

**THEY ALL LEARN THE SAME.....DON'T THEY?:
AN EVALUATION OF THE LEARNING STYLE PREFERENCES OF THE NZ DAIRY
INDUSTRY**

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Abstract

The New Zealand Dairy industry is committed to developing the knowledge and skills of its farmers by investing time, energy and money into training activities. What is uncertain is how effective this training is in terms of learning. It has been proposed that effectiveness of training is largely determined by the learning styles of the participants relative to that of the trainer. The term "learning styles" refers to an individual's characteristics and preferred way of gathering, organising and thinking about information. An individual's learning style is expressed as either a single preference or, most commonly, multi-modal. In the study reported here, questionnaires to determine their learning styles were delivered to every dairy farmer supplying Fonterra (n=8000). From these data reasonable assumptions can be made as to the most appropriate and effective extension and training materials to promote learning. Results showed definite single mode preferences for read/write (24%) and kinaesthetic (18%) and a lower percentage of multimodal preferences compared with the reference database. Dairy farmers over 35 years of age showed a definite preference for single mode read/write compared to those younger who were predominantly single mode kinaesthetic. There was also a difference between the learning style preferences between sexes, women displaying a single mode preference for read/write and men almost even preferences for read/write and kinaesthetic modes. Of significance are the low scores for aural and visual learning styles as single preferences. However, as discussion groups are still one of the most common extension activities conducted, this may explain why the current modes of delivering training to the dairy sector are apparently falling short of participants' expectations. Three Key Learnings: (1) NZ dairy farmers have a greater proportion of single mode preferences, compared with other populations researched who favour multi-modal learning styles (55-70%). Therefore they have less flexibility in switching modes and will be distracted from learning when information is presented in their less preferred modes. (2) NZ dairy farmers have a stronger preference for Read/write and Kinaesthetic learning styles than for either Aural/oral or Visual learning styles. (3) NZ dairy farmers can be segmented on the basis of their different learning style preferences and gender and/or position in the industry.

Background

The New Zealand Dairy Industry is committed to developing the knowledge and skills of its farmers by investing time, energy and money into training activities. What is uncertain is how effective this training is in terms of cognitive learning and changed attitudes and/or behaviours as a consequence. The industry understands the training needs in terms of skills and knowledge required from an industry perspective, but little is understood about the needs of the participants as learners, to ensure they get maximum benefit from their training.

The effectiveness of training is largely determined by the learning styles of the participants which in turn impacts upon their motivation to learn (Fleming, 2005). Work undertaken Fleming and Bonwell in the late 1980s to understand why some students did not learn with even the best teachers, shows that different people have different learning preferences or learning styles. The term “learning styles” refers to an individual’s characteristics and preferred way of gathering, organising and thinking about information (Davis, 1993, p.185).

Fleming et al (2005) divide learning styles into four types:

1. personality characteristics e.g. introvert vs. extrovert
2. information processing e.g. a holistic vs. sequential approach
3. social interaction – looking at how individuals behave alone or in groups
4. instructional preference – the media used for learning e.g. listening, reading, direct experience.

Rita and Kenneth Dunn (2003) include 21 elements across five “stimuli” in which individuals may differ in their learning. The five stimuli are: Environmental, Emotional, Social, Physiological and Psychological.

- Environmental factors include light, temperature sound and design of the learning environment.
- Emotional stimuli refer to an individual’s different responses to motivation, persistence, responsibility and level of structure of learning activities.
- Social stimuli are the preference for working alone or with others and the interactions for working with two or more people, in addition to the preference for involvement in a variety of tasks whilst learning.
- Physiological factors are perceptual learning, intake of food or drink whilst learning, time of learning and mobility (or the need to move whilst learning).
- Psychological stimuli are concerned with preferences for looking at the big picture of the topic or one aspect at a time and the right brain/left brain differences.

Despite many of these being outside of the trainer’s control, they are all factors that can impinge on learning and are required to be considered at least in the design of learning activities.

Learning styles, as developed by Fleming et al in the late eighties, are concerned primarily with the perceptual aspect of the Dunn’s learning styles. The intake and output of information based on individual choices for different modes of communication are: Visual, Aural, Read/write and Kinaesthetic.

The creation of VARK (visual, aural, read/write, kinaesthetic) has allowed training recipients to understand their preferences for the ways in which they work with information, in addition to creating an awareness of the different styles from a trainer’s perspective. It is based on three principles – everybody can learn regardless of academic ability but each person learns differently; motivation for learning increases where different learning styles are accommodated and that new material is best learned through using different perceptual strengths.

