communication pathology.

Figure 7 depicts the key descriptors by quadrant in order to provide information regarding the general preferences of the group. An arbitrary mark was chosen as 50% and anything less than 50% was considered to be indicative of a low preference or the need for further development.

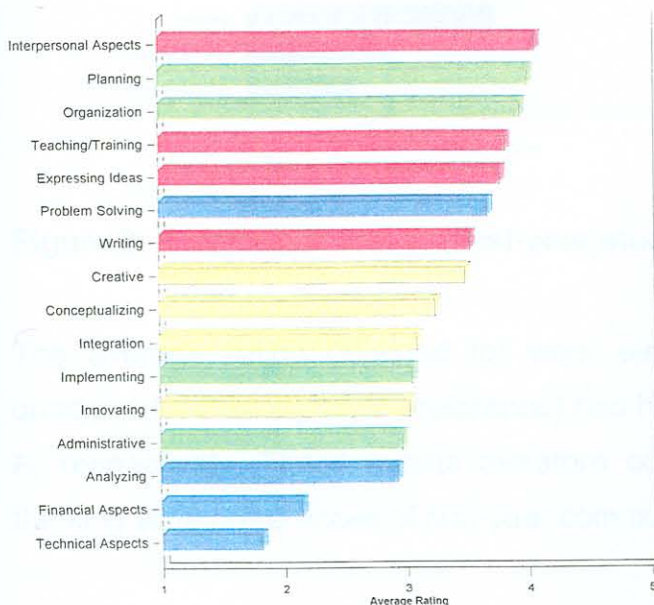


Figure 7: Key descriptors (first-year students).

The results of Figure 7 correlated with the results obtained in Figures 5 and 6. Most of the key descriptors, which indicate the group's greatest preferences, were in quadrant C. Quadrant C's key descriptors showed the highest values, followed by quadrants B, D and A.

The work elements, or aspects of a profession for which the amount of competency is shown, is depicted in Figure 8. A value of 4 or 5 is indicative of greater competency and anything less than 4 shows elements that need further development.

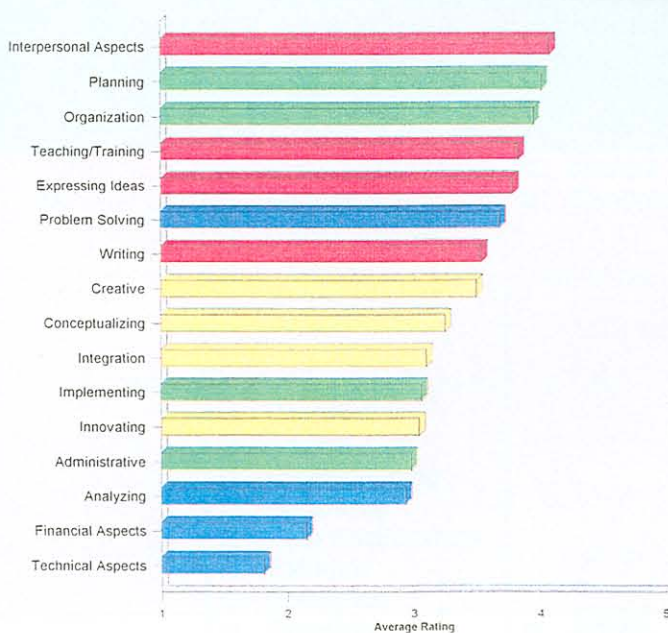


Figure 8: Work elements (first-year students).

The average rating obtained for work elements shows that quadrant C (the quadrant for thinking style preference) had higher ratings than quadrants B, D and A, respectively. These results therefore confirmed the results obtained for the thinking style preferences of first-year communication pathology students.

A comparison of the results presented in Figures 7 and 8 and the proposed thinking style preferences of the communication pathologist (Table 2) is shown in Table 4.

Table 4: A comparison of proposed skills, less preferred key descriptors and work elements of poorer competency (first-year students).

Quadrant:	Associated skills:	Key descriptors (preference of less than 50%):	Work elements (competency rating of less than 4):
A	<input type="checkbox"/> Problem solving <input type="checkbox"/> Business acumen <input type="checkbox"/> Scientific attitude <input type="checkbox"/> Professional norms <input type="checkbox"/> Education <input type="checkbox"/> Objectivity <input type="checkbox"/> Clinical training	<input type="checkbox"/> Factual <input type="checkbox"/> Quantitative <input type="checkbox"/> Critical <input type="checkbox"/> Mathematical <input type="checkbox"/> Analytical	<input type="checkbox"/> Problem solving <input type="checkbox"/> Analysing <input type="checkbox"/> Financial aspects <input type="checkbox"/> Technical aspects
B	<input type="checkbox"/> Planning <input type="checkbox"/> Professional identity <input type="checkbox"/> Priority setting <input type="checkbox"/> Organising <input type="checkbox"/> Time management <input type="checkbox"/> Legal identity	<input type="checkbox"/> Conservative <input type="checkbox"/> Sequential <input type="checkbox"/> Detailed <input type="checkbox"/> Dominant	<input type="checkbox"/> Implementing <input type="checkbox"/> Administrative
C	<input type="checkbox"/> Team building <input type="checkbox"/> Empathy <input type="checkbox"/> Family support <input type="checkbox"/> Personal philosophy <input type="checkbox"/> Acceptance <input type="checkbox"/> Conflict management <input type="checkbox"/> Perspective <input type="checkbox"/> Tactful <input type="checkbox"/> Understanding <input type="checkbox"/> Sensitivity <input type="checkbox"/> Peer relationships <input type="checkbox"/> Patience <input type="checkbox"/> Tolerance	<input type="checkbox"/> Musical <input type="checkbox"/> Symbolic	<input type="checkbox"/> Teaching / training <input type="checkbox"/> Expressing ideas <input type="checkbox"/> Writing
D	<input type="checkbox"/> Creativity <input type="checkbox"/> Innovation <input type="checkbox"/> Curiosity <input type="checkbox"/> Flexibility <input type="checkbox"/> Risk-taker <input type="checkbox"/> Managing diversity	<input type="checkbox"/> Artistic <input type="checkbox"/> Holistic <input type="checkbox"/> Synthesiser <input type="checkbox"/> Simultaneous <input type="checkbox"/> Spatial	<input type="checkbox"/> Creative <input type="checkbox"/> Conceptualising <input type="checkbox"/> Integrating <input type="checkbox"/> Innovating

The results obtained in this comparison (Table 4) can be used to identify aspects that are in need of further development. It should be kept in mind that there is a strong relationship between preferences and competencies, since one typically leads to another (Herrmann 1996).

For quadrant A the development of a greater preference for factual, quantitative, critical, mathematical and analytical aspects is very important in order to comply with the proposed thinking style preferences of the communication pathologist. The results obtained for work elements, aspects of a profession that the individual considers himself to be less competent in, are also problematical since the four above-mentioned skills of lesser competency are essential for the development of skills associated with communication pathology. The key descriptors of quadrant B indicated that there was least competency for conservative, sequential, detailed and dominant aspects for the group of first-year students in communication pathology. The work elements identified, implementing and administrative, were indicative of problems with the proposed skills. These skills cannot be developed without successful implementation and administration. Although musicality, as a key descriptor of lesser preference, is not essential to be a successful communication pathologist, it should be noted that the development of a greater preference for and competency in this aspect could lead to creative and interesting therapy sessions. The development of a greater preference for the use of symbols is more important, since this ability to use and understand objects, marks and signs as being representative of facts and ideas, is important for the development of skills such as family support, acceptance, conflict management and sensitivity. The development of a greater competency in teaching and training, expressing ideas and writing is of the utmost importance. The profession of communication pathology cannot function without these competencies since many of the proposed skills such as conflict management, team building, family support and good peer relationships cannot be developed without these three skills. The skills of lesser competency for quadrant D, creativity, conceptualising, integrating and innovating, need to be developed in order to comply with the proposed skills of the communication pathologist. For example, without innovation, no risk-taking, flexibility, creativity or management of diversity can be achieved. The need for the development of greater preference for the use of artistic, holistic, synthesising, simultaneousness and spatial skills is apparent. The inter-relationship between preferences, competencies and skills is again obvious when looking at a skill like flexibility. One would have

For quadrant A the development of a greater preference for factual, quantitative, critical, mathematical and analytical aspects is very important in order to comply with the proposed thinking style preferences of the communication pathologist. The results obtained for work elements, aspects of a profession that the individual considers himself to be less competent in, are also problematical since the four above-mentioned skills of lesser competency are essential for the development of skills associated with communication pathology. The key descriptors of quadrant B indicated that there was least competency for conservative, sequential, detailed and dominant aspects for the group of first-year students in communication pathology. The work elements identified, implementing and administrative, were indicative of problems with the proposed skills. These skills cannot be developed without successful implementation and administration. Although musicality, as a key descriptor of lesser preference, is not essential to be a successful communication pathologist, it should be noted that the development of a greater preference for and competency in this aspect could lead to creative and interesting therapy sessions. The development of a greater preference for the use of symbols is more important, since this ability to use and understand objects, marks and signs as being representative of facts and ideas, is important for the development of skills such as family support, acceptance, conflict management and sensitivity. The development of a greater competency in teaching and training, expressing ideas and writing is of the utmost importance. The profession of communication pathology cannot function without these competencies since many of the proposed skills such as conflict management, team building, family support and good peer relationships cannot be developed without these three skills. The skills of lesser competency for quadrant D, creativity, conceptualising, integrating and innovating, need to be developed in order to comply with the proposed skills of the communication pathologist. For example, without innovation, no risk-taking, flexibility, creativity or management of diversity can be achieved. The need for the development of greater preference for the use of artistic, holistic, synthesising, simultaneousness and spatial skills is apparent. The inter-relationship between preferences, competencies and skills is again obvious when looking at a skill like flexibility. One would have

difficulty developing this skill without a preference for using the above key descriptors.

When comparing the HBDI results obtained for first-year students in communication pathology with the proposed thinking style preferences for the communication pathologist (Table 2), it is clear that most of the proposed skills (ASHA 2000; Scheurle 1992; Craig & Sleight 1989) were concentrated in quadrant C. One very important factor should be noted however. Although the highest concentration of skills was situated in quadrant C, the proposed thinking style preferences indicates that the communication pathologist should be “whole-brained” (Herrmann 1995). That means that although a certain skill might not be in the individual’s preferred thinking style (the individual’s dominant quadrant for which a strong preference is present), the individual *must* be able to utilise skills in intermediate and low preference quadrants. The key descriptors in Figure 7 emphasise aspects of lesser preference, especially in quadrants A, B and D. The work elements depicted in Figure 8 indicate poor competencies of the first-year students in communication pathology. Since there is a strong relationship between preferences, competencies and therefore the development of certain skills associated with a profession, the development and nurturing of preferences and competencies are essential to comply with the ever-growing demands and challenges placed on the communication pathologist (Hugo 1998; Ashby 1995 and Tuomi 1994).

3.1.2 Thinking style preferences of final-year students in communication pathology using the Herrmann Brain Dominance Instrument

The thinking style preferences of the group of final-year students ($N = 23$) in communication pathology were determined from the completion of the Herrmann Brain Dominance Instrument. Figure 9 depicts the *average* thinking style profile of final-year students in communication pathology. The Friedman test of *statistical significance* shows that the results obtained were not indicative of a statistically significant value ($p = 0,0000$); statistically speaking no quadrant was more dominant than the other. This study will however concentrate on the *numerical values* of the different quadrants.

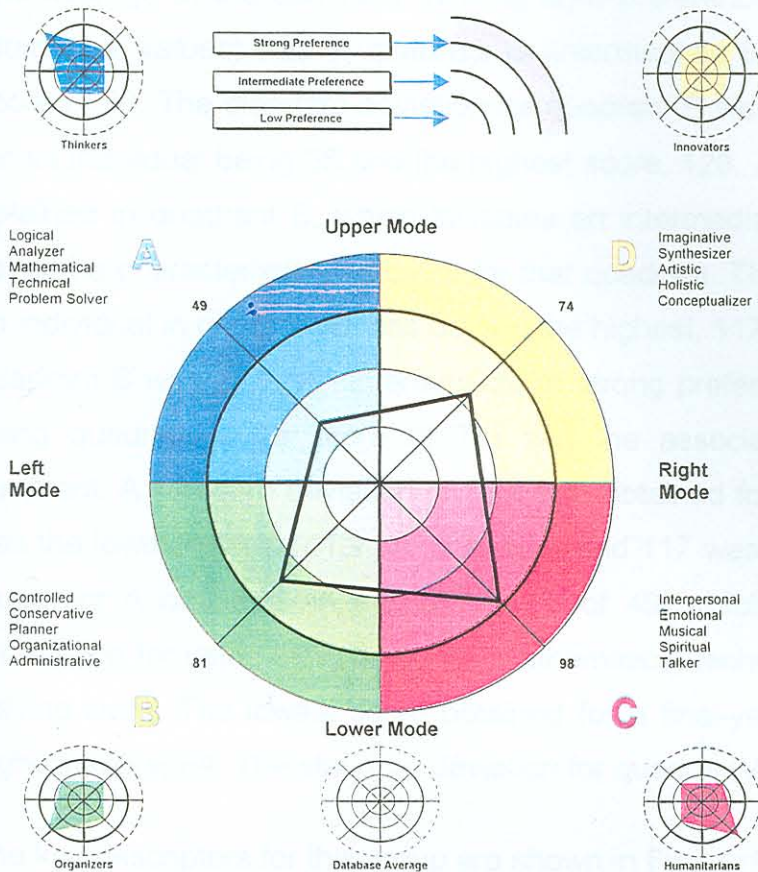


Figure 9: The average thinking style profile (final-year students).

Figure 10 provides a graphic presentation of the average thinking style preferences of final-year students in communication pathology according to the HBDI.

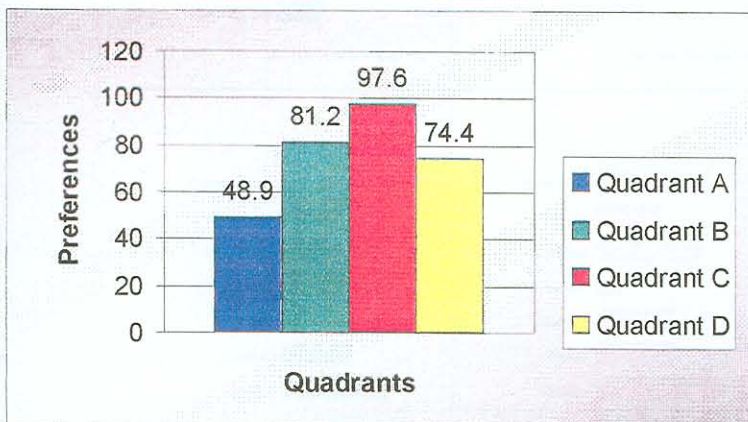


Figure 10: The average thinking style preferences (final-year students).

The *average* of the dominant thinking style preference for the final-year students (*numerical values*) was in quadrant C (intermediate to strong preference), with a score of 98. The standard deviation for quadrant C was 20,2 with the lowest score for an individual being 35 and the highest score, 128. An average score of 81 was obtained in quadrant B, which indicates an intermediate to strong preference for using the characteristics indicated for that quadrant. The lowest score obtained for an individual in quadrant B was 35 and the highest, 117. The standard deviation for quadrant B was 23,2. An intermediate to strong preference was also indicated for using quadrant D (a score of 74) and the associated characteristics of that quadrant. A standard deviation of 19,4 was obtained for quadrant D. A score of 47 was the lowest obtained for an individual, and 117 was the highest for quadrant D. Quadrant A obtained an average score of 49, which indicates an intermediate preference for using logic, analysis, mathematics, technical methods and problem-solving skills. The lowest score obtained for a final-year student was 21 and the highest score, 84. The standard deviation for quadrant A was 15,7.

The key descriptors for this group are shown in Figure 11.

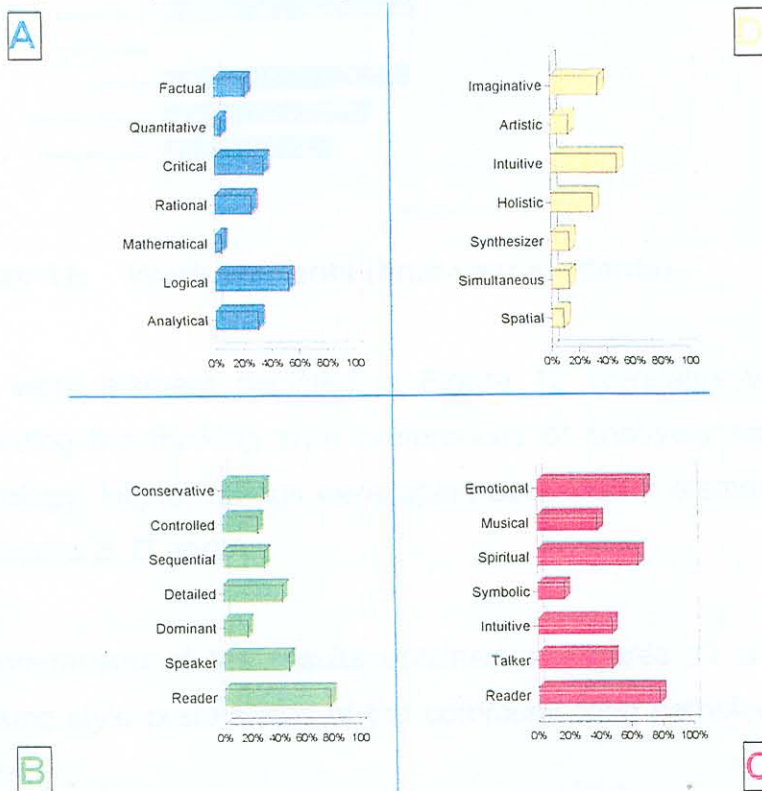


Figure 11: Key descriptors (final-year students).