VARK scores can be categorised by either single modes such as visual (V), aural (A) read/write (R) and kinaesthetic (K) or as multi-modal such as KA, AKR, VARK preferences. Single mode preferences are just that – preferences. They do not indicate an inability to learn by any other mode - merely that it is an individual’s preference to learn in that particular mode over the others. It is important to remember that VARK has little to do with leisure activities or strengths – it is primarily concerned with the communication of information in and out where learning is involved.

Individuals with a strong preference for Visual modes (either as single or multimodal preference) will be cued toward symbols, diagrams, artistic pictures, charts and graphs, TV and any videos where the focus is on pictures not dialogue or print. Text should be visually interesting with lots of space, colour and different fonts etc. They may or may not be artistic.

Those with a preference for Aural/oral prefer to learn through discussion, lectures, tapes, email and texting, speeches and talking things over to others and themselves. Some will verbally put an idea 'out there' for discussion without giving it much thought initially.

Individuals with a strong preference for Read/write have a preference for lists, bullet points, handouts, manuals, internet, most PowerPoint presentations and books, so long as the focus is on text, and words not pictures or diagrams. They prefer to have the context provided right at the start so they can work out what is important relative to this.

Kinaesthetic learners prefer experience and practice – simulated or real. The key is that the learning is connected to reality through; case studies, photos, demonstrations examples etc. It is important for them to deconstruct and see how it works before being given the context. They may or may not be practically-minded.

While there are many examples of VARK theory being used in the development and provision of training overseas, there is little evidence to suggest that it is being employed in New Zealand to make a difference to the suitability of training and or presentations for specific audiences. Anecdotal evidence suggests that the current mode of delivery of training packages in the agricultural sector is falling short of participants' learning expectations. Based on the research reported here, testing the learning styles of different agricultural sectors could potentially make a big difference to actual learning and therefore to changes in attitudes and behaviours, if the mode of delivery was designed to meet the predominant learning styles of participants.

Methodology

Approximately 8000 VARK questionnaires were included in Fonterra's monthly magazine (Farmlink) posted to every dairy farm supplying the Cooperative. These were designed to be pulled out and folded up to form a pre-paid envelope for replies. An incentive was offered in the form of petrol vouchers for the first 10 replies and inclusion in a draw for all subsequent replies. Federated Farmers also emailed the questionnaire to all registered dairy farmers on its data base (number unknown) with the author's email address included for replies and correspondence.

All respondents were asked to provide details on the age, gender, size of herd and position in the industry. Email respondents were also asked their location and factory supplied. Locations for postal replies were as per the post-mark.

All valid responses were loaded into a data base for analysis. The results were compared with the VARK database on www.vark_learn.co.nz which has the only reference database for VARK in New Zealand. While the bias is for teachers and students it does represent other professions such as lawyers and has, at the time of printing, a total of 19298 respondents.

Results

A total of 486 responses were loaded into the database. While this only represents 6% of the total questionnaires sent, it is considered by dairy industry people to be good response rate considering the timing of the mail out and the population involved (Glover 2005) The most common response was from males aged 36-55 who were owners of herds of 301-400 cows from

Waikato farms. Only 35% of respondents were female and 5% of the total held positions other than Owner-operator or Sharemilker. Table 1. shows the VARK options chosen by the different segments of the dairy industry and Table 2 shows a comparison between the dairy industry data and the reference group for individual VARK preferences.

Table 1. NZ Dairy Industry. Proportions in each VARK option.

	n=	VARK Options				100.0
		V	A	R	K	
Overall	48	18.3	22.2	30.3	29.2	100.0
	6	%	%	%	%	%
Herd Size						
	10	18.2	21.9	33.5	26.4	100.0
1-200	8	%	%	%	%	%
	17	18.3	22.8	28.8	30.2	100.0
201-400	8	%	%	%	%	%
	12	17.9	21.6	30.5	30.0	100.0
401+	7	%	%	%	%	%
		20.0	22.4	27.6	30.0	100.0
Multiple	47	%	%	%	%	%
Factory						
	47	18.1	22.2	30.3	29.4	100.0
Fonterra	1	%	%	%	%	%
Sex						
	17	18.9	21.9	31.7	27.6	100.0
Female	1	%	%	%	%	%
	29	17.9	22.4	29.5	30.1	100.0
Male	5	%	%	%	%	%
Age						
		25.3	25.9	16.5	32.4	100.0
18-25	12	%	%	%	%	%
		18.4	22.9	25.9	32.7	100.0
26-35	74	%	%	%	%	%
	14	19.1	23.9	28.8	28.2	100.0
36-45	6	%	%	%	%	%
	13	18.8	20.3	30.9	30.0	100.0
46-55	9	%	%	%	%	%
		15.3	21.2	36.8	26.7	100.0
56+	98	%	%	%	%	%
Position						
Contractor	8	19.6	26.4	25.0	29.1	100.0