The results shown in Figure 11 confirm the graphic representations in Figures 9 and 10. Higher percentages (more than the arbitrary 50%) were obtained for key descriptors in the more preferred quadrants (quadrant C) than in the intermediate preference quadrant (quadrant A).

The work elements, aspects of a profession of which the amount of competency is shown, is depicted in Figure 12. A value of 4 or 5 is indicative of greater competency and anything less than 4, elements that need further development.



Figure 12: Work elements (final-year students).

The work element depicted in Figure 12 correlates with the results obtained regarding the thinking style preferences of final-year students in communication pathology. Higher ratings were again obtained for elements in quadrant C than in quadrants B, D and A.

A comparison of the results obtained in Figures 11 and 12 and the proposed thinking style preferences of the communication pathologist (Table 2) is shown in Table 5.

Table 5: A comparison of proposed skills, less preferred key descriptors and work elements of poorer competency (final-year students).

Quadrant:	Associated skills:	Key descriptors (preference of less than 50%):	Work elements (competency of less than 4):
A	<input type="checkbox"/> Problem solving <input type="checkbox"/> Business acumen <input type="checkbox"/> Scientific attitude <input type="checkbox"/> Professional norms <input type="checkbox"/> Education <input type="checkbox"/> Objectivity <input type="checkbox"/> Clinical training	<input type="checkbox"/> Factual <input type="checkbox"/> Quantitative <input type="checkbox"/> Critical <input type="checkbox"/> Rational <input type="checkbox"/> Mathematical <input type="checkbox"/> Analytical	<input type="checkbox"/> Problem solving <input type="checkbox"/> Analysing <input type="checkbox"/> Financial aspects <input type="checkbox"/> Technical aspects
B	<input type="checkbox"/> Planning <input type="checkbox"/> Professional identity <input type="checkbox"/> Priority setting <input type="checkbox"/> Organising <input type="checkbox"/> Time management <input type="checkbox"/> Legal identity	<input type="checkbox"/> Conservative <input type="checkbox"/> Controlled <input type="checkbox"/> Sequential <input type="checkbox"/> Detailed <input type="checkbox"/> Dominant <input type="checkbox"/> Speaking	<input type="checkbox"/> Organising <input type="checkbox"/> Implementing <input type="checkbox"/> Administrative
C	<input type="checkbox"/> Team building <input type="checkbox"/> Empathy <input type="checkbox"/> Family support <input type="checkbox"/> Personal philosophy <input type="checkbox"/> Acceptance <input type="checkbox"/> Conflict management <input type="checkbox"/> Perspective <input type="checkbox"/> Tactful <input type="checkbox"/> Understanding <input type="checkbox"/> Sensitivity <input type="checkbox"/> Peer relationships <input type="checkbox"/> Patience <input type="checkbox"/> Tolerance	<input type="checkbox"/> Musical <input type="checkbox"/> Symbolic	<input type="checkbox"/> Expressing ideas <input type="checkbox"/> Writing
D	<input type="checkbox"/> Creativity <input type="checkbox"/> Innovation <input type="checkbox"/> Curiosity <input type="checkbox"/> Flexibility <input type="checkbox"/> Risk-taker <input type="checkbox"/> Managing diversity	<input type="checkbox"/> Artistic <input type="checkbox"/> Imaginative <input type="checkbox"/> Holistic <input type="checkbox"/> Synthesiser <input type="checkbox"/> Simultaneous <input type="checkbox"/> Spatial	<input type="checkbox"/> Creative <input type="checkbox"/> Integrating <input type="checkbox"/> Innovating <input type="checkbox"/> Conceptualising

The results obtained in this comparison (Table 5) can again be used to identify aspects that are in need of further development. It should be kept in mind that there is a strong relationship between preferences and competencies, since one typically leads to another (Herrmann 1996).

For quadrant A the development of a greater preference for factual, quantitative, critical, mathematical, analytical and rational aspects is very important in order to

comply with the proposed profile for the communication pathologist. These aspects of lesser preference correlated with the proposed characteristics associated with quadrant C. A person who prefers interpersonal, emotional aspects will logically have problems with or a lesser preference for the key descriptors mentioned for quadrant A. The results obtained for work elements, aspects of a profession that the individual considers himself to be less competent in, are again problematical since the four above-mentioned skills of lesser competency are essential for the development of skills associated with communication pathology. The key descriptors of quadrant B indicated that there was a lesser preference for conservative, controlled, sequential, detailed, planning and speaking aspects in the group of final-year students in communication pathology. The work elements identified: organised, implementing and administrative, were indicative of problems with the proposed skills. These skills cannot be developed without successful organisation, implementation and administration. As mentioned above, musicality as a key descriptor of lesser preference is not essential to be a successful communication pathologist. It should be noted, however, that the development of a greater preference and competency in this aspect could lead to creative and interesting therapy sessions. The development of a greater preference for the use of symbolism is of more importance since this ability to use and understand objects, marks and signs as being representative of facts and ideas, is important for the development of skills such as family support, acceptance, conflict management and sensitivity. The development of a greater competency in expressing ideas and writing (quadrant C) is of the utmost importance. Success in the profession of communication pathology is not possible without these competencies since many of the proposed skills such as conflict management, team building, family support and good peer relationships cannot be developed without these skills. The work elements of lesser competency for quadrant D, creativity, conceptualising, integration and innovation, need to be developed in order to comply with the proposed skills of the communication pathologist. For example, without innovation, no risk-taking, flexibility, creativity or management of diversity can be achieved. The need for the development of greater preference for the use of imaginative, artistic, holistic, synthesising, simultaneousness and spatial skills is apparent. The inter-

relationship between preferences, competencies and skills is again obvious when looking at a skill like flexibility. One would have trouble developing this skill without a preference for using the above key descriptors.

When a comparison is made of the HBDI results obtained for final-year students in communication pathology and the proposed thinking style preferences for the communication pathologist (Table 2), it is again apparent that most of the proposed skills (ASHA 2000; Scheurle 1992; Craig & Sleight 1989) were concentrated in quadrant C. The key descriptors of greatest preferences shown in Figure 10 emphasise the need for development of certain skills, especially in quadrants A, B and D (as identified). The work elements in Figure 12 identified competencies that need to be developed in order to comply with the proposed thinking style preferences of the communication pathologist (Table 2). Only with the development of greater competency and skills will the communication pathologist be able to comply with the ever-growing demands and challenges (Hugo 1998; Ashby 1995; Tuomi 1994).

3.1.3 Thinking style preferences of professional communication pathologists using the Herrmann Brain Dominance Instrument

The thinking style preferences of a group of professional communication pathologists ($N = 26$) were determined by the completion of the Herrmann Brain Dominance Instrument. Figure 13 depicts the *average* thinking style profiles by quadrant of professional communication pathologists. The Friedman test of *statistical significance* shows that the results obtained were not indicative of a statistically significant value ($p = 0,0000$). Statistically speaking no quadrant was more dominant than the other. This study will however concentrate on the *numerical values* of the different quadrants.

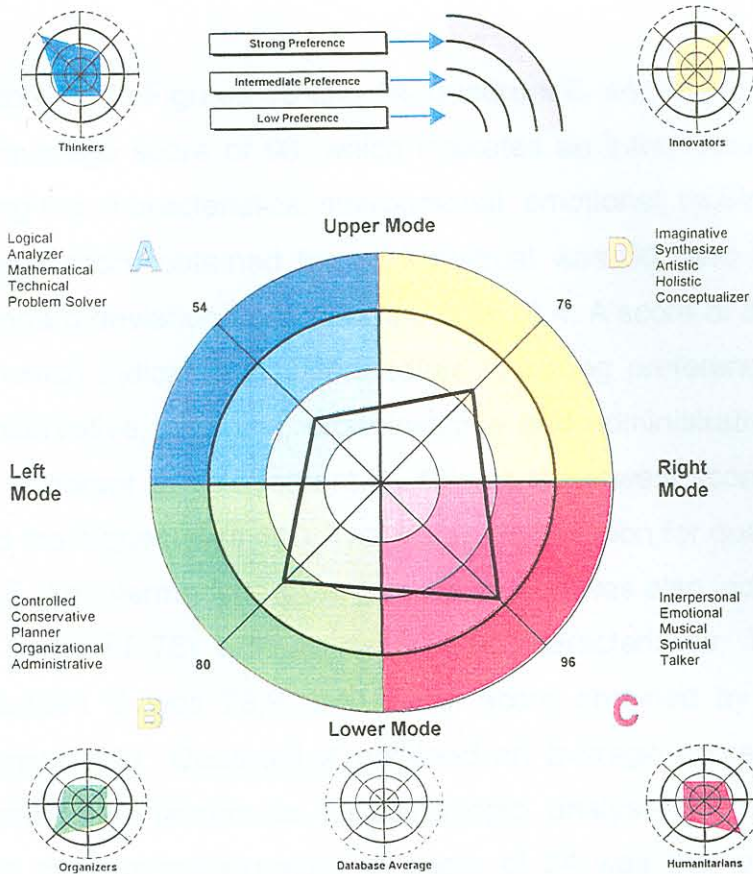


Figure 13: The average thinking style profile (professional communication pathologists).

Figure 14 provides a graphic presentation of the average thinking style preferences of professional communication pathologists according to the HBDI.

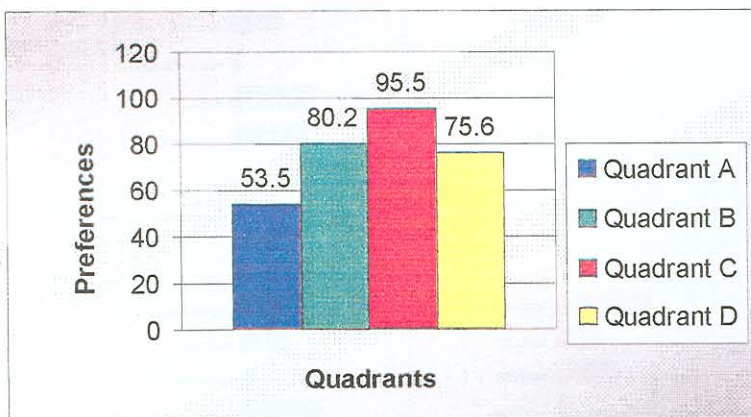


Figure 14: The average thinking style preferences (professional communication pathologists).

According to Figures 13 and 14, quadrant C was the most dominant quadrant with an average score of 96, which indicates an intermediate to strong preference for using the characteristics: interpersonal, emotional, musical, spiritual and talker. The lowest score obtained for an individual was 50, and the highest was 131. The standard deviation for quadrant C was 18,4. A score of 80 was obtained in quadrant B, which indicates an intermediate to strong preference for using the controlled, conservative, planning, organisational and administrative characteristics indicated for quadrant B. In quadrant B, 45 was the lowest score obtained by an individual and the highest was 110. The standard deviation for quadrant B was determined as 15,5. An intermediate to strong preference was also indicated for using quadrant D (a score of 76) with its associated characteristics. The standard deviation for quadrant D was 23,9; the lowest score obtained by an individual, 26 and the highest, 131. Quadrant A obtained an average score of 54, which indicates an intermediate preference for using logic, analysis, mathematics, technical methods and problem-solving skills. A score of 24 was the lowest score obtained by an individual and 75 was the highest. The standard deviation for quadrant A was 13,9.

More detailed information regarding the key descriptors are provided in Figure 15.



Figure 15: Key descriptors (professional communication pathologists).

The results obtained in Figure 15 confirm the graphic representations in Figures 13 and 14. Higher percentages for key descriptors were obtained in the quadrant of greater preference, namely quadrant C. Quadrant B followed, with lower percentages and quadrants D and A had even lower percentages. Figure 15 depicts the work elements of professional communication pathologists. A rating of less than 4 is indicative of less competence.

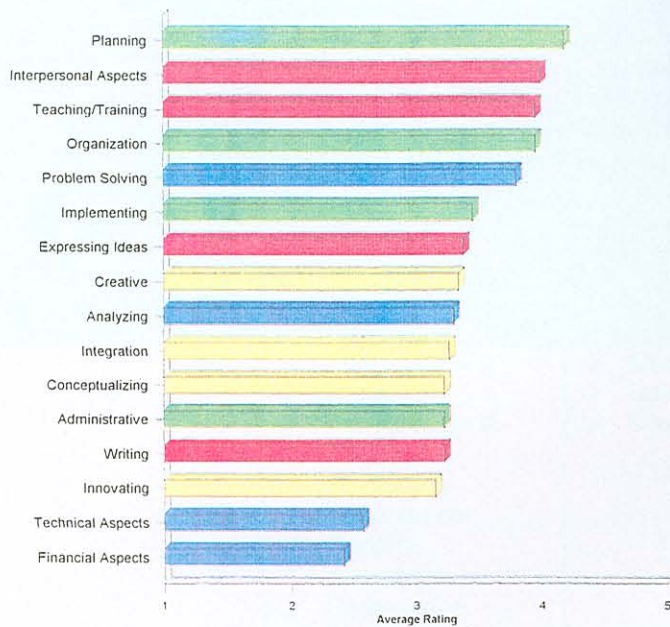


Figure 16: Work elements (professional communication pathologists).

The work elements depicted in Figure 16 correlate with the results obtained for the thinking style preferences of the professional communication pathologist. Higher ratings were obtained for work elements in quadrants C and B as opposed to quadrants D and A.

A comparison of the proposed skills (Table 2), key descriptors (Figure 15) and work elements (Figure 16) is provided in Table 6.

Table 6: A comparison of proposed skills, less preferred key descriptors and work elements of poorer competency (professional communication pathologists).

Quadrant:	Associated skills:	Key descriptors (preference of less than 50%):	Work elements (competency of less than 4):
A	<input type="checkbox"/> Problem solving <input type="checkbox"/> Business acumen <input type="checkbox"/> Scientific attitude <input type="checkbox"/> Professional norms <input type="checkbox"/> Education <input type="checkbox"/> Objectivity <input type="checkbox"/> Clinical training	<input type="checkbox"/> Factual <input type="checkbox"/> Quantitative <input type="checkbox"/> Critical <input type="checkbox"/> Rational <input type="checkbox"/> Mathematical <input type="checkbox"/> Logical <input type="checkbox"/> Analytical	<input type="checkbox"/> Problem solving <input type="checkbox"/> Analysing <input type="checkbox"/> Financial aspects <input type="checkbox"/> Technical aspects
B	<input type="checkbox"/> Planning <input type="checkbox"/> Professional identity <input type="checkbox"/> Priority setting <input type="checkbox"/> Organising <input type="checkbox"/> Time management <input type="checkbox"/> Legal identity	<input type="checkbox"/> Conservative <input type="checkbox"/> Controlled <input type="checkbox"/> Sequential <input type="checkbox"/> Dominant	<input type="checkbox"/> Implementing <input type="checkbox"/> Administrative
C	<input type="checkbox"/> Team building <input type="checkbox"/> Empathy <input type="checkbox"/> Family support <input type="checkbox"/> Personal philosophy <input type="checkbox"/> Acceptance <input type="checkbox"/> Conflict management <input type="checkbox"/> Perspective <input type="checkbox"/> Tactful <input type="checkbox"/> Understanding <input type="checkbox"/> Sensitivity <input type="checkbox"/> Peer relationships <input type="checkbox"/> Patience <input type="checkbox"/> Tolerance	<input type="checkbox"/> Musical <input type="checkbox"/> Spiritual <input type="checkbox"/> Symbolic	<input type="checkbox"/> Expressing ideas <input type="checkbox"/> Writing
D	<input type="checkbox"/> Creativity <input type="checkbox"/> Innovation <input type="checkbox"/> Curiosity <input type="checkbox"/> Flexibility <input type="checkbox"/> Risk-taker <input type="checkbox"/> Managing diversity	<input type="checkbox"/> Artistic <input type="checkbox"/> Holistic <input type="checkbox"/> Synthesiser <input type="checkbox"/> Simultaneous <input type="checkbox"/> Spatial	<input type="checkbox"/> Creative <input type="checkbox"/> Integrating <input type="checkbox"/> Conceptualising <input type="checkbox"/> Innovating

The results obtained in this comparison (Table 6) are indicative of aspects that are in need of further development. The strong relationship between preferences and competencies should be kept in mind, since one typically leads to another (Herrmann 1996).

For quadrant A the development of a greater preference for factual, quantitative, critical, mathematical, analytical and rational aspects is very important in order to comply with the proposed thinking style preferences of the communication pathologist. These aspects of lesser preference again correlated with the proposed characteristics associated with quadrant C. The results obtained for work elements in quadrant C, aspects of a profession that the individual considers himself to be less competent in, were again problematical since the above-mentioned skills of lesser competency are essential to the development of skills associated with communication pathology. The key descriptors of quadrant B indicated that there was a lesser preference for conservative, controlled, sequential and dominance aspects for the group of professional communication pathologists. The work elements identified, implementing and administrative skills, were again indicative of problems with the proposed skills. The above-mentioned skills cannot be developed without successful implementation and administration. The foundation of any communication pathology practice lies in successful implementation and administration of therapy. As mentioned above, musicality as a key descriptor of lesser preference is not essential for the success of a communication pathologist. It should be noted however that the development of a greater preference and competency in this aspect could lead to creative and interesting therapy sessions and therefore cost-effective service delivery. The development of a greater preference for symbolic use is important for the development of skills such as family support, acceptance, conflict management and sensitivity. The development of a greater competency in expressing ideas and writing (quadrant C) is of the utmost importance. Success in the communication pathology profession is not possible without these competencies since many of the proposed skills such as conflict management, team building, family support and good peer relationships cannot be developed without the above skills. Communicating with the client and his significant others, as well as report writing, forms an integral part of the profession, and the development of the above competencies of quadrant C is very important. The work elements of lesser competency for quadrant D, creativity, integration, conceptualising and innovation, need to be developed in order to comply with the proposed skills of the communication pathologist. For example: without creativity

and innovation, no risk-taking, flexibility or management of diversity can be achieved. The need for the development of greater preference for the use of artistic, holistic, synthesising, simultaneousness and spatial skills is apparent. The inter-relationship between preferences, competencies and skills is again obvious when looking at a skill like flexibility. One would have difficulty developing this skill without a preference for using the above-mentioned key descriptors.