		%	%	%	%	%
		18.1	22.5	31.3	28.0	100.0
Manager	12	%	%	%	%	%
	32	18.0	21.3	31.7	29.0	100.0
Owner	5	%	%	%	%	%
	10	18.8	24.5	26.5	30.2	100.0
Sharemilker	7	%	%	%	%	%
		25.0	20.0	27.0	28.0	100.0
Other	6	%	%	%	%	%
		17.3	22.3	30.7	29.7	100.0
Blank	28	%	%	%	%	%

The relative preferences for both single and multi-modes as chosen by all respondents in this study are shown in Figure 1. Figure 2 shows the preferences for both single and multi-modes as chosen by the reference database¹. This comparison highlights significant differences between the two in the percentages of multi-modal to single-mode preferences chosen (50% vs. 57%²) and in the types of modes chosen as single-mode preferences. These results indicate that dairy farmers have significantly more ‘A- and R-ness’ than the reference group, and less ‘K- and V-ness’ as seen in Table 2. Dairy farmers also show lower rates of having a combination of all four learning modes - VARK preferences than the comparison population.

Table 2. Dairy Industry vs. Reference Group for Individual VARK Preferences.

	V	A	R	K
Dairy Industry	1%	7%	24%	18%
Reference Group	3%	3%	15%	22%

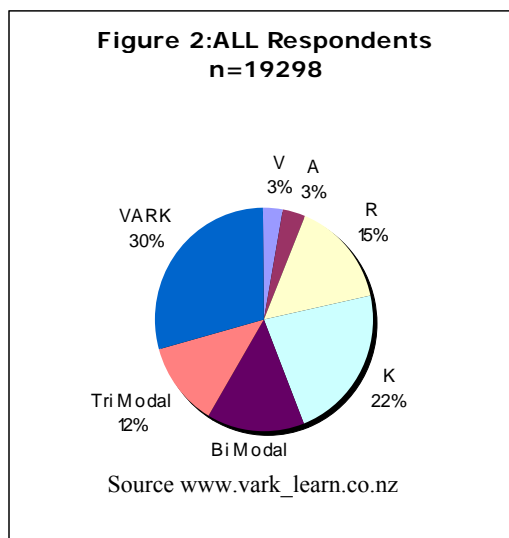
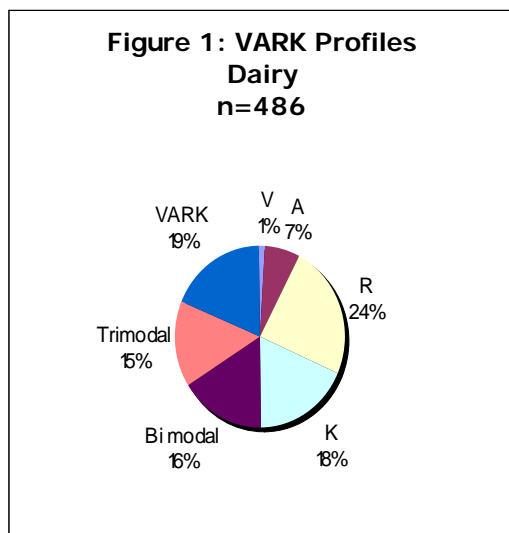
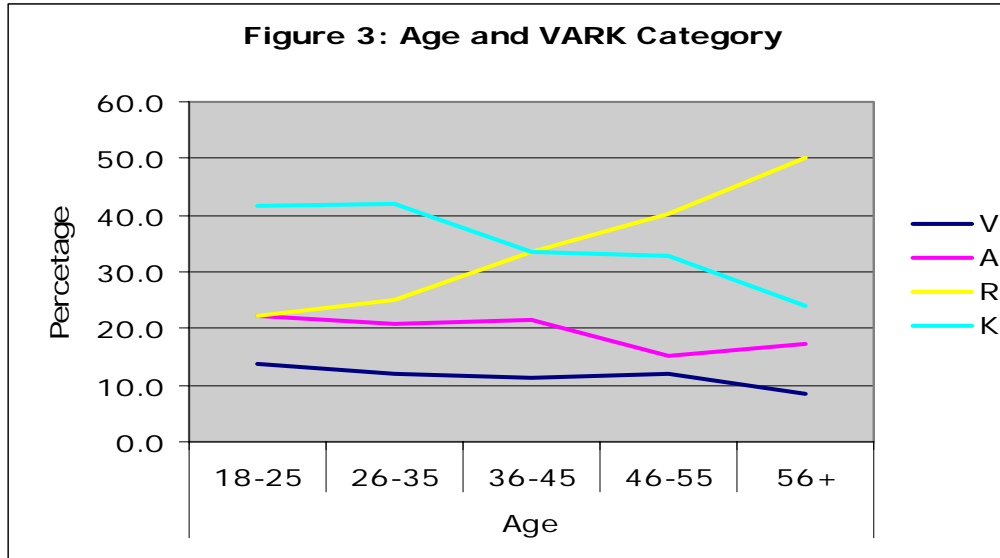
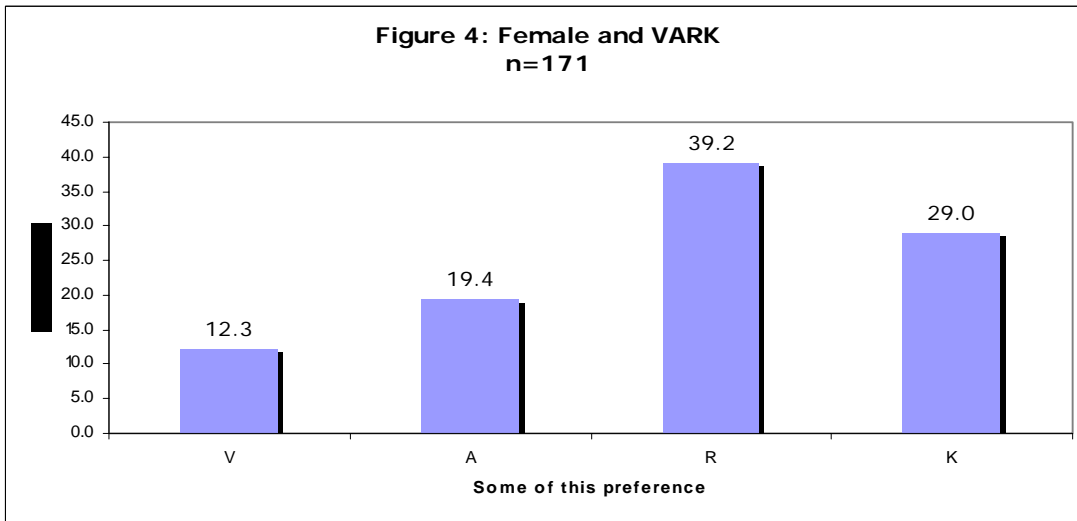
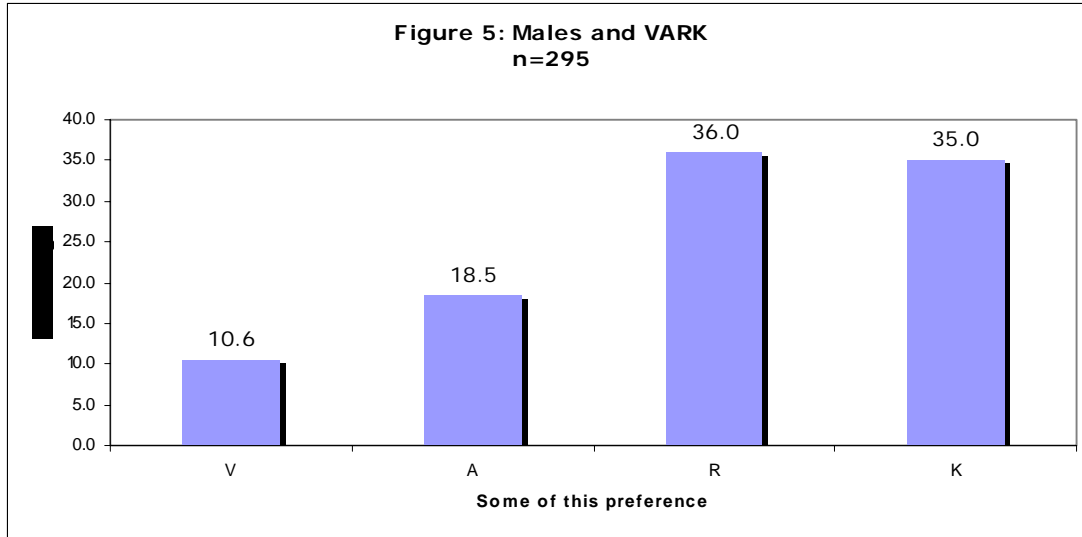