When comparing the HBDI results obtained for professional communication pathologists with the proposed thinking style preferences for the communication pathologist (Table 2), it is again apparent that most of the proposed skills (ASHA 2000; Scheurle 1992; Craig & Sleight 1989) were concentrated in quadrant C. The key descriptors in Figure 15 emphasise the lesser preferences of the communication pathologist, especially in quadrants A, B and D. The work elements (Figure 15) identify areas in which lower competencies are apparent for the professional communication pathologist. The inter-relationship between preferences and competencies (Herrmann 1996) should be kept in mind in order to develop the necessary skills for the competent communication pathologist.

3.1.4 The average thinking style preferences of the communication pathologist (N = 91) using the Herrmann Brain Dominance Instrument

The *average* thinking style preferences for all the subjects (N = 91) in the study were determined in order to ascertain if there were any deviations from the results already obtained. The results of all the thinking style profiles of all the subjects who participated in the study are depicted in Figure 17. The *numerical values* obtained will again be used to determine the quadrant of greatest preference.

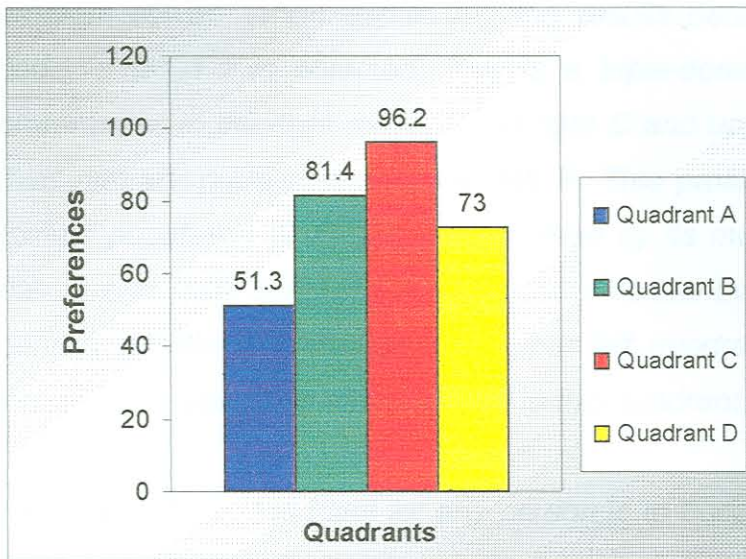


Figure 17: The average thinking style preferences of the communication pathologist (students and professionals).

The quadrant of intermediate to strongest thinking style preference for all the subjects in the study was quadrant C where 96,2 was obtained. The lowest score for an individual in quadrant C was 35 and the highest score, 131. A standard deviation of 17,6 was obtained for quadrant C. Quadrant B, the next quadrant of preference, scored 81,4. The standard deviation for quadrant B was 18, the lowest score obtained for an individual was 35, and the highest, 117. Quadrant D received an average of 73, with a standard deviation of 21,2. The lowest individual score was 26, and the highest was 131. Once again, quadrant A was the quadrant of intermediate preference with an average of 51,3. The standard deviation for quadrant A was 14,4, the lowest score was 20, and the highest, 84.

The results of 3.1.1, 3.1.2, 3.1.3 and 3.1.4 indicate that according to numerical values, all the subjects that participated in the study showed an intermediate to strong thinking style preference for quadrant C, with the accompanying characteristics: interpersonal, emotional, musical, spiritual and talker. Thinking style preference for quadrants B and D were also intermediate to strong. The intermediate thinking style preference, on average, was in quadrant A, with the accompanying characteristics: logical, analyser, mathematical, technical and

problem solver. When expressing the results obtained in a four-digit numerical code, a 2-1-1-1 is obtained. This is a triple-dominant profile with two primary preferences in the right mode, lower right C and upper right D quadrants, and the third primary preference in lower left B. This profile, seen in the majority of the female population (24%), is characterised by its multi-dominant and “generalised” nature and fairly balanced amounts of understanding and ability to use the three primary quadrants. Although the upper left quadrant A was least preferred, the individual is typically quite functional in this quadrant.

As stated above, the ideal for any person is to become “whole-brained”. The need for further development of this concept is very obvious in the light of the data on the key descriptors and work elements of each of the three groups. The question can therefore be asked: “Why does the communication pathologist need to develop these key descriptors and work elements?” In order to comply with the greater demands and changes in the profession (Ashby 1995), the communication pathologist needs to acquire more information on a wide variety of subjects and apply the information and skills in the workplace (Campbell and Taylor 1992). The greater demands for the provision of cost-effective and measurable services imply that the communication pathologist must not only comply with the traditional role of “humanitarian”, but also with the new roles as “thinker, organiser and innovator”. The navigation of reimbursement systems, the complexities of the healthcare system, legislation and patient advocacy (<http://www.asha.org/students/changing.htm>) indicate that the use of the quadrant of strongest preference (quadrant C) would not necessarily be enough to overcome the many obstacles that face the communication pathologist. Craig and Sleight (1989) demand that communication pathologists need to be independent life-long learners with entrepreneurial attitudes and management skills (<http://www.asha.org/students/changing.htm>), skills which are clearly associated with quadrants A, B and D. Ashby (1995) also indicates that the communication pathologist needs to develop greater skills in team work, marketing and cost containment.

In order to survive as a successful communication pathologist, development of the discussed key descriptors, and therefore, the development of the quadrants of

lower preference, is of the utmost importance. The proposed changes in the existing traditional, tertiary education programmes (Hugo 1998) are indicative of the utilisation and role of tertiary programmes in the development of the key descriptors, work elements and “whole-brained” communication pathologists.

3.2 Differences between the thinking style preferences of the speech-language pathologist, audiologist, and the speech-language pathologist *and* audiologist

The biographical questionnaire that was included with the Herrmann Brain Dominance Instrument was used to obtain information on the specific type of communication pathologist that the subjects considered themselves to be, namely: a speech-language pathologist only, an audiologist only or both a speech-language pathologist *and* audiologist.

3.2.1 Thinking style preferences of speech-language pathologists (first-year students, final-year students and professional communication pathologists).

Statistical methods were used to determine the thinking style preferences of individuals in communication pathology who considered themselves to be speech-language pathologists ($N = 18$). The results of the Friedman two-way analysis of variance test indicated that there was no significant *statistical* difference between any of the quadrants ($p = 0,0000$). Although *numerically*, quadrant B was the quadrant of preference, statistically speaking, no quadrant could be considered more dominant than the other. Figure 18 depicts the thinking style preferences of speech-language pathologists.

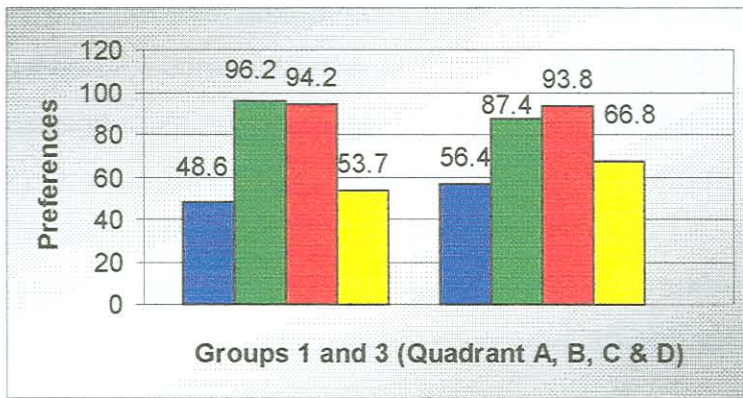


Figure 18: Thinking style preferences of speech-language pathologists (first-year students and professional communication pathologists).

The results obtained for the first-year students in communication pathology indicate that there was a slightly stronger preference for quadrant B (96,2) over quadrant C (94,2). An intermediate to strong preference for the use of these two quadrants was therefore indicated. The lowest score obtained for quadrant B was 72 and the highest score, 117. A standard deviation of 15,8 was found for quadrant B. A score of 74 was the lowest score obtained for quadrant C and 114, the highest. The standard deviation for quadrant C was 13,7. An intermediate preference was found for the use of quadrant D, with 53,7. The lowest score in this quadrant was 35, the highest was 75 and the standard deviation, 15,4. Quadrant A was once again the quadrant of lowest preference with a value of 48,6. The lowest score obtained for this quadrant was 33 and the highest was 65.