Figure 3 shows the relationship between age and VARK for all respondents in this study. This switch between Kinesthetic and Read/Write in the mid-thirties is consistent with the reference data base.

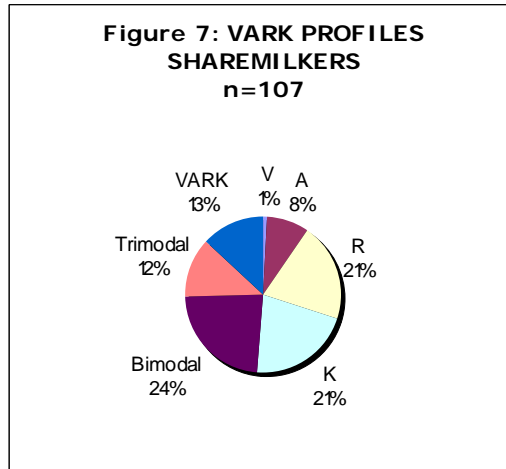
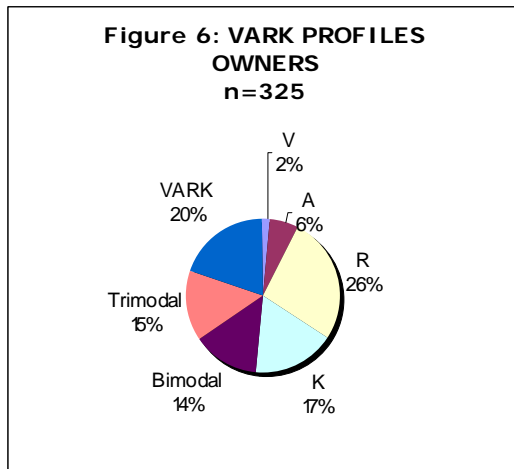


Figures 4 and 5 show the difference between preferences chosen by men and women with the main difference being that women have a higher preference for Read/write and less “K-ness” than men.





Sharemilkers and owner/operators as groups have different VARK profiles as seen in Figures 6 and 7 where Sharemilkers have more preferences for A and K than Owners. Both have predominance for single mode Read/write and K preferences.



The results of this study can be summarised as:

1. 24% of all participants had a single mode preference for Read/Write (R)
18% of all participants had a single mode preference for Kinaesthetic (K)
7 % of all participants had a single mode preference for Aural (A)
1% of all participants had a single mode preference for Visual (V)
2. 50.6% of participants had a multimodal preference, compared with the comparison group which had 55-70%
3. 39% of women have some R in their profiles; 30% have some K
36% of men have some R in their profiles; 35% have some K
4. As groups, Sharemilkers and Owners have different profiles
5. Dairy farmers show different VARK profiles when analysed by age, gender or position (sharemilker or owner)
6. Read/write and Kinaesthetic are the most popular mode in either multi-modal or single preference.

Discussion

New Zealand dairy farmers have a greater proportion of single mode preferences compared with the comparison group. A likely consequence is decreased effectiveness of learning for these individuals, to switch and learn from information presented in a different mode to that which they prefer. This decrease is likely to be caused by the increase in effort or discipline required by learners to concentrate and or be motivated when material is presented in a style not of their preference. There is greater pressure (for trainers) therefore to present information in a style that is congruent with their preferences, to motivate and encourage learning and prevent the confusion that can occur when attempting to learn in a least preferred mode.

As approximately 42% of dairy farmers have a single mode preference for either Read/write or Kinaesthetic, the challenge to extension and trainers is for all information to be presented in *both* of these modes to ensure that the correct message has been received. Presenting information in all four modes deliberately³ can have the effect of confusing learners who have strong single preferences or who are not strongly multi-modal (Fleming 2005). In addition to the consideration made towards appropriate presentation styles, allowances should be made for the mode(s) in which information is to be relayed back. Learners should be given a choice of ways in which they can check their knowledge and understanding which are consistent with their preferred modes.