According to the results obtained from the biographical questionnaire, none of the final-year students in communication pathology considered themselves to be speech-language pathologists.

Quadrant C was the quadrant of intermediate to strongest preference (93,8) for professional communication pathologists who considered themselves exclusively speech-language pathologists. The standard deviation for quadrant C was 13,7, the lowest individual score was 78 and the highest, 119. An intermediate to strong

preference was also indicated for Quadrant B with a value of 87,4. The lowest individual score obtained in quadrant B was 78 and the highest was 110. The average obtained in quadrant D was 66,8, indicating an intermediate to strong preference. The lowest individual score in quadrant D was 26 and the highest, 84. The standard deviation for quadrant D was 21,6. The value of 56,4 indicates an intermediate preference for the usage of quadrant A. The standard deviation for this quadrant was 13,4, the lowest score was 39 and the highest, 75.

According to these results, quadrants B and C were dominant for the first-year subjects who preferred to be seen as speech-language pathologists. When using the four-digit profile proposed by Herrmann (1995), it was found that first-year subjects who considered themselves speech-language pathologists exclusively, had a 2-1-1-2 profile. This profile is a double-dominant profile with the two primaries in the lower left B and lower right C quadrants. The profile is characterised by very strong preferences for conservative thinking and controlled behaviour with a desire for organisation and structure, as well as detail and accuracy. The primary in the lower right C quadrant would manifest itself in emotional and interpersonal preferences, an interest in music and a sense of spirituality (Herrmann 1995). Occupations typical of individuals with this profile include nurses and other members of the “helping professions”.

One of the most obvious results obtained for the final-year students in communication pathology was the absence of any subjects who considered themselves solely speech-language pathologists. The reason for this was impossible to explain and more detailed information would be required (possibly through an extensive interview). It could be hypothesised however that the subjects who participated in the study might have had bad experiences during their speech-language therapy course, for example, no successful discharge of patients, the lengthy time of therapy or poor supervision by lecturers.

For professional communication pathologists who considered themselves speech-language pathologists exclusively, a 2-1-1-2 profile was also found. As discussed

above, these individuals have a double primary in the limbic area and may have problems with internal conflict due to the opposing qualities of control and structure versus emotions and interpersonal feelings.

3.2.2 Thinking style preferences of audiologists (first-year students, final-year students and professional communication pathologists)

Statistical methods were used to determine the thinking style preferences of individuals in communication pathology who considered themselves audiologists ($N = 18$). The results of the Friedman two-way analysis of variance test indicated that there was no significant *statistical* difference between any of the quadrants ($p = 0,0000$). Figure 19 depicts the thinking style preferences of audiologists.

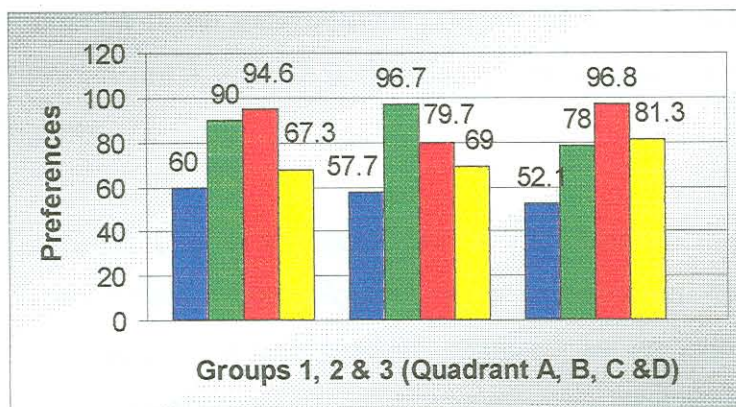


Figure 19: The thinking style preferences of audiologists (first-year students, final-year students and professional communication pathologists).

Quadrant C was indicated as the quadrant for which an intermediate to strong preference (*numerical*) was present in first-year students who considered themselves audiologists (94,6). The lowest individual score obtained in this quadrant was 72 and the highest 111. The standard deviation for quadrant C was 20,3. Quadrant B followed with slightly less, namely 90. The lowest score obtained was 81 and the highest, 96. The standard deviation for quadrant B was 7,9. An intermediate to strong preference (76,1) was obtained in quadrant D, with a standard deviation of 11,9. The lowest score in quadrant D was 59 and the highest score, 81. Quadrant A obtained an average score of 59,7, indicative of an

intermediate preference. The standard deviation for this quadrant was 13,3, the lowest individual score was 51 and the highest was 75.

The results indicating the thinking style preferences of final-year audiology students showed that the quadrant of intermediate to strongest preference was B with 96,7. The lowest score obtained in this quadrant was 78, and the highest, 107. The standard deviation for quadrant B was 16,2. Quadrant C followed with an average of 79,7, indicative of an intermediate to strong preference for using this quadrant. The lowest score was 74, 87 was the highest and 6,7 the standard deviation. Quadrant D gave 69 points. The lowest score obtained by an individual was 60 and the highest, 75. The standard deviation for quadrant D was 7,9. The quadrant indicative of an intermediate preference was A, with 57,7. The standard deviation for quadrant A was 12,9; the lowest score obtained by an individual was 47, and the highest, 72.

Quadrant C was the quadrant of intermediate to strongest preference (96,8) for communication pathologists who considered themselves to be audiologists exclusively. The lowest score obtained by an individual was 75, and the highest, 122. An intermediate to strong preference was also apparent in quadrant D (81,3). The standard deviation for quadrant D was 26,6; the lowest score obtained by an individual was 39 and the highest, 131. Quadrant B followed with slightly less than quadrant D, 78 (an intermediate to strong preference). The lowest score for an individual was 45 and the highest score, 99. The standard deviation for quadrant B was 18,3. An intermediate preference for the use of quadrant A was shown with a score of 52,1. The lowest score obtained by an individual for quadrant A was 30 and the highest was 71. The standard deviation for quadrant A was 12,1.

Quadrant C was dominant for the first-year subjects who considered themselves to be audiologists, closely followed by quadrant B. These subjects had a 2-1-1-1 profile (Herrmann 1995). This profile is typical of professions in human resources, or occupations that require an understanding and ability to function on many levels, such as social workers and supervisory nurses.

The final-year students who considered themselves audiologists showed dominance in quadrant B, followed by quadrants C and D. A sharp increase in the value was also obtained for quadrant A. These subjects had a greater preference for the following characteristics, namely: logical, analyser, mathematical, technical and problem solving. Quadrant C was the most dominant quadrant for professional communication pathologists, closely followed by a preference for using quadrants B and D. A 2-1-1-1 profile was found for final-year students and professional communication pathologists who considered themselves to be audiologists.

3.2.3 Thinking style preferences of speech-language pathologists and audiologists (first-year students, final-year students and professional communication pathologists).

Statistical methods were used to determine the thinking style preferences of individuals in communication pathology who considered themselves to be both speech-language pathologists and audiologists ($N = 18$). The results of the Friedman two-way analysis of variance test indicated that there was no significant statistical difference between any of the quadrants ($p = 0,0000$). Figure 20 depicts the thinking style preferences of speech-language pathologists and audiologists.

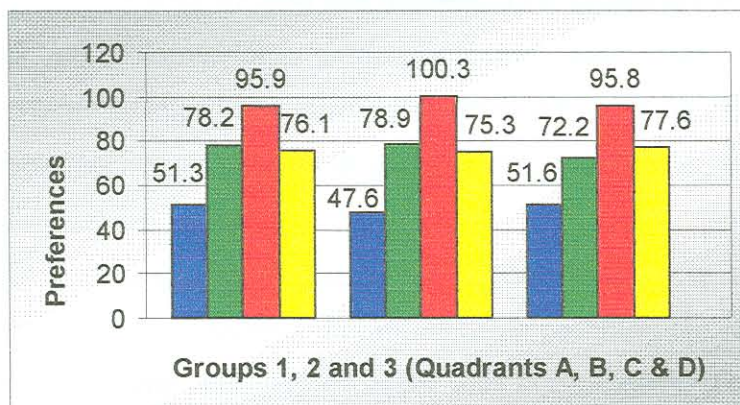


Figure 20: The thinking style preferences of speech-language pathologists and audiologists (first-year students, final-year students and professional communication pathologists).

The results obtained for first-year students in communication pathology indicated that quadrant C (95,9) was the quadrant in which an intermediate to strongest

preference was present. The lowest score obtained by an individual was 63, and the highest, 122. The standard deviation for this quadrant was 17,5. Quadrant B (78,2) was the next highest score (intermediate to strong preference). The standard deviation for quadrant B was 15,5, the lowest score was 44 and the highest score, 110. Quadrant D obtained an average of 76,1 (also an intermediate to strong preference). The lowest score obtained for this quadrant was 36 and the highest, 111. The standard deviation for quadrant D was 20,6. The quadrant for which an intermediate preference was shown was quadrant A, with 51,3. A standard deviation of 14,3 was obtained, with the lowest score 20 and the highest, 77.

The area for final-year students in communication pathology in which the intermediate or strongest preference was apparent was quadrant C, with 100,3. The standard deviation for quadrant C was 20,3; the lowest individual score was 35, and the highest, 128. Quadrant B obtained 78,9, which is indicative of an intermediate to strong preference for using this quadrant. The lowest score obtained in quadrant B was 35, and the highest was 117. The standard deviation for quadrant B was 23,5. Quadrant D (intermediate to strong preference) gave a value of 75,3 with a standard deviation of 20,6. The lowest score obtained by an individual was 47 and the highest, 117. Quadrant A obtained 47,6 points, indicative of an intermediate preference for using this quadrant and the associated characteristics. The standard deviation for quadrant A was 16; the lowest score obtained by an individual was 21, and the highest, 84.

Quadrant C was the quadrant of intermediate to strong preference (95,8) for the group of professional communication pathologists who considered themselves both speech-language pathologists *and* audiologists. The lowest score obtained by an individual in this quadrant was 50, and the highest score, 131. The standard deviation for quadrant C was 29,7. An intermediate to strong preference was also apparent for quadrant D, where 77,6 was obtained. The standard deviation for quadrant D was 20,4, the lowest score obtained was 54 and the highest score, 108. The professional communication pathologists who participated in the study showed an intermediate to strong preference for quadrant B (72,2). The standard deviation

was 13,9, the lowest score obtained was 54 and the highest was 92. An intermediate preference for the use of quadrant A and the accompanying characteristics was shown (51,6). The lowest score obtained by an individual was 24, and 74 was the highest. The standard deviation for quadrant A was 20,3.

Quadrants B and C were dominant for those first-year subjects, final-year subjects and professional communication pathologists who considered themselves to be both of the above professions (a 2-1-1-1 profile). This profile is typical of professions in human resources, or occupations that require an understanding and ability to function on many levels, such as social workers and supervisory nurses. This indicates that all the subjects preferred the associated characteristics of quadrants B and C, namely: controlled, conservative, planner, organisational, administrative, interpersonal, emotional, musical, spiritual and talker.

When looking at the results obtained in 3.2.1, 3.2.2 and 3.2.3 it is clear that the results of quadrant A (first-year students) (Figure 17) showed higher values for the audiology students than for the speech-language pathology students (Figure 18) and the speech-language pathology and audiology students (Figure 19). A possible explanation for this dramatic increase (48,6 to 60 and 51,3 to 60) in the results from quadrant A lies in the demands of the profession of audiology. Herrmann (1995) explains that a profession should be chosen in the area of strongest preference and greatest competence. The students who identified themselves as audiologists may have been aware of these preferences and competencies and had therefore chosen to specialise in audiology. It should however be remembered that an individual is the product of both nature (30%) and nurture (70%) (Herrmann 1996) and the development of new skills in an individual is always possible. A definite decrease in the values for quadrant B for first-year students was apparent when comparing the results of the speech-language pathologist, the audiologist and the speech-language pathologist and audiologist (96,2 to 90 to 78,2). The implication of these results is that the preference for characteristics associated with quadrant B decreased when professions such as speech-language pathology and audiology were chosen. The values of quadrant C remained quite stable for these

professions. There was a large increase in the values obtained for quadrant D for the subjects who considered themselves to be audiologists and those who considered themselves speech-language pathologists and audiologists. This might indicate that the work done by the audiologist, and the speech-language pathologist and audiologist demands more imaginative, synthesising, artistic, holistic and conceptual skills than the work done by individuals who consider themselves speech-language pathologists only.

An interesting feature was present in quadrant B for the final-year subjects who considered themselves to be both speech-language pathologists and audiologists (Figure 19). A significant decrease was seen when the values obtained for Audiologists (Figure 18) and speech-language pathologists and audiologists (Figure 19) were compared. The implication of this is that subjects who considered themselves to be both the above professionals had a lower preference for the following characteristics: controlled, conservative, planner, organisation and administration. The values for quadrants C and D of speech-language pathologists and audiologists increased significantly when compared with the values obtained for subjects who considered themselves audiologists only. The reason for this might again lie in the nature of the combined professions. An individual who is actively involved in both speech-language pathology and audiology will develop more skills that are associated with quadrants C and D respectively. The nature and nurture concepts of Herrmann (1995) are again applicable here.

The results obtained for quadrant A (both professions) (Figure 19) again showed a decrease when compared to the values of quadrant A for the subjects who considered themselves solely speech-language pathologists (Figure 17) and those who considered themselves solely audiologists (Figure 18). The decrease in these values was subtle, but the question can be asked, "why this is happening?" It could be hypothesised that the practising speech-language pathologist and audiologist is no longer faced with challenging activities (Sarason 1977) and therefore is neglecting the characteristics associated with quadrant A. The decrease in quadrant B from the speech-language pathologist (87,4), to the audiologist (78), to

the individual who considered herself to be a speech-language pathologist as well as an audiologist (72,2) might be indicative of the structure of activities that form an integral part of the different professions. The speech-language pathologist should be more of an organiser because of the nature of therapy sessions. Active planning, organising, administration and control are essential in order to provide measurable and cost-effective services (<http://www.asha.org/students/changing.htm>). Once again there was a large increase in the values obtained for quadrant D for the subjects who considered themselves to be audiologists and those who considered themselves speech-language pathologists and audiologists. Some people might be of the opinion that the type of work done by the audiologist (hearing evaluations, interpretation of results, hearing aid fitting and more) demands more imaginative, synthesising, artistic, holistic and conceptual skills than the work done by individuals who consider themselves speech-language pathologists only.

3.2.4 The average thinking style preference of speech-language pathologists

The average thinking style preferences of all the subjects (first-year students, final-year students and competent professionals) that considers themselves to be speech-language pathologists ($N = 18$) are depicted in Figure 21. Numerical values are again used for this discussion.

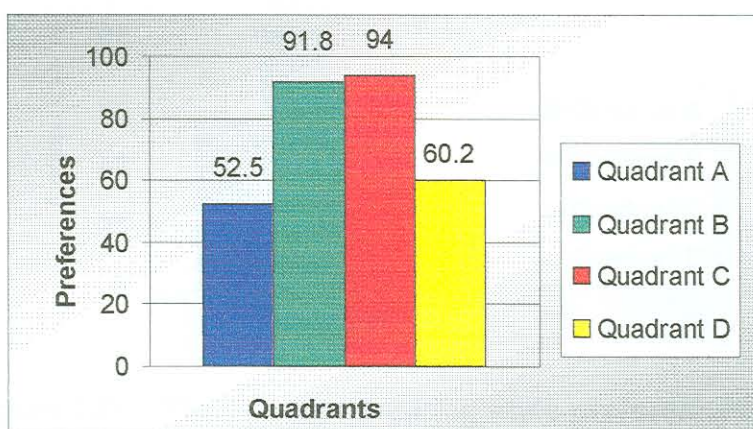


Figure 21: The average thinking style preferences of speech-language pathologists.

Quadrant C was on average the quadrant of intermediate to strongest preference (94). The lowest points obtained for this quadrant were 74 and the highest 119. The standard deviation for quadrant C was 13,3. The results obtained for quadrant B (91,8) were only slightly lower than those for quadrant C, therefore also indicative of an intermediate to strong preference for the use of the characteristics of quadrant B. The standard deviation for quadrant B was 13,4; the lowest score obtained by an individual was 72 and the highest, 117. Quadrant D obtained an average of 60,2 (intermediate to strong preference), with a standard deviation of 19,4. The lowest results obtained by an individual for quadrant D were 26, and the highest, 84. An intermediate preference was suggested by the results for quadrant A (52,5). The minimum score obtained by an individual was 33 and the maximum score was 75. The standard deviation for quadrant A was 12,6.

3.2.5 The average thinking style preference of audiologists

The average thinking style preferences for all the subjects (first-year students, final year students and competent professionals) who considered themselves audiologists ($N = 18$) were determined through statistical procedures. A depiction of the *numerical* results is shown in Figure 22.

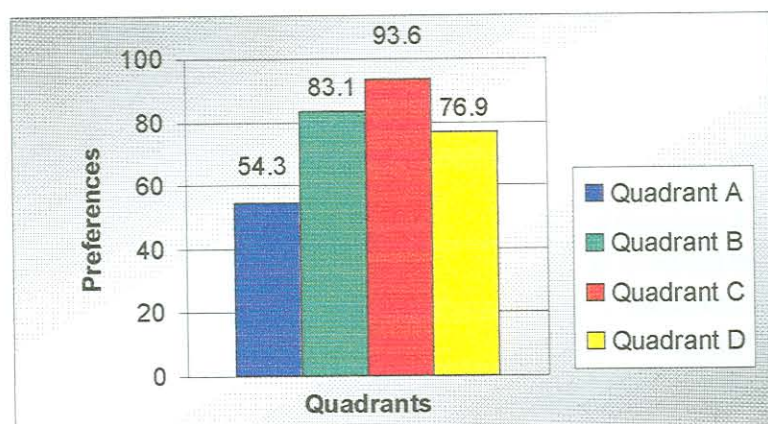


Figure 22: The average thinking style preferences of the audiologist.