It would seem that one of the challenges for those preparing learning or extension material for all learners, especially those with strong R-preferences, is to ensure that the language used is appropriate relative to the intended recipients' reading age. In New Zealand, the average reading age is considered to be 12-13 years (Cook, 2005).

The differences between male and female learning preferences appears to revolve around the gap between Read/write and Kinaesthetic preferences for females which could prove to be significant in terms of learning outcomes if managed appropriately. In other words, a female dominant group is more likely to respond to learning material presented in a R-mode than if it were presented in a strongly kinaesthetic manner. Males appear to have similar preferences for both R and K modes.

That sharemilkers and farm owners; males and females have different learning preferences suggests there is a basis for segmentation as groups. But it must be remembered that

groups consist of many individuals and therefore the only safe assumptions that can be made are that sharemilkers have a greater preference for Kinaesthetic and Aural learning techniques when compared with owner/operators who are significantly more Read/write. Males and females differ on their 'R' and 'K' preferences in that 5% of females are less likely to learn kinaesthetically than their male counterparts who are 4% less likely to learn via Read/write methods. While these differences provide enough scope for the targeted segmentation of groups for learning or communication, so too could the means in which an invitation to participate were to be extended. For example, using a case study as the basis of an invitation with an offer to discuss the information is more likely to appeal to sharemilkers than a densely worded written invitation promising or providing scientific references for the information.

Agri-media, knowingly or not, differentiate themselves with respect to the emphasis placed on the different modes of VARK. The relative success of the Dairy Exporter could perhaps be explained by its mostly kinaesthetic presentation. The focus is on case studies of farmers and science in practical application and it makes great use of photos which is kinaesthetic. There is very little in the main body of the magazine that is strictly read/write or visual. Comparing the preferred industry magazines with the preferred mode of learning of two NZ dairy farmers showed a direct relationship between the two, which is what would be expected.

As a profession, New Zealand dairy farmers appear to have a greater preference for Read/write than others recorded by Fleming (Pers.Com 2005). This is seemingly at odds with the low level of literacy that is thought to exist within the New Zealand dairy farming population. Fleming (2005) opines that this could be explained by the transition from Kinaesthetic to Read/write that can occur with age. Quite simply, being a kinaesthetic learner i.e. having to learn by experience can be expensive in terms of time and money. In addition as people age they build up a wealth of information based on experiences which can be drawn upon as required for learning purposes.

In terms of the relationship between VARK and extension and communication there is a clear message. As a group of learners, NZ dairy farmers will have increased motivation for and understanding of the message when it is presented both in read/write and kinaesthetic format. In an ideal world, prior to any training or extension event, the intended participants could be required to complete a VARK questionnaire and the material prepared accordingly. This would require a multi talented and flexible team who can prepare, deliver and receive information in all four modes as required. This may not be practical or pragmatic given the relatively low numbers of V and A preferences. This is not to say that they should be forgotten altogether – just kept in context of who the target audience is, what the information is, and how it is going to be presented.

Armed with this knowledge, the NZ dairy industry should now review all its extension, training and communication policies (including conferences) with respect to its relevance to the desired target audience. More work is required to capture the VARK preferences of other segments of the dairy industry - contractors, managers and staff. Considering the challenges facing the labour market and recent criticisms⁴ of regional training courses this should be undertaken as soon as possible before the credibility of industry-based learning is further challenged.

This leads to the recommendation that based on the results of this study the surest option to communicate with dairy farmers as a group is in R and K modes – the predominance depends on which is the target segment; owner-operators or sharemilkers. However, more work is

required to build a larger database of VARK preferences for dairy farmers in their various segments to test the validity of this study.

Three Key Learnings:

- NZ dairy farmers have a greater proportion of single mode preferences, compared with other populations researched who favour multi-modal learning styles (55-70%). Therefore they have less flexibility in switching modes and will be distracted from learning when information is presented in their less preferred modes.
- NZ dairy farmers have a stronger preference for Read/write and Kinaesthetic learning styles than for either Aural/oral or Visual learning styles.
- NZ dairy farmers can be segmented on the basis of their different learning style preferences and gender and/or position in the industry

¹ Comprising predominantly students and teachers; courtesy of Neil Fleming.

² Range is 55-70%, based on work by Fleming et al

³ It is virtually impossible to present in one mode only

⁴The New Zealand Farmers Weekly Vol 3 No 41

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