The highest average was obtained in quadrant C with 93,6. These results indicate that audiologists have an intermediate to strong preference for using the

characteristics of quadrant C. The average minimum score obtained was 72 and the maximum score, 122. The standard deviation obtained for quadrant C was 17,1. Quadrant B obtained an average of 83,1 (an intermediate to strong preference). The minimum score obtained was 45, and 107 was the maximum for quadrant B. The standard deviation for quadrant B was 17,8. The average result obtained in quadrant D was 76,9. An intermediate to strong preference existed for individuals to use the associated characteristics of quadrant D. An individual minimum score of 39 and a maximum of 131 were obtained for quadrant D. The standard deviation for quadrant D was 22,9. Quadrant A's results (54,3) were indicative of an intermediate preference for using the associated characteristics of that quadrant. The standard deviation for quadrant A was 12,1, the minimum individual score was 30 and the maximum score obtained was 75.

3.2.6 The *average* thinking style preference of speech-language pathologists and audiologists.

The *average numerical* thinking style preferences of subjects (first-year students, final-year students and competent professionals) who considered themselves both speech-language pathologists and audiologists ($N = 50$) are depicted in Figure 23.

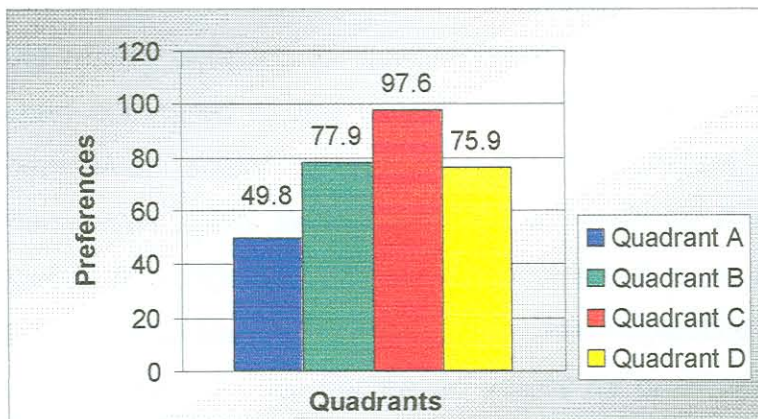


Figure 23: The *average* thinking style preferences of the speech-language pathologist and audiologist.

Once again quadrant C was the quadrant of intermediate to strong preference (97,6). The minimum score obtained was 35 and the maximum, 131. The standard

deviation for quadrant C was 19,7. The result obtained for quadrant B was 77,9 (intermediate to strong preference). The standard deviation for this quadrant was 18,7; the minimum score obtained was 35, and the maximum score, 117. Quadrant D obtained 75,9, also indicative of an intermediate to strong preference for using the characteristics associated with this quadrant. The minimum score obtained for quadrant D was 36, and the maximum score, 117. A standard deviation of 20,2 was obtained for quadrant D. An intermediate preference for the use of the associated characteristics of quadrant A was indicated with the results obtained (49,8). The standard deviation for quadrant A was 15,4, the minimum score obtained was 20, and the maximum score, 84.

Quadrants B and C were the most dominant quadrants for individuals who considered themselves speech-language pathologists only or audiologists only. The individuals who considered themselves to be both speech-language pathologists and audiologists showed quadrant C to be of greatest preference.

When constructing the four-digit profile of Herrmann (1995) it was again found that the speech-language pathologist had a 2-1-1-2 profile and the audiologist, and the speech-language pathologist and audiologist, a 2-1-1-1 profile.

The results obtained for quadrant A (both professions) again showed a decrease when compared to the values for quadrant A for the subjects who considered themselves solely speech-language pathologists and those who considered themselves solely audiologists. It can again be hypothesised that the practising speech-language pathologist and audiologist is no longer faced with challenging activities (Sarason 1977) and is therefore neglecting the characteristics associated with quadrant A. The decreased values for quadrant B from the speech-language pathologist (91,8), to the audiologist (83,1), to the individual who considered herself to be a speech-language pathologist as well as an audiologist (77,9) might again be indicative of the structure of activities that form an integral part of the different professions. The speech-language pathologist should be more of an organiser because of the nature of therapy sessions. Active planning, organising,

administration and control are essential in order to provide measurable and cost-effective services (<http://www.asha.org/students/changing.htm>). Once again there was a large increase in the values obtained for quadrant D for the subjects who considered themselves to be audiologists and those who considered themselves speech-language pathologists and audiologists. Some people might be of the opinion that the type of work done by the audiologist (hearing evaluations, interpretation of results, hearing aid fitting and more) demands more imaginative, synthesising, artistic, holistic and conceptual skills than the work done by individuals who consider themselves speech-language pathologists only.

3.3 Learning and teaching strategies relevant to thinking style preferences

The results obtained from the HBDI and presented in 3.1 and 3.2 indicated that the quadrant of thinking style preference for the communication pathologist was quadrant C with a score of 96,2. Quadrant B followed with a slightly lower score (81,4), which was then followed by quadrants D (73) and A (51,3) (Figure 16). When presenting these results in a four-digit numerical code, a 2-1-1-1 was obtained. As discussed, this profile is characterised by its multi-dominant and “generalised” nature and a fairly balanced amount of understanding and an ability to use the three primary quadrants (B, C and D). Although quadrant A was the least preferred quadrant, the individual can typically function in this thinking style.

This knowledge should be kept in mind by lecturers and students in communication pathology, in order to avoid the occurrence of any mismatch between the prevailing teaching style and the learning style of the student, which may lead to lower grades, and a loss of interest in the course material and therefore the chosen profession (Felder and Silverman 1988).

The Whole Brain Teaching and Learning Model (Herrmann 1995) (Figure 4) suggests that students with a thinking style preference in the C quadrant are participative and feelings driven. The Whole Brain Learning and Design Considerations (Herrmann 1995) (Figure 3) therefore offer suggestions for C

quadrant learners. According to these considerations the student with a thinking style preference in the C quadrant will respond to the following:

- Experiential opportunities;
- Sensory movement;
- People-orientated cases;
- Discussions and
- Group interaction.

Successful learning for students with a thinking style preference in quadrant C will be achieved by:

- Listening and sharing ideas;
- Integrating experience with self;
- Moving and feeling;
- Harmonising with the content and
- Emotional involvement.

One very important fact should be kept in mind. Although the prevailing thinking style preference for the communication pathologist was in quadrant C, the development of skills and key descriptors and work elements (see 3.1) in the other three quadrants is essential for “whole-brain” development (Herrmann 1995). It is therefore important that the person working with and training the diverse population of communication pathologists realises that major transformations in teaching styles are not necessary in order to achieve the desired balance (<http://www.2ncsu.edu/unity/lockers...blder/public/Papers/Secondtier.html>).

The idea is not to teach each student exclusively according to his or her preferences, but rather to strive for a balance of instructional methods (Figure 3). If this balance is achieved, the communication pathology student will be taught partly in a manner he/she prefers (quadrants B, C and D), which leads to an increased comfort level and willingness to learn, and partly in a less preferred manner, which

provides feedback in ways of thinking and solving problems with which he/she may not initially be comfortable, but which he/she will have to use to be a fully effective professional (quadrant A) (<http://www2.ncsu.edu/unity/lockers...felder/public/LearningStyles.html>). Some strategies or additional teaching methods that should be used to compliment all four quadrants are as follows (<http://www.2ncsu.edu/unity/lockers...blder/public/Papers/Secondtier.html>):

- Motivate the presentation of theoretical material with prior presentation of phenomena that the theory will help to explain, and problems that the theory will solve;
- Balance concrete information;
- Make use of sketches, plots, schematics, vector diagrams, computer graphics and physical demonstrations in addition to oral and written explanations and derivations in lectures and readings;
- To illustrate abstract concepts or problem-solving algorithms, use at least some numerical examples to supplement;
- Use physical analogies and demonstrations to illustrate the magnitude of calculated quantities;
- Give some experimental observations before presenting the general principles and have the student see how far he/she can get towards inferring the latter;
- Provide time in class for the students to think about the material being presented and for active participation;
- Encourage or mandate co-operation on homework and
- Demonstrate the logical flow of individual course topics, but also point out connections between the current material and other relevant material in the same course, in other courses in the same discipline, in other disciplines and in everyday experiences.

Through the use of these strategies, expansion of the individual's learning style, according to the preferred thinking style of the individual, is made possible (<http://www.bergen.org/ETTC/courses/LearningStyles/Introduction.html>